

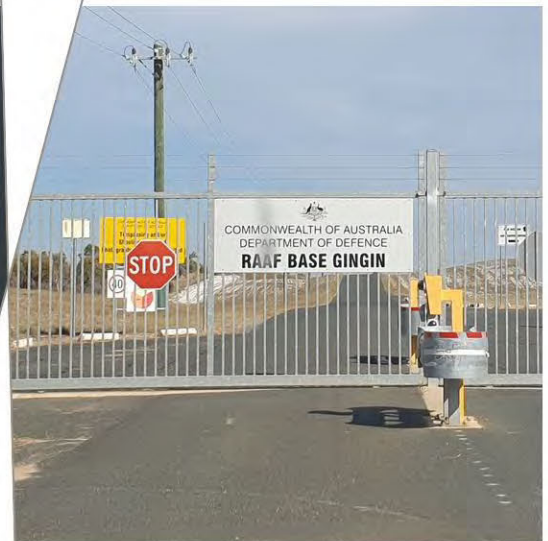
Ongoing Monitoring Report (September 2022 – August 2023)

Gingin Satellite Airfield

304700525

Prepared for
Department of Defence

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 **Cardno**

now

 **Stantec**

Contact Information

Stantec Australia Pty Ltd

Cardno, now Stantec

ABN 17 007 820 322

GF, 226 Adelaide Terrace

Perth WA 6000

Australia

www.stantec.com

Phone +61 8 6222 7000

Fax +61 8 9486 8664

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Executive Summary

Introduction

Cardno, now Stantec (“Cardno”), were engaged by the Australian Department of Defence (“Defence”) to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP)¹ at the Royal Australian Air Force (RAAF) Gingin Satellite Airfield, Western Australia (WA) (Figure 1, Appendix A).

The OMP developed as part of the PFAS Management Area Plan (PMAP)² outlines the rationale and scope for the monitoring of the concentrations and extent of PFAS in groundwater and tap water originating from the RAAF Gingin Satellite Airfield, WA (‘the site’). The PMAP was designed to manage potential risks to receptors (for example, to people or the environment) associated with Defence’s historical use of legacy aqueous film forming foam (AFFF).

Four primary sources of PFAS were identified on-site during a Detailed Site Investigation (DSI)³ in 2018 (Jacobs, 2018c): Former Fuel Farm, Firehouse & Refuelling Area, Powerhouse, and Eastern Leach Field (Figure 2, Appendix A). These source areas have been monitored through the OMP since 2019.

The Monitoring Area comprises both on-site and off-site areas. The on-site area is also identified as the Management Area (Defence 2018b), as shown in Figure 1 in Appendix A. The off-site area incorporates the Yeal Swamp Nature Reserve to the south, north and west. Risks from PFAS contamination within the off-site area are considered low and are not actively managed.

Objectives

The objective of the ongoing monitoring program is to assess changes in the nature and extent of PFAS within the Monitoring Area. The OMP used the monitoring network developed as part of the PMAP to monitor the PFAS concentrations in groundwater in and around site.

Monitoring Scope

The September 2022 – August 2023 monitoring period (‘monitoring period’) comprised four monitoring events conducted in accordance with the Sampling and Analysis Quality Plan (SAQP, Cardno 2023), provided in Appendix B. Deviations from the SAQP are summarised within Section 3.4 of this report. Scope of works involved biannual monitoring of groundwater within the Monitoring Area in September 2022 (post-winter) and April 2023 (post-summer), which allows samples to be taken during different seasonal conditions to provide a better understanding of the movement and concentrations of PFAS in the environment.

In addition, sampling of water from on-site taps and abstraction bores, and off-site groundwater monitoring wells was also conducted on a quarterly basis, in September 2022, January 2023, April 2023 and July 2023.

¹ The OMP is publicly available at <https://www.defence.gov.au/about/locations-property/pfas/pfas-management-sites/gingin-satellite-airfield>, and is found as Attachment 1 of the PMAP

² Defence, 2018b, [Gingin Satellite Airfield – PFAS Management Area Plan](#)

³ Publicly available at <https://www.defence.gov.au/about/locations-property/pfas/pfas-management-sites/gingin-satellite-airfield>

Groundwater Results

Groundwater Flow Direction

The local groundwater beneath the site flows to the west-south-west, with a component of the groundwater at the southern portion of the site flowing south. This is a slight deviation to the regional groundwater which flows west, towards the Yeal Swamp Nature Reserve. Local groundwater elevations and flow direction recorded during the monitoring period were consistent with historical records. Information from historical PFAS monitoring can be found in the previous monitoring reports (Cardno, 2021-2024) and DSI (Jacobs 2018c).

PFAS Concentrations in Groundwater

PFAS concentrations in groundwater remained within the same order of magnitude as historical data.

As identified during the DSI (Jacobs, 2018c), localised areas of PFAS contamination are present across the site that slowly moves with the groundwater away from the source areas (Figure 2, Appendix A).

What is a 'limit of reporting'?

The limit of reporting (LOR) is the lowest concentration level that the laboratory is able to measure in a sample with a reasonable degree of certainty. Where monitoring shows <LOR, it means that if PFAS is present in the sample it is too low for the laboratory to measure with any degree of certainty.

The Sum of Perfluorooctane Sulfonate (PFOS) and Perfluorohexane Sulphonate (PFHxS) ("PFOS+PFHxS") concentrations in groundwater during the monitoring period ranged from below the laboratory limit of reporting (LOR) (0.01 µg/L) to a maximum of 139 µg/L recorded at MW310 within the Powerhouse. The Heads of EPA's (HEPA) (2020) PFAS National Environmental Management Plan (NEMP) Human Health Drinking Water criteria of 0.07 µg/L for PFOS+PFHxS and 0.56 µg/L for Perfluoro-octanoic Acid (PFOA) were exceeded at monitoring wells positioned in the immediate vicinity of the source areas. Most of these wells also exceeded the HEPA (2020) recreational use criteria of 2.0 µg/L for PFOS+PFHxS.

PFAS monitoring results for the off-site production bores (Pinjar bores P140 & P145) were provided by the Water Corporation for the monitoring period and reviewed with the OMP results. Results were below the laboratory LOR for Perfluoro-octanoic Acid (PFOA) and PFOS+PFHxS. OMP monitoring well MW403, located halfway between the Management Area boundary and the two Water Corporation production bores also reported results below the laboratory LOR which is consistent with historical monitoring data.

To determine the stability and extent of PFAS in groundwater, statistical analysis was undertaken within the Monitoring Area. The statistical analysis showed that PFAS is mostly stable with localised instances of decreasing and increasing concentration trends within the Management Area. Overall, the groundwater monitoring results obtained during the monitoring period were consistent with historical data and do not suggest a change in the understanding of PFAS contamination within the Management Area.

PFAS Concentrations in Tap Water

An abstraction bore located on-site is used to provide the site water supply. Historically, the abstraction bore and connected tap water supply had been impacted by PFAS in groundwater and are therefore monitored as part of the ongoing monitoring program. During the monitoring period, all tap water PFOS+PFHxS results were above the drinking water criteria, but below the recreational use criteria. PFAS concentrations in tap water remained within the historical range collected at the tap sampling locations. No clear trends or stable trends in PFAS concentrations were identified from the statistical analysis. As a result, there is no change in the understanding of the PFAS concentrations at these sampling locations.

What is an 'order of magnitude'?

This refers to something decreasing or increasing by multiples of ten. For instance, an increase from 10 to 100 is an order of magnitude increase. When assessing changes in PFAS concentrations at an individual location, all concentrations are considered when determining trends, but order of magnitude changes are discussed separately as they represent a significant change in concentrations from what was reported in the previous event. If a change is close to established health or environmental criteria, it will also be considered significant.

Risk Summary

A review of the PFAS sources, transport pathways and receptors presented in the PMAP has been undertaken with the data obtained during the monitoring period. No new sources of PFAS contamination, transport pathways or potential receptors were identified. The on-site taps have “not for drinking water use” signage to prevent the use of groundwater as drinking water. This management measure should remain in place to prevent potential risk to human health.

No detection of PFAS was recorded at the groundwater monitoring well (MW403) located halfway between the site and the Water Corporation production bores (Pinjar bores P140 & P145).

Potential off-site PFAS movement with groundwater flow to the southwest has been identified with boundary well MW136D displaying increasing trends and inner perimeter well MW122S reporting new concentration maximums. There were no off-site monitoring wells sampled during the monitoring period to the west/southwest of the site to confirm the extent of PFAS within this area. MW141S located off-site south of the Management Area has recorded decreasing concentrations since April 2022. The concentrations detected at MW136D and MW141S were less than an order of magnitude above the LOR, therefore the risk is considered to be unchanged from the previous assessments, however, further investigation off-site will be considered.

Based on the data collected from the previous monitoring events and the current monitoring period, there is no change to the overall risk profile of the Management Area or the Monitoring Area. The risk profile remains low and acceptable.

Conclusions

The September 2022 – August 2023 monitoring results met the objective of the OMP and work was carried out in accordance with the SAQP.

Overall, the concentrations of PFAS in groundwater and tap water at on-site locations across the Management Area have remained consistent with historical data. The results of the statistical analysis indicate that PFAS concentrations generally display a stable or no clear trend. There are exceptions at some monitoring wells that are showing ‘increasing’ or ‘probably increasing’ trends from within the Former Fuel Farm, and others that are ‘decreasing’ or ‘probably decreasing’ within the Fire House and Refuelling Area, and the water supply infrastructure (secondary source area). These trends indicate that while PFAS concentrations are for the most part stable, the highest PFAS concentrations in groundwater remain within the source areas, consistent with previous monitoring periods.

PFAS concentrations across the tap water network on-site generally displayed a stable or no clear trend. On-site abstraction bores, understood to be connected to the site’s water tanks and tap network, will continue to be monitored for PFAS as part of the ongoing monitoring program.

The nature and extent of PFAS in groundwater has not changed from the understanding presented in the 2022 Ongoing Monitoring Report (OMR, Cardno 2024) and the PMAP (Defence, 2018b). Based on the current available data there is no change to the risk profile of the Monitoring Area.

The OMP is currently being reviewed with consideration of the OMP data collected to date to ensure that the ongoing monitoring program continues to appropriately monitor the PFAS extent in and around site.

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Technical Terms & Abbreviations

AFFF	Aqueous Film Forming Foam
ANZECC	Australian and New Zealand Environment and Conservation Council
AS	Australian Standard
ASS	Acid Sulphate Soil
AST	Above ground Storage Tank
BoM	Bureau of Meteorology
CF	Confidence Factor
CoV	Coefficient of Variation
CSM	Conceptual Site Model
DoH	Department of Health
DPaW	Department of Parks and Wildlife
DPLH	Department of Planning, Lands and Heritage
DSI	Detailed Site Investigation
DWER	Department of Water and Environmental Regulation
EC	Electrical Conductivity
EPA	Environment Protection Authority
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
GDE	Groundwater Dependent Ecosystem
HEPA	Heads of Environmental Protection Authority
IWSS	Integrated Water Supply Scheme
LGA	Local Government Authority
LOR	Limit of Reporting
NEPC	National Environment Protection Council
NEMP	National Environmental Management Plan
NEPM	National Environmental Protection Measure
QA	Quality Assurance
QC	Quality Control
RAP	Remedial Action Plan
SAQP	Sampling and Analysis Quality Plan
SMP	Site Management Plan
SRV	Site Remediation and Validation
SWL	Standing Water Level
TOC	Top of Casing
UWPCA	Underground Water Pollution Control Area

Units

ha	Hectares
kL	Kilo Litre (i.e. 1000 Litres)
mAHD	Metres relative to the Australian Height Datum
mBGL	Metres Below Ground Level
mbTOC	Metres below Top of Casing
mg/kg	Milligram per Kilogram (approximately equivalent to ppm)
mg/L	Milligram per Litre
mV	Millivolt
µg/L	Microgram per Litre
µS/cm	Micro Siemens per Centimetre (Electrical Conductivity - Water)

Chemical Names

DO	Dissolved Oxygen
EC	Electrical Conductivity
ORP	Oxidation-Reduction Potential
PFAS	Per- and Poly-fluoroalkyl Substances
PFHxS	Perfluorohexane Sulphonate
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate

Site Specific

OMR	Ongoing Monitoring Report
OMP	Ongoing Monitoring Plan
PMAP	PFAS Management Area Plan
RAAF	Royal Australian Air Force

1 Introduction

The Australian Department of Defence ('Defence') engaged Cardno, now Stantec (Cardno), to undertake the implementation of the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) at Royal Australian Air Force (RAAF) Gingin Satellite Airfield ('the site'). The site is located in Gingin, Western Australia (WA) and is displayed in Figure 1, Appendix A.

1.1 Background

The site is located on Commonwealth Land and is regulated under Commonwealth environmental legislation. The OMP outlines the rationale and scope for the monitoring of the concentrations and extent of PFAS in groundwater originating from the site.

The OMP includes sampling and analysis, not only from the site (Management Area), but also from several surrounding (off-site) groundwater monitoring wells (Monitoring Area). The Management Area is defined in the PFAS Management Area Plan (PMAP, Defence, 2018b) as the area for which active management of risks relating to PFAS contamination are required. The Monitoring Area is defined as the area where risks relating to PFAS contamination are currently considered to be acceptably low and therefore active management of these risks is not considered necessary.

For the purposes of this report:

- > The Management Area was defined as the site (Figure 2, Appendix A).
- > The Monitoring Area was defined as comprising the site, plus the parcel of Crown Land that represents the Yeal Swamp Nature Reserve – an area that surrounds much of the southern, western and northern extent of the site. The lateral extents of the Monitoring Area are aligned with the boundary of the adjoining Crown Lands property (Figure 1, Appendix A).

1.2 Purpose & Objectives

The specific objectives of the monitoring specified in the OMP (Defence, 2018a) is to:

- > Evaluate the nature and extent (geographically and over time) of PFAS in groundwater and tap water associated with the site sources of PFAS derived from historical use of Aqueous Film-Forming Foam (AFFF).
- > Monitor the migration of PFAS in groundwater from the site;
- > Provide confirmation of the current understanding of risk; and
- > Provide supporting data for assessment of management actions, where relevant.

The purposes of the Ongoing Monitoring Report (OMR) are to:

- > Inform Defence and key stakeholders of PFAS trends in groundwater and tap water.
- > Assess any variations in the distribution of PFAS for the site and how this changes the understanding of the conceptual site model and risk profile.

1.3 Scope of Work

The ongoing monitoring program was carried out in accordance with the scope and limitations presented in the Sampling and Analysis Quality Plan (SAQP), Appendix B:

- > Cardno, 24 August 2023, PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Gingin Satellite Airfield. Rev.10

The SAQP was reviewed prior to each monitoring event and amended if required.

The ongoing monitoring program included the following main components:

- > Biannual monitoring (gauging and sampling) of all on-site groundwater monitoring wells.
- > Sampling from on-site taps and abstraction bores on a quarterly basis.
- > Monitoring of selected off-site groundwater monitoring wells and abstraction bores on a quarterly basis, specifically:
 - Two Water Corporation production bores (Pinjar Production Bore P145 and P140)⁴; and
 - Four shallow groundwater monitoring wells located between the Water Corporation bores and the site boundary.

Biannual sampling was undertaken post-winter (September 2022), and post-summer (April 2023) with additional quarterly events in January 2023 and July 2023.

1.4 Standards of Assessment and Limitations

This OMR has been prepared in accordance with the current industry standards for an assessment of this type for the purpose, objectives and scope identified in this report.

This report is not any of the following:

- > A Mandatory Audit Report (MAR) or Voluntary Audit Report (VAR) as defined under the *Contaminated Sites Act 2003* (CS Act).
- > A Geotechnical Assessment.
- > A Detailed Site Investigation (DSI).
- > A Detailed Hydrogeological Assessment.
- > A Remediation Action Plan (RAP) or Site Remediation and Validation (SRV) report.
- > A Site Management Plan (SMP).

⁴ Sampled by the Water Corporation and results provided to the Department of Defence.

2 Site Setting

The site is located approximately 55 km north of Perth within the suburb of Yeal and approximately 15 km southwest of Gingin town centre and covers an area of approximately 706 hectares (ha).

The site has operated as a Satellite Airfield since the mid-1960s and is used by the RAAF and visiting allied forces to support flying training. The RAAF operations include firefighting services, there is a Fire House located on-site which includes a fire response vehicle. The majority of the buildings and associated infrastructure and support services include:

- > Powerhouse and associated transformers and fuel infrastructure.
- > Pump house and associated water supply infrastructure.
- > Former fuel farm compound (decommissioned).
- > Fire house and adjoining vehicle refuelling area.
- > Vehicle wash down bay.
- > Runway, taxiways and air traffic control tower:
- > Aircraft hangers.
- > Administration and change rooms / crew huts (for pilots).
- > Caretaker's accommodation.
- > Asset services yard compound.
- > Buildings formerly used by Pearce Flying Club (vacated).
- > Radio tower and associated buildings.

2.1 Site Definition and Planning

The site location is presented in Figure 1, Appendix A. Key site identification details are presented in Table 2-1.

Table 2-1 Site Identification Details

Details	Description
Site Address	1 Airfield Road, Yeal, WA, 6503
Land Description	RAAF Satellite Airfield
Owner	Commonwealth of Australia
Title Details	Lot 1 on Deposited plan 49337 / Certificate of Title 192/157A
Planning Zone/Land use	Public Purposes – Government Services
Local Government Authority (LGA)	Shire of Gingin and City of Wanneroo

Source: Department of Defence, 2018a, Gingin Satellite Airfield PFAS Ongoing Monitoring Plan.

2.2 Surrounding Land Uses and Zoning

The surrounding land uses are outlined in Table 2-2.

Table 2-2 Surrounding Land Uses

Direction	Land Use
North	Yeal Swamp Nature Reserve (including ephemeral wetlands)
East	<ul style="list-style-type: none"> Duffy Road Strawberry farms Hobby farm Broiler farms
South	Yeal Swamp Nature Reserve
West	Yeal Swamp Nature Reserve
Other	The Site is located within the boundary of the Gngangara Underground Water Pollution Control Area (UWPCA).

2.3 Environmental Setting

Key details defining the site are summarised in Table 2-3.

Table 2-3 Key Site Details

Setting	Description
Climate	<p>The area has a Mediterranean climate with hot dry summers and cool, wet winters. The records held by the Bureau of Meteorology (BoM) for Gingin Aero station #9178, indicate that the highest volume of rainfall typically occurs during the month of July with a mean monthly rainfall amount of 126.0 mm (BoM, 2024). The mean annual rainfall is recorded as 611.1 mm.</p> <p>January is the hottest month of the year with a mean temperature of 33.3°C. By contrast, winters are cool with July mean temperatures being 18.4°C.</p>
Topography	<p>The topography across the site undulates and generally grades from west to east, however, the landform occupied by the Airfield has been substantially modified, regraded and levelled to accommodate the runway, infrastructure and buildings. Ground elevation generally ranges between approximately 75 – 80 metres relative to the Australian Height Datum (mAHD), with the runway at 75 mAHD.</p>
Geology	<p>Regional Geology</p> <p>The site is located on the Swan Coastal Plain, which extends up to 36 km wide and is bounded by the Darling Fault and associated Darling Scarp to the east and the Indian Ocean to the west. The Bassendean Dune System lies beneath the site, which generally consists of calcareous sand with quartz sand. The sands inter-finger with the Guildford Clay to the east and overlies the Gngangara Sand. To the west, the sands are overlain by the Tamala Limestone.</p> <p>Site Specific Geology</p> <p>Soil logging was completed during the DSI undertaken by Jacobs in 2018 (Jacobs, 2018c). The core recovery showed the superficial aquifer to be primarily characterised as a fine to coarse grained sand or silty sand to the maximum depth of investigation being 56 m below ground level (mBGL).</p> <p>Multiple sandy silt units were identified during drilling, from approximately 9-10 mBGL, 14-16 mBGL, and 20-21 mBGL. The layers were of various thicknesses, ranging from 0.1 to 2.0 m thick, and locally discontinuous. These silts may act as local or partially confining layers.</p>
Acid Sulfate Soil	<p>A review of the Acid Sulphate Soils (ASS) risk mapping, available on the National Map online database indicates that the majority of the area encompassing the site is classified as having a low to moderate known ASS risk within 3.0 m of soil surface but high to moderate risk beyond 3.0 m of soil surface. There was one area in the northern portion of the site, and multiple surrounding areas that had identified a high to moderate risk of ASS occurring within 3.0 m of the natural soil surface (DWER, 2019).</p>

Setting	Description
Hydrology	<p>There are no permanent surface water features located at the site. The closest water bodies to the site include:</p> <ul style="list-style-type: none"> ▪ Lake Bambun – approximately 3.0 km northeast, up hydraulic gradient. ▪ Bindiar Lake – approximately 7.2 km to the west, down hydraulic gradient. ▪ Lake Mungala – approximately 2.2 km to the northeast, up hydraulic gradient. ▪ Lake Nambung – approximately 2.2 km to the northeast, up hydraulic gradient. ▪ Gregadoo Creek – approximately 4.0 km to the northeast, up hydraulic gradient. <p>East of the site is a dampland classified for conservation purposes (Jacobs, 2018d). Stormwater drainage from the site is conveyed towards the dampland via artificial channels. However, due to the sandy surface soil conditions, water readily infiltrates during rainfall events where off-site migration of stormwater occurrences are rare.</p>
Hydrogeology	<p>Regional Hydrogeology</p> <p>The site is located on the Gngangara groundwater system, which covers approximately 2,200 km² along the coastal plain north of the Swan River to Gingin and east to the Darling Scarp. It comprises four main aquifers that are of relevance to the site:</p> <ul style="list-style-type: none"> ▪ The shallow, unconfined superficial aquifer (the Gngangara Mound). ▪ The semi-confined Mirrabooka aquifer. ▪ The deep, mostly confined Leederville aquifer; and ▪ The deepest, mostly confined Yarragadee aquifer. <p>Groundwater Use</p> <ul style="list-style-type: none"> ▪ The Gngangara groundwater system is a crucial part of Perth's public water supply, but similarly supplies water for public open spaces, local agriculture and gardens (DWER, 2018). It also supports nationally significant groundwater-dependent ecosystems (GDEs), such as wetlands and Banksia woodlands. ▪ There are two abstraction bores located on the site: <ul style="list-style-type: none"> - Abstraction Bore 1 is located adjacent to the former Caretaker's House. This bore is understood to intersect the Leederville aquifer. Since 2010 the bore has been active and now supplies two large water tanks (each 144 kL) which are used to supply a network of fire hydrants across the site (non-potable use). - Abstraction Bore 2 is located within the Pump House compound and is understood to intersect the superficial aquifer. Groundwater from Abstraction Bore 2 is extracted for non-potable use at the site (including bathing, laundry, general site water supply, vehicle / equipment washdown and irrigation) as water quality is above drinking water guidelines and below recreational guidelines. Water from this bore is treated by a reverse osmosis unit and chlorine and more recently with a granular activated carbon filtration system following an upgrade of the water supply system. ▪ The site is situated within the boundary of the Gngangara UWPCA, the central area of the Gngangara groundwater system that provides public drinking water supply, as part of the Integrated Water Supply Scheme (IWSS). The Gngangara UWPCA covers an area of nearly 815 km² within the cities of Wanneroo, Swan and Stirling, and the shires of Gingin and Chittering (Water Corporation, 2007). ▪ The Water Corporation extract water from many bores for the Perth IWSS. The closest to site include: <ul style="list-style-type: none"> - Pinjar production bore P140 (reference code 61618216) located 7.3 km south-southwest of the site boundary. This bore is screened from 53 – 70 mBGL which is inferred to be in the superficial aquifer. - Pinjar production bore P145 (reference code 61615123) located 7.3 km south-southwest of the site boundary. This bore is screened from 111 – 183 mBGL which is inferred to be in the Leederville aquifer. <p>Groundwater Elevation</p> <p>During the post-summer sampling event, groundwater elevations were recorded between 52.337 mAHD (MW403) and 66.29 mAHD (MW114S). This was slightly deeper than during the post-winter sampling event.</p> <p>Groundwater Flow</p> <p>The regional groundwater flow direction is expected to be predominantly towards the west. However, based on information collected during the post-summer and post-winter events the inferred groundwater flow direction was interpreted as to the west-south-westerly, with a component of groundwater flowing to the south observed in the southern portion of the site as displayed in Figures 4A, 4B, 5A and 5B, Appendix A.</p>

Setting	Description
Environmental Sensitive Areas	<ul style="list-style-type: none"> The Yeal Swamp Nature Reserve and Gnangara-Moore River State Forest to the north, south and west of the site are classified as protected areas. In addition, there are a number of smaller protection areas to the east of the site including the Timaru Nature Reserve, Breera Road Nature Reserve and Chandala Nature Reserve. Chandala Swamp is located approximately 7.0 km to the east of the site, at its closet point. There is a regional forest agreement approximately 15 km to the east of the site. <p>The DSI (Jacobs, 2018c) did not identify a potential exposure risk to off-site ecological receptors.</p>
Further information can be found in the DSI report (Jacobs, 2018c) and previous ongoing monitoring reports (Cardno, 2021-2024).	

2.4 Source Areas

The primary PFAS source areas identified in the DSI (refer to Figure 2, Appendix A) include the following:

- > SA01 – The Former Fuel Farm together with a firefighting deluge system, the Former Fuel Farm was located at the east of the main buildings. Previous reports indicated that PFAS contamination found could have resulted from periodic testing and maintenance of this system.
- > SA02 – The Firehouse and Refuelling Area located at the south of the taxiway. The Refuelling Area consisted of three above ground storage tanks (ASTs) connected to a series of fuel pumps. The Firehouse was formerly used to store legacy AFFF and conduct maintenance of firefighting equipment. Indications of high PFAS presence in these areas' soils and groundwater could have been due to a combination of firefighting equipment testing and maintenance activities.
- > SA03 – The Powerhouse is located to the east of the Firehouse and Refuelling Area. Although no records of AFFF use were reported around this building, elevated concentrations of PFAS were reported in soil and groundwater.
- > SA04 – The Eastern Leach Field located at the south of the Firehouse. Wastewater contamination was found in this area from the sewerage system where water is disposed via an infiltration system. It is understood that PFAS contamination resulted from the historic use of this area for the testing of firefighting equipment, which involved the release of AFFF.

Potential secondary sources of PFAS were also identified, these include:

- > Pump House, Abstraction bore 2 and associated reticulation system.
- > Sewerage System and Western Leach Field.
- > Stormwater Drainage Infrastructure.
- > Abstraction Bore 1 and associated Fire Water Supply Infrastructure.
- > Landfills.

3 Sampling and Analytical Methodology

3.1 Sampling Dates

A summary of the dates for each sampling event of the monitoring period is presented in Table 3-1.

Table 3-1 Summary of Sampling Dates

Sampling Event	OMP Activity	Sampling Period
2022 post-winter biannual monitoring	Groundwater monitoring (sampling and gauging)	28 to 29 September 2022
	Tap sampling	
First quarterly monitoring	Limited groundwater monitoring (sampling and gauging)	11 January 2023
	Tap sampling	
2023 post-summer biannual monitoring	Groundwater monitoring (sampling and gauging)	11 April 2023
	Tap sampling	
Second quarterly monitoring	Limited groundwater monitoring (sampling and gauging)	18 July 2023
	Tap sampling	

3.2 Groundwater Sampling Network

Sampling of groundwater monitoring locations was conducted in accordance with the SAQP (Cardno 2023, Appendix B), applying methods set out in Section 6.3.3 of the SAQP. Deviations from the SAQP that occurred during the monitoring period can be found in Section 3.4.

The groundwater wells monitored as part of the OMP are presented in Table 3-2 and are shown in Figures 3A and 3B, Appendix A.

Table 3-2 Groundwater Monitoring Locations

Monitoring Area	Monitoring Well ID
On-site – Source Areas	Former Fuel Farm (SA01) – MW112S, MW113S, MW101I, MW102D, MW301, MW302, MW303
	Fire House and Refuelling Area (SA02) – MW104I, MW105D, MW304, MW305, MW306, MW504
	Powerhouse (SA03) – MW307, MW308, MW309, MW310
	Eastern Leach Field (SA04) – MW111S, MW505
On-site – Secondary Sources	Sewerage system and western leach field – MW114S
	Site Drainage – MW115S
	Pump House and Water Supply Infrastructure – MW312, MW313
	Landfills – MW106S, MW107S, MW108S, MW109S, MW110S
	Abstraction Bore 1 – MW401
On-site – Other	Abstraction Bore 2 – MW402
	Inner perimeter – MW116S, MW117I, MW118D, MW119S, MW120I, MW121D, MW122S, MW123I, MW124D
	Site boundary – MW125S, MW126I, MW128D, MW129S, MW130D, MW131D, MW132I, MW133D, MW134D, MW135I, MW136D, MW138S, MW139I, MW140D
	Background – MW137S
Off-site	Water Corporation Production bores⁽¹⁾ – Pinjar Production P140, Pinjar Production P145
	Public land ⁽²⁾ – MW143S, MW142S, MW141S, MW403

Notes:

(1) Sampled by the Water Corporation.

(2) Yeal Swamp Nature Reserve managed by the Department of Parks and Wildlife (DPaW) / Vacant Crown Land managed by the Department of Planning, Lands and Heritage (DLPH)

3.3 Tap Water Sampling Locations

Tap water samples were collected from the monitoring locations listed in Table 3-3 and shown in Figures 3A and 3B, Appendix A. Sampling was conducted in accordance with the SAQP, applying methods set out in Section 6.4.2 of the SAQP (Cardno, 2023, Appendix B).

Table 3-3 Tap Water Monitoring Locations

Monitoring Area	Location ID
On-site	POT102, POT103, POT104
Notes:	
Former OMP tap water monitoring locations POT101 and POT105 are no longer sampled given their associated building was decommissioned. These locations are not referred to in this report.	

3.4 Deviations from the OMP SAQP

Table 3-4 below provides deviations from the OMP SAQP, including details on locations where samples could not be collected.

Table 3-4 Summary of Deviations from the OMP SAQP

Location	Deviation	Comments
September 2022 (post-winter)		
MW107S, MW108S	Not sampled	These monitoring wells were found dry.
MW134D		Monitoring well blocked at 22mBGL.
MW307		Monitoring well had been destroyed.
MW505	Standing Water Level (SWL) record not used for groundwater contours	Monitoring well monument had been damaged, therefore survey data is no longer reliable.
January 2023		
MW143S	Not sampled	This monitoring well was dry.
April 2023 (post-summer)		
MW107S, MW108S, MW111S	Not sampled	These monitoring wells were found dry.
MW307		Monitoring well had been destroyed.
MW114S	No field parameters recorded	Insufficient amount of water in the HydraSleeve.
July 2023		
No deviation from the SAQP.		

3.5 Changes to the Monitoring Network Condition

The following changes to the monitoring network conditions were noted during the monitoring period:

- > Monitoring well MW505's monument has been damaged therefore the top of casing (TOC) survey data can no longer be relied upon for groundwater elevation calculation.
- > Monitoring well MW134D was found blocked during the post-winter event and was subsequently unblocked with a steel bailer during the post-summer event.

4 Quality Assurance / Quality Control

A critical aspect of site assessments is the demonstration of the quality of the data used as the basis for the assessment. This is achieved through a Data Validation process which includes a review of the following data quality indicators, as described in the SAQP (Cardno, 2023, Appendix B):

- > Quality Assurance (QA) documentation.
- > Bias.
- > Data Representativeness.
- > Data Precision & Accuracy.
- > Laboratory Performance.
- > Data Comparability.
- > Data Set Completeness.

A detailed review of the Quality Assurance/Quality Control (QA/QC) aspects was completed during each monitoring event, outcomes are included within the factual reports presented in Appendix C.

The laboratory has undertaken different Quality Control (QC) measures in all sets of sample analysis which validate the accuracy of their techniques. The laboratory is appropriately certified for environmental sample analysis. It is considered that the results are accurate and reliable for the purposes of this assessment.

The data validation process has concluded that there are no significant systematic errors in the data collection process. Therefore, the data set used as the basis for the assessment is considered valid and complete.

5 Assessment Criteria

At the time of preparing this report, a number of guidance documents were available in Australia including:

- > National Health and Medical Research Council (NHMRC) 2019. *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.
- > Heads of the Environmental Protection Authority (HEPA) 2020. *PFAS National Environmental Management Plan (NEMP) Version 2*.
- > Department of Health (DoH), 2019. *Health Based Guidance Values for PFAS for Use in Site Investigations in Australia*. September 2019.

The adopted assessment criteria for groundwater and tap water are detailed in Table 5-1. It is noted that no exposure risk to ecological receptors have been identified, therefore no ecological criteria have been adopted.

Table 5-1 Criteria for Groundwater – Human Health

Location	Pathway	Analyte	Criteria	Comment / Reference
On and Off-site	Drinking Water	PFOS+PFHxS	0.07 µg/L	The values presented in the PFAS NEMP, 2020 are from DoH 2019, which published final health-based guidance values for PFAS for use in site investigations in Australia.
		PFOA	0.56 µg/L	
	Recreational Use	PFOS+PFHxS	2.0 µg/L	The values presented in the PFAS NEMP, 2020 are from NHMRC 2019, which published final health-based guidance values for PFAS for use in site investigations in Australia.
		PFOA	10 µg/L	

Notes:

PFOS – Perfluorooctane Sulfonate

PFOA – Perfluorooctanoic Acid

PFHxS – Perfluorohexane Sulfonate

6 Contextual and Ancillary Information

6.1 Additional Analytical Data

All data available at the time of reporting on the Defence ESdat database for each OMP monitoring location was utilised to form the basis of the interpretations and conclusions presented in this report, including historical investigations (Jacobs 2018c and 2019) results.

6.2 Remediation and Infrastructure Projects

No remediation project or infrastructure works that could affect the interpretation of monitoring results were undertaken at the site during the monitoring period.

6.3 Climate

Rainfall is potentially the most significant meteorological factor that can influence PFAS migration. Monthly rainfall for all months between January 2018 and August 2023 (recorded at the BoM station 9178, Gingin Aero) are displayed in Figure 6-1.

It is noted during the monitoring period that rainfall levels were generally below the mean rainfall, except for June 2023 where higher than average rainfall was recorded. Higher than average rainfall is likely to influence regional groundwater levels in the aquifer. These climatic conditions may result in changes to the hydrogeological system and manifest in several outcomes relevant to the monitoring of PFAS in the vicinity of the site. Changes may include groundwater gradients, groundwater flow directions and PFAS concentrations.

Monthly maximum mean temperatures recorded between 2018 and 2023 are displayed in Figure 6-2. The temperatures during the monitoring period were generally higher than the monthly mean with the exception of June 2023.

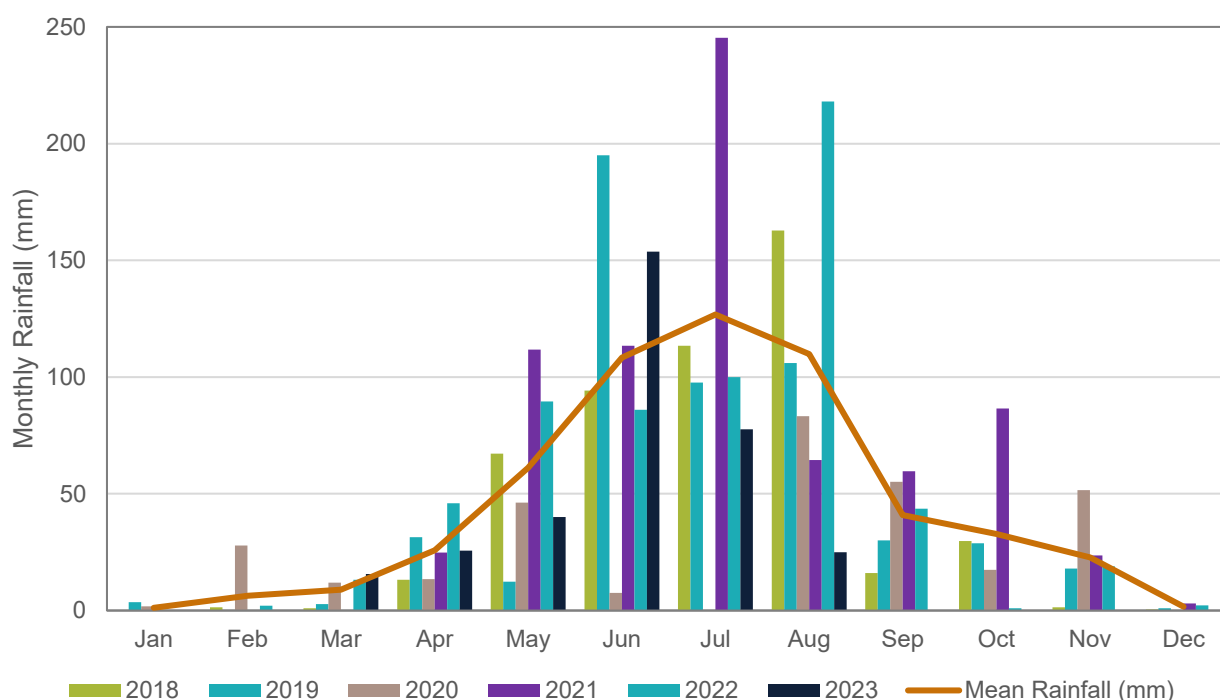


Figure 6-1 Rainfall data 2018 – 2023 and Long-term Mean Monthly Rainfall for Gingin Aero (Station 9178) (BoM, 2023)

Note: No rainfall data was available from the BoM for July and December 2020 and January, February, and March 2021.

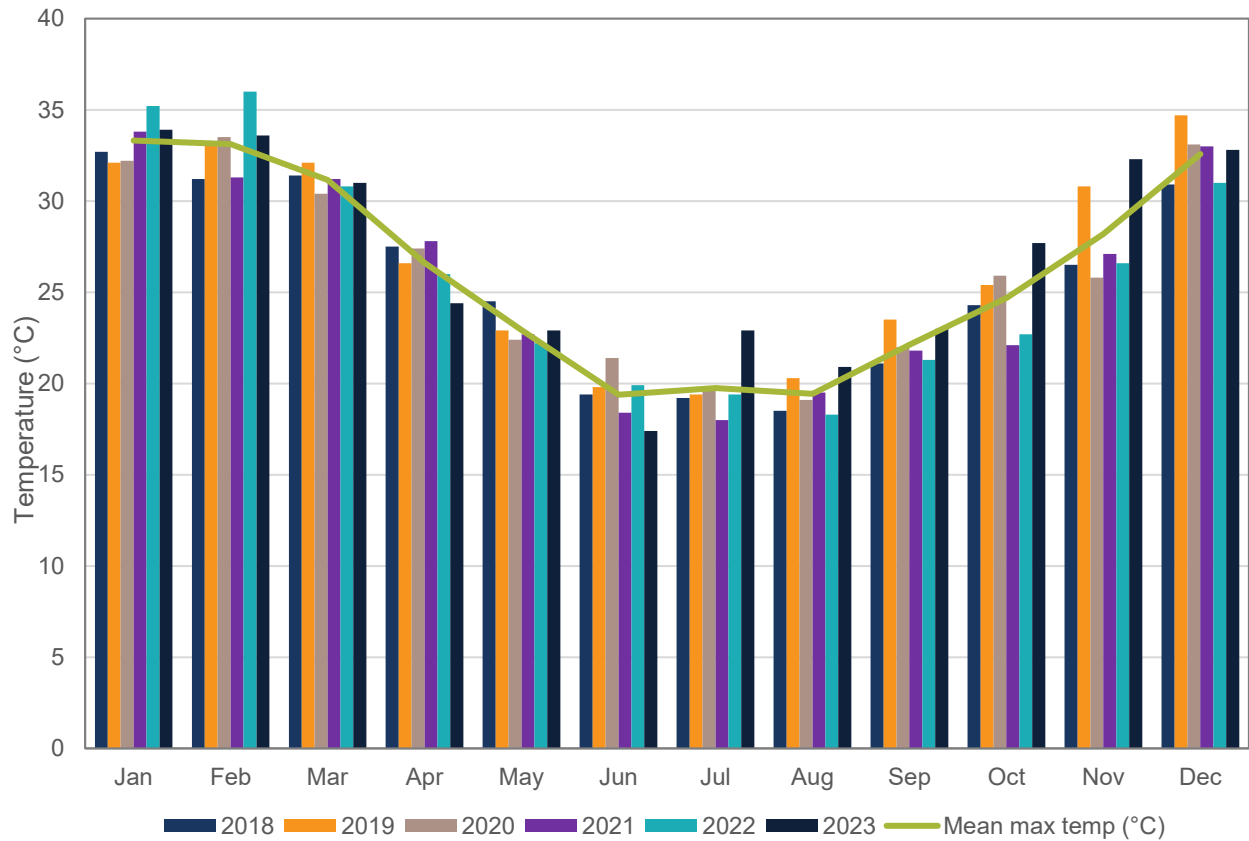


Figure 6-2 Monthly Mean Maximum Temperature 2018 – 2023 and Long-term for Gingin Aero (Station 9178) (BOM, 2023)

7 Monitoring Data Summary

7.1 Groundwater

Groundwater information is presented as follows:

- > A summary of physicochemical parameters recorded during the monitoring period is presented in Section 7.1.1, a consolidated table is provided within Table 1 and Table 2, Appendix D.
- > Groundwater elevation data is summarised in Section 7.1.2, a gauging records table is provided within Table 5, Appendix D.
- > Analytical results are summarised in Section 7.1.3 and consolidated tables are provided within Table 3 and Table 4, Appendix D.
- > Monitoring locations are presented in Figure 3A and Figure 3B, Appendix A.

7.1.1 Groundwater Physicochemical Parameters

Groundwater physicochemical parameters recorded during the post-winter 2022 and post-summer 2023 monitoring events are summarised in Table 7-1 and provided in Table 1, Appendix D. Physicochemical parameters recorded during the quarterly monitoring events have not been summarised below as only a limited number of wells are monitored during these events.

Groundwater physicochemical parameters recorded during the monitoring period were consistent with historical data range.

Table 7-1 Groundwater Physicochemical Parameters

Parameter	Post-winter 2022 (September 2022)	Post-summer 2023 (April 2023)
DO	0.53 mg/L (MW402) – 7.09 mg/L (MW122S) <i>Aerobic conditions</i>	0.59 mg/L (MW125S) – 6.15 mg/L (MW119S) <i>Aerobic conditions</i>
EC	73.6 µS/cm (MW122S) – 654 µS/cm (MW402) <i>Fresh conditions</i>	91.1 µS/cm (MW120I) – 1,729 µS/cm (MW115S) <i>Fresh to brackish conditions</i>
pH	3.1 (MW106S) – 6.84 (MW140D) <i>Acidic to neutral conditions</i>	3.28 (MW106S) – 7.29 (MW140D) <i>Acidic to neutral conditions</i>
ORP	25.2 mV (MW139I) – 354.9 mV (MW166S) <i>Oxidising conditions</i>	80.6 mV (MW402) – 583.5 mV (MW301) <i>Oxidising conditions</i>

Note: Oxidation-Reduction Potential (ORP) values have been corrected from field readings (i.e. field readings+200mV)

DO – Dissolved Oxygen

EC – Electrical conductivity

7.1.2 Groundwater Elevations and Migration Contours

Groundwater gauging data measured during the post-winter 2022 and post-summer 2023 monitoring events are presented within Table 5, Appendix D. Inferred groundwater contours are presented in Figures 4A, 4B, 5A and 5B, Appendix A. A summary is provided in Table 7-2. The groundwater elevations and inferred contours and flow direction were consistent with historical data.

Table 7-2 Groundwater Levels and Flow Direction

Item	September 2022 (post-winter)	April 2023 (post-summer)
Depths to groundwater	4.942 mbTOC (MW115S) – 21.175 mbTOC (MW135I)	5.58 mbTOC (MW115S) – 21.83 mbTOC (MW134D)
Groundwater elevation	57.671 mAHD (MW143S) – 67.016 mAHD (MW114S)	52.337 mAHD (MW403) – 66.29 mAHD (MW114S)
Inferred direction of groundwater flow	Groundwater is interpreted to flow from the site in a south- southwesterly direction, with wells in the southern portion of the site indicating a southerly direction, which is consistent with previous monitoring periods.	
Seasonal difference in groundwater elevation	Groundwater levels were on average 0.47 m shallower during the post-winter event.	
mTOC - Metres below Top of Casing		

7.1.3 Groundwater Results Summary

7.1.3.1 On-site – Source Areas

Concentrations reported at monitoring wells within the on-site source areas are presented in Table 7-3 and concentration trend graphs for PFOS+PFHxS are presented in Figures 7-1 to 7-4.

Table 7-3 On-site Primary Source Area PFOA and PFOS+PFHxS Concentrations

Well ID	Sample Date					
	Historical range	Sep - 22	April-23	Historical range	Sep-22	April-23
PFOA (µg/L)			PFOS+PFHxS (µg/L) ¹			
Former Fuel Farm						
MW101I	<0.01 – 0.02	0.02	0.01	0.25 – 0.60	0.70	0.45
MW102D	<0.01 – 0.01	<0.01	<0.01	0.04 – 0.54	0.05	<0.01
MW112S	<0.01	<0.01	<0.01	<0.01 – 0.14	0.02	<0.01
MW113S	<0.01	<0.01	<0.01	<0.01 – 0.06**	<0.01	<0.01
MW301	0.02 – 2.39	3.93	2.64	0.12 – 86.2**	104	70.5
MW302	<0.01 – 0.66	0.12	0.17	<0.01 – 8.30	5.17	1.85
MW303	0.68 – 3.0	0.87	0.53	21.6 – 88.0**	25.7	14.8
Fire House and Refuelling Area						
MW504	0.10 – 0.69	0.74	0.35	3.39 – 25.5	23.6	16.1
MW104I	<0.01 – 0.06	0.11	0.13	0.08 – 2.65	3.73	3.13
MW105D	<0.01 – 0.08	<0.01	<0.01	0.09 – 2.46	<0.01	<0.01
MW304	0.16 – 0.45	0.23	0.11	4.6 – 44	7.48	4.95
MW305	0.08 – 0.99	0.08	0.10	4.1 – 6.86	4.22	6.02
MW306	0.15 – 0.34	0.11	0.12	5.84 – 7.0	5.94	4.95
Powerhouse						
MW307	0.28 – 1.51	NS	NS	14.5 – 53.0	NS	NS
MW308	0.15 – 1.6	0.62	0.36	22.9 – 63	75.7	19.8
MW309	0.22 – 5.0	0.82	1.28	23.6 – 271.0**	127	41.3
MW310	0.05 – 2.92	3.57	0.14	3.98 – 147	139	12.4
Eastern Leach Field						
MW111S	0.06*	0.07	NS	2.39**	2.76	NS
MW505	<0.01 - 0.03	0.03	<0.01	0.14 – 1.50	1.05	0.30
New Maximum		New Minimum		New Exceedance		

Notes:

1. PFHxS were not analysed prior to 2018

NS – Not Sampled

* Only sampled once in March 2018.

**calculated from PFHxS and PFOS concentrations, PFOS+PFHxS was not reported in 2018 laboratory results.

PFAS concentrations recorded during the monitoring period were all within the same order of magnitude as historical data. The following exceedances of the assessment criteria were noted:

- > Exceedances of the drinking water criteria for PFOA (0.56 µg/L) were recorded at:
 - the Former Fuel Farm (MW301 and MW303).
 - the Fire House and Refuelling Area (MW504).

- the Powerhouse (MW308, MW309 and MW310).
- > Exceedances of the drinking water criteria for PFOS+PFHxS (0.07 µg/L) were recorded at:
 - the Former Fuel Farm (MW101I, MW301, MW302, MW303).
 - the Fire House and Refuelling Area (MW504, MW104I, MW304, MW305, MW306).
 - the Powerhouse (MW308, MW309, MW310).
 - the Eastern Leach Field (MW111S, MW505).
- > Exceedances of the recreational criteria for PFOS+PFHxS (2.0 µg/L) were recorded at:
 - the Former Fuel Farm (MW301, MW302, MW303).
 - the Fire House and Refuelling Area (MW504, MW104I, MW304, MW305, MW306).
 - the Powerhouse (MW308, MW309, MW310).
 - the Eastern Leach Field (MW111S).

The following new concentration minimums/maximums are noted:

- > New maximum concentrations:
 - MW101I: Concentrations of PFOS+PFHxS were recorded at a new maximum of 0.70 µg/L during September 2022.
 - MW111S recorded new PFOA and PFOS+PFHxS concentration maximums in September 2022 reporting 0.07 µg/L and 2.76 µg/L respectively. It is noted that MW111S had only previously been sampled once in March 2018, and was dry and not sampled in April 2023.
 - MW301: Concentrations of PFOA and PFOS+PFHxS recorded new maximums during September 2022 reporting concentrations of 3.93 µg/L and 104 µg/L respectively.
 - MW504: A new maximum concentration of PFOA (0.74 µg/L) was recorded in September 2022.
 - MW104I: A new maximum concentration of PFOA was recorded in September 2022 (0.11 µg/L) and increased again in April 2023 to 0.13 µg/L. A new maximum concentration of PFOS+PFHxS was recorded in September 2022 of 3.73 µg/L.
 - MW308: A new maximum concentration of PFOS+PFHxS (75.7 µg/L) was recorded during September 2022.
 - MW310: A new maximum concentration of PFOA (3.57 µg/L) was recorded in September 2022.
- > New minimum concentrations:
 - MW102D: The concentration of PFOS+PFHxS was not recorded above the LOR in April 2023 for the first time since monitoring started.
 - MW105D: Concentrations of PFOS+PFHxS were not recorded above the LOR in September 2022 for the first time since monitoring started and remained below the LOR in April 2023.
 - MW303: New minimum concentrations of PFOA (0.53 µg/L) and PFOS+PFHxS (14.8 µg/L) were recorded in April 2023.
 - MW304: A new minimum concentration of PFOA (0.11 µg/L) was recorded in April 2023.
 - MW306: New minimum concentrations of PFOA (0.11 µg/L) and PFOS+PFHxS (4.95 µg/L) were recorded in September 2022 and April 2023 respectively.
 - MW308: A new minimum concentration of PFOS+PFHxS (19.8 µg/L) was recorded in April 2023.

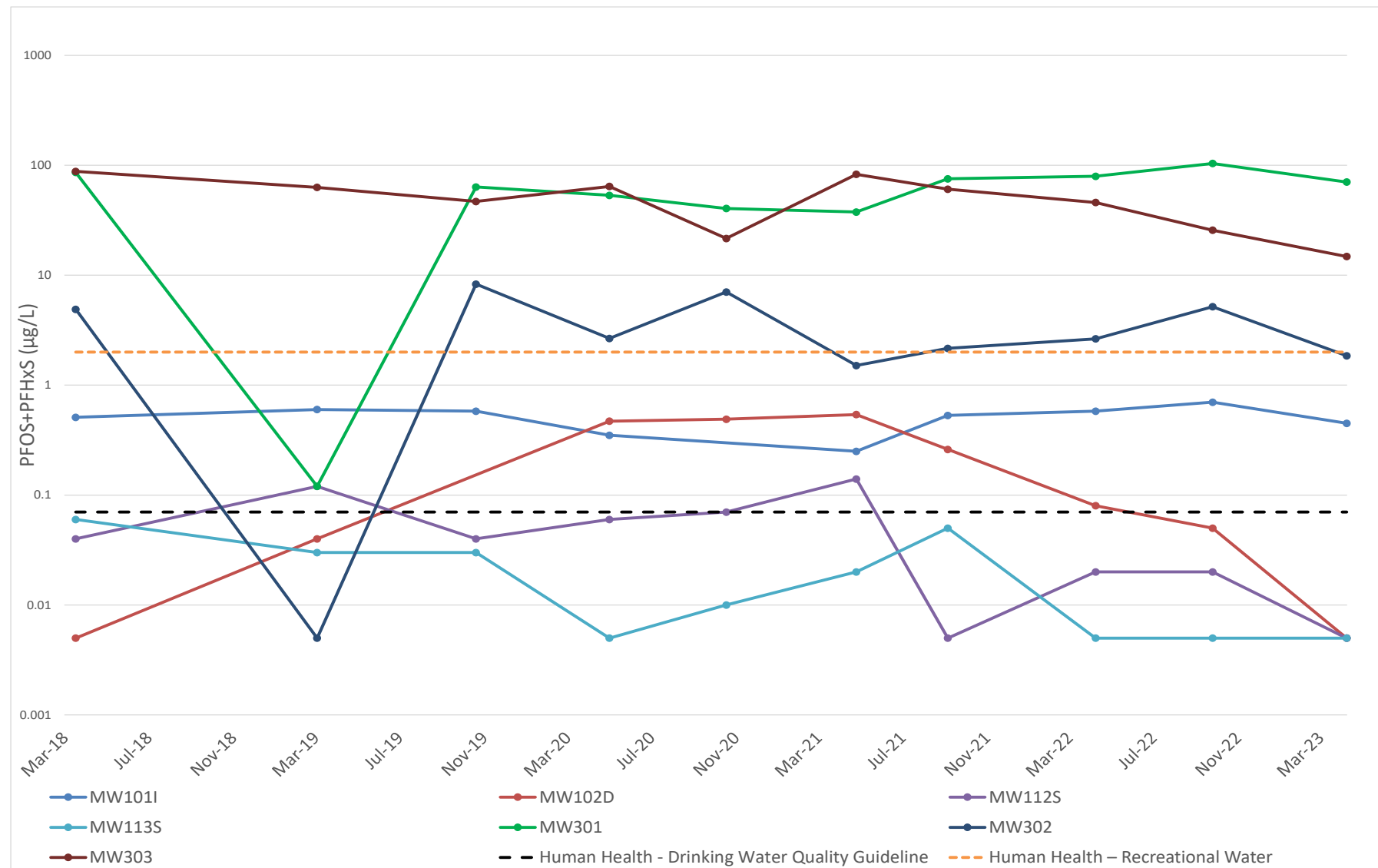


Figure 7-1 Former Fuel Farm PFOS+PFHxS Concentration Trends

A logarithmic scale is used for the vertical axis. Non-detectable concentrations were replaced by half of the LOR value (0.005 µg/L).

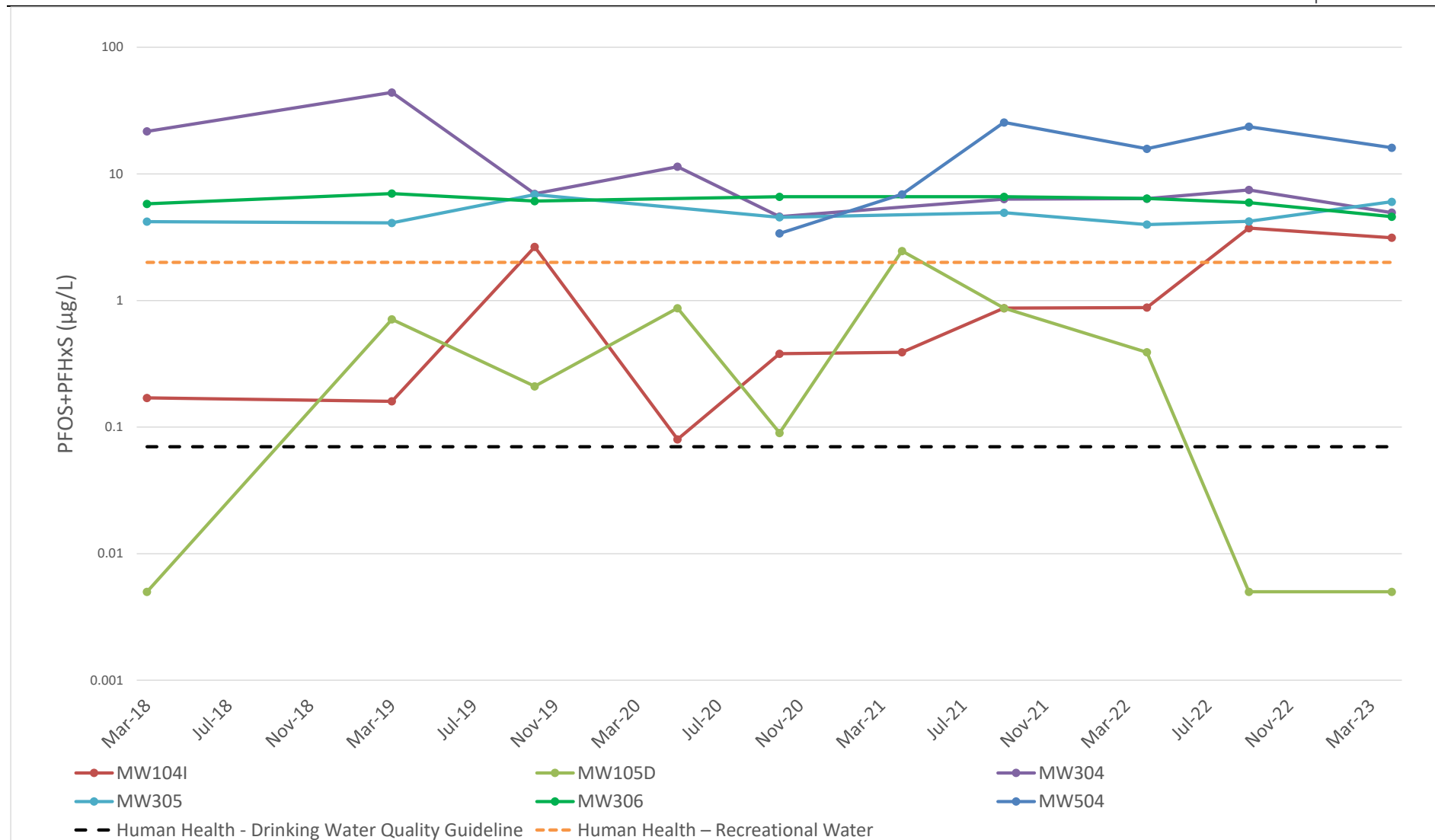


Figure 7-2 Fire House and Refuelling Area PFOS+PFHxS Concentration Trends

A logarithmic scale is used for the vertical axis. Non-detectable concentrations were replaced by half of the LOR value (0.005 µg/L).

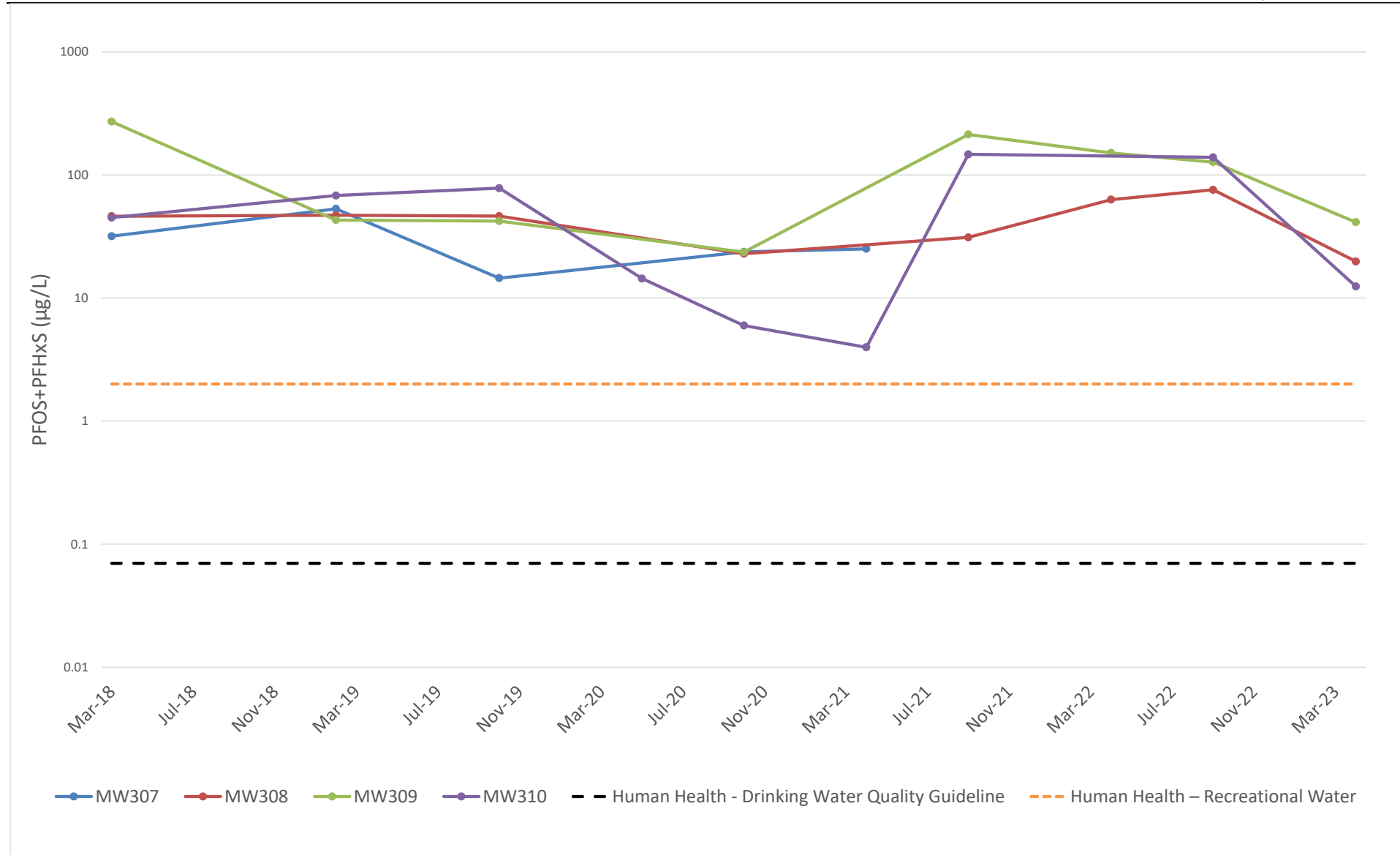


Figure 7-3 Powerhouse PFOS+PFHxS Concentration Trends

A logarithmic scale is used for the vertical axis.

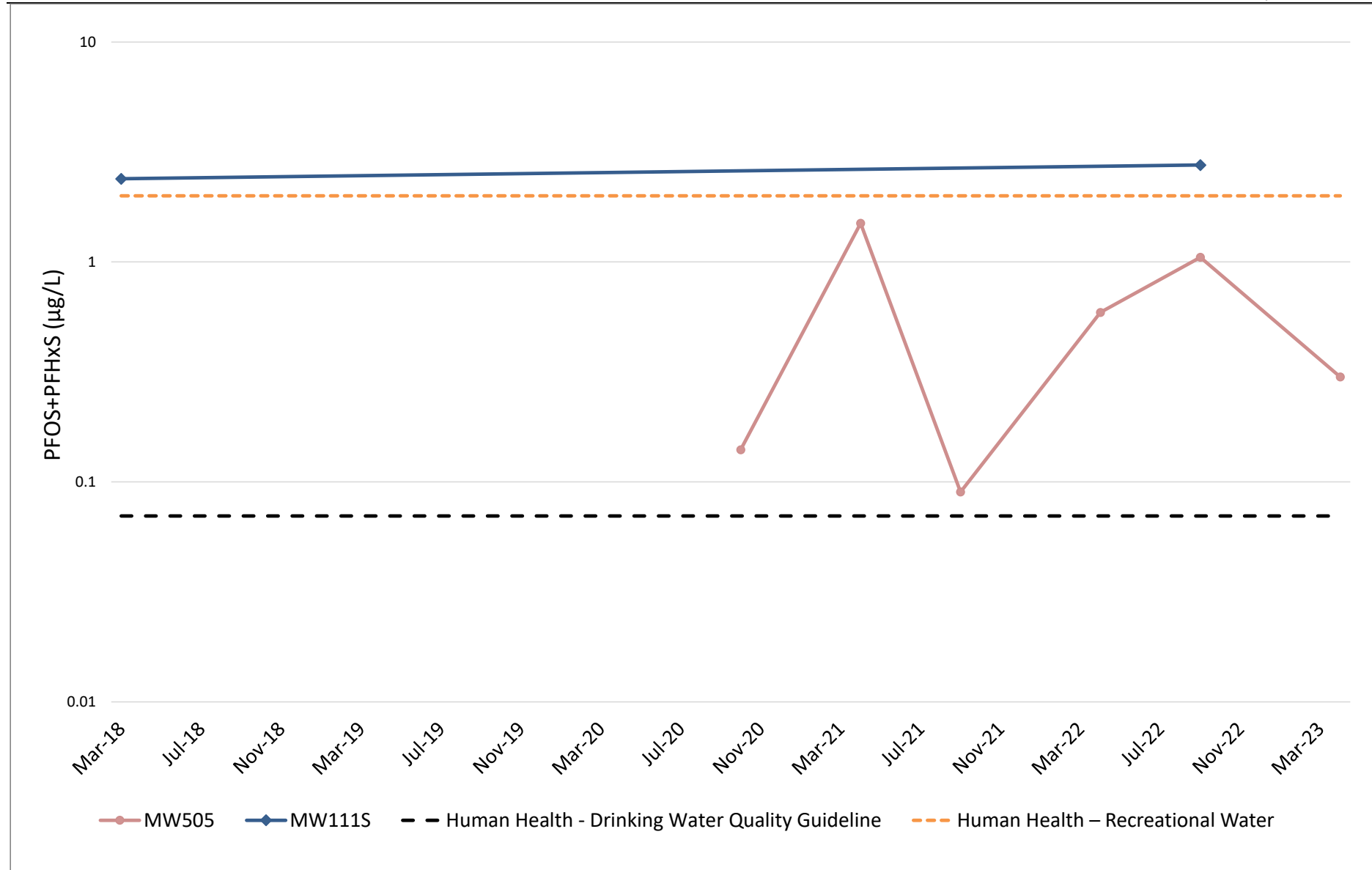


Figure 7-4 Eastern Leach Field PFOS+PFHxS Concentrations Trends

A logarithmic scale is used for the vertical axis.

7.1.3.2 On-site – Secondary Sources

There are five areas identified in Jacobs (2018) as on-site secondary sources, the monitoring wells associated with each secondary source area are provided below:

- > Sewerage System and Western Leach Field – MW114S.
- > Site Drainage – MW115S.
- > Pump House and Water Supply Infrastructure – MW312, MW313.
- > Landfills - MW106S, MW107S, MW108S, MW109S, MW110S.
- > Abstraction Bore 1 – MW401.
- > Abstraction Bore 2 – MW402.

The results for PFOA and PFOS+PFHxS for the on-site secondary source monitoring wells are presented in Table 7-4 and concentration trends for PFOS+PFHxS are presented in Figures 7-5 to 7-7.

Table 7-4 On-site Secondary Source Areas PFOA and PFOS+PFHxS Concentrations

Well ID	Historical Range	Sept-22	Apr-23	Historical Range	Sept-22	Apr-23
PFOA (µg/L)			PFOS+PFHxS (µg/L) ¹			
Sewerage System and Western Leach Field						
MW114S	0.02 – 0.03	0.03	0.01	0.78 – 1.80	1.55	0.78
Site Drainage						
MW115S	<0.01 -0.01	<0.01	<0.01	0.01 - 0.36	0.30	0.20
Pump House and Water Supply Infrastructure						
MW312	0.02 – 1.06	0.03	0.02	0.29 – 3.25	2.45	1.21
MW313	<0.01 – 1.64	0.02	<0.01	0.09 – 1.6	1.5	0.47
Landfills						
MW106S	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW107S	<0.01*	NS	NS	<0.01*	NS	NS
MW108S	<0.01*	NS	NS	<0.01*	NS	NS
MW109S	<0.01 – 0.16	<0.01	0.01	0.25 – 1.90	0.27	0.53
MW110S	<0.01	<0.01	<0.01	0.01 – 0.14	0.09	0.05
Abstraction Bores						
MW401	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW402	0.02 - 0.10	0.06	0.06	0.77 – 2.37	1.85	1.57
New Maximum		New Minimum		New Exceedance		

Notes:

1. PFHxS were not analysed prior to 2018.

* Only sampled once in March 2018.

NS – Not sampled

PFAS concentrations recorded during the monitoring period were all within the same order of magnitude as historical data. A new PFOA concentration minimum was recorded at MW114S in April 2023.

Concentrations of PFOA were recorded below the drinking water criteria at all the secondary source monitoring wells which is similar to the previous monitoring period.

Exceedances of the drinking water criteria for PFOS and PFHxS were recorded at MW114S, MW115S, MW312, MW313, MW109S, MW110S and MW402.

PFOS+PFHxS concentrations were recorded below the recreational use criteria at all locations except at MW312 in September 2022.

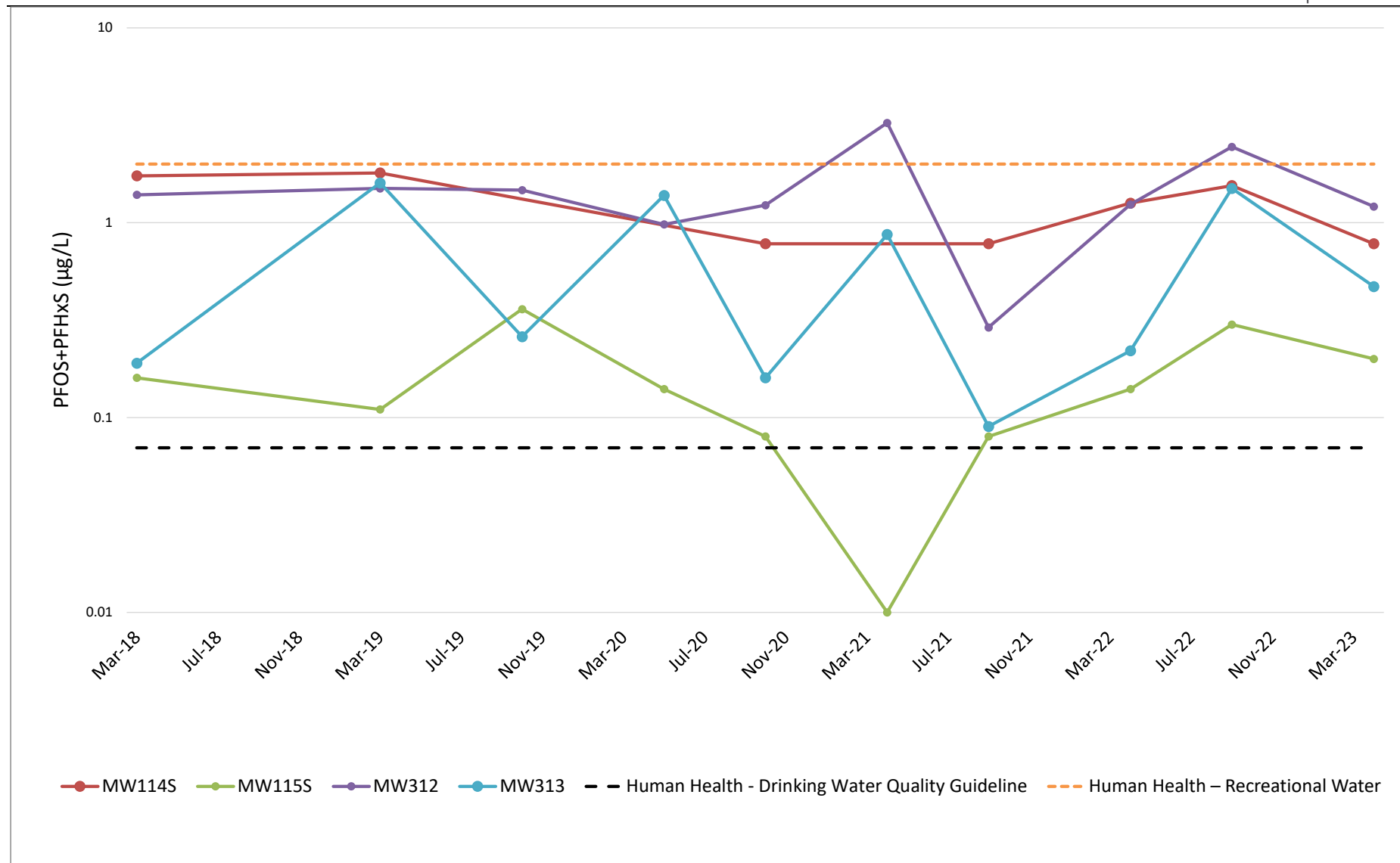


Figure 7-5 On-site Secondary Source Areas PFOS+PFHxS Concentration Trends

A logarithmic scale is used for the vertical axis.

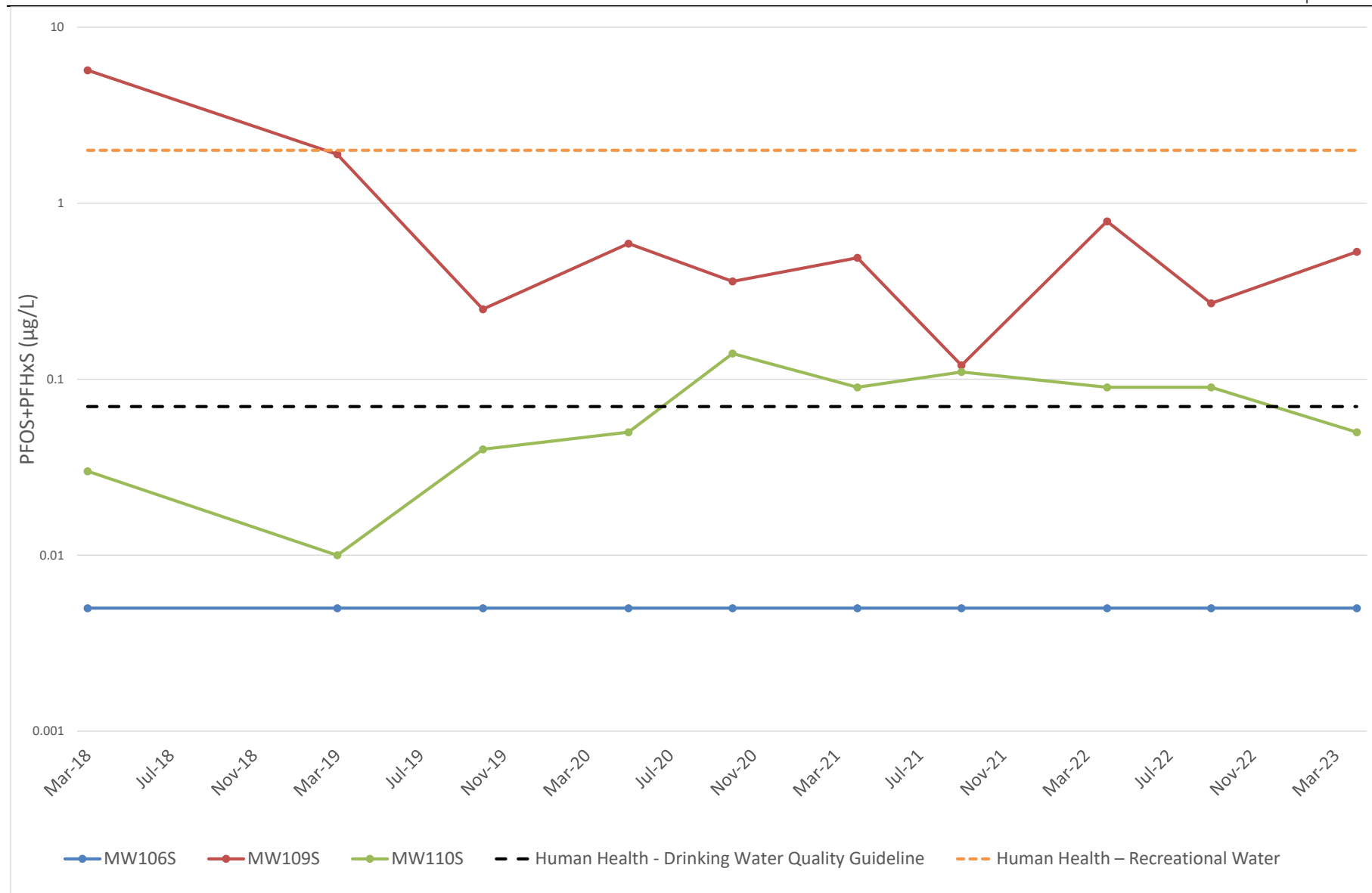


Figure 7-6 Landfills PFOS+PFHxS Concentrations Trends

A logarithmic scale is used for the vertical axis. Non-detectable concentrations were replaced by half of the LOR value (0.005 µg/L). MW107S and MW108S are not represented on the chart.

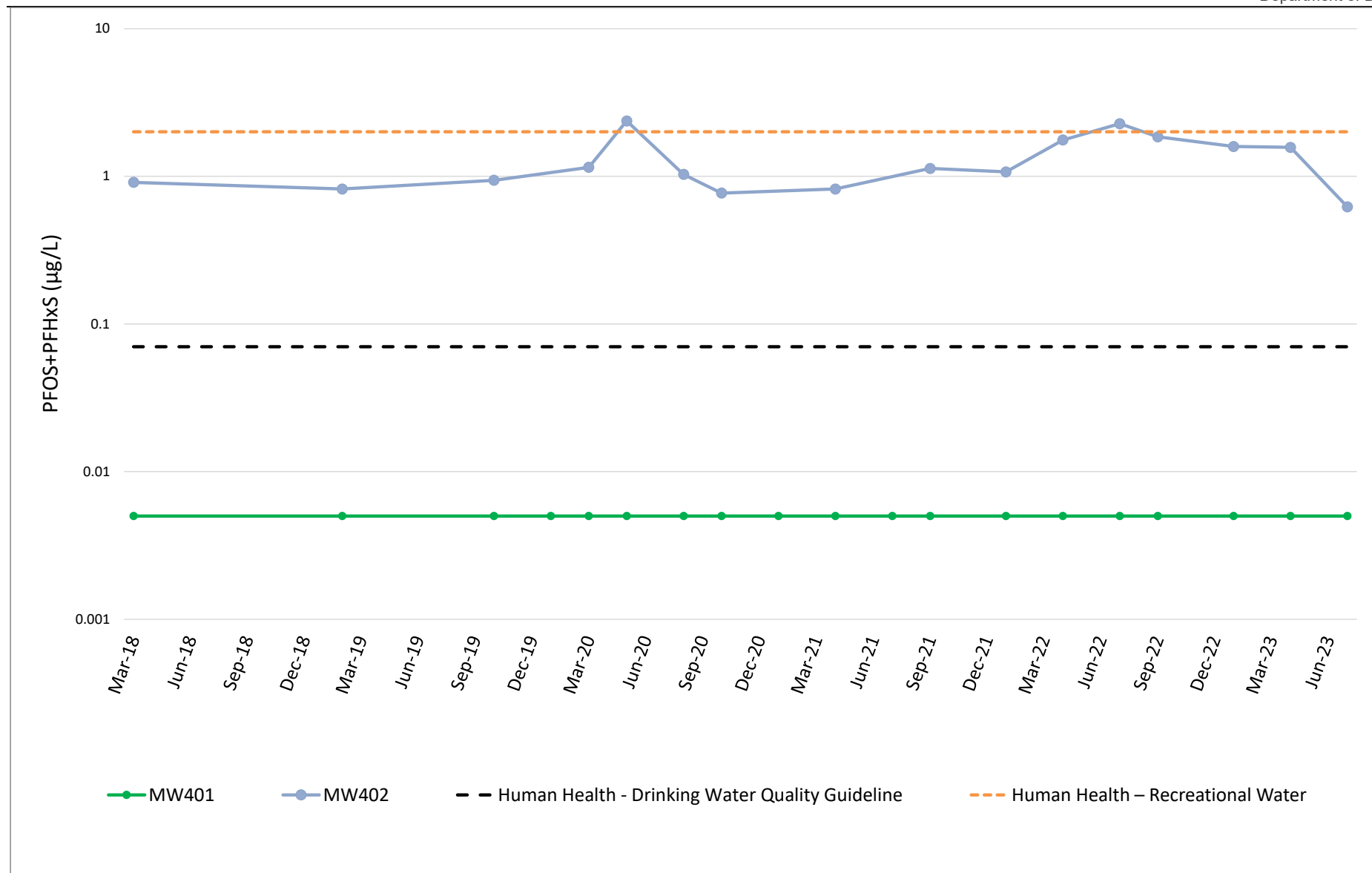


Figure 7-7 Abstraction Bores PFOS+PFHxS Concentration Trends

A logarithmic scale is used for the vertical axis. Non-detectable concentrations were replaced by half of the LOR value (0.005 µg/L).

7.1.3.3 On-site – Other

The on-site monitoring well network consists of:

- > On-site inner perimeter wells: MW116S, MW117I, MW118D, MW119S, MW120I, MW121D, MW122S, MW123I, MW124D.
- > On-site boundary wells: MW125S, MW126I, MW128D, MW129S, MW130D, MW131D, MW132I, MW133D, MW134D, MW135I, MW136D, MW138S, MW139I, MW140D.

The results for PFOA and PFOS+PFHxS are displayed in Table 7-5.

Table 7-5 On-site Other Areas PFOA and PFOS+PFHxS Concentrations

Well ID	Historical Range	Sept-22	Apr-23	Historical Range	Sept-22	Apr-23
	PFOA (µg/L)			PFOS+PFHxS (µg/L)		
Inner Perimeter						
MW116S	<0.01	<0.01	<0.01	<0.01 – 0.08**	0.12	0.01
MW117I	<0.01	<0.01	<0.01	<0.01 – 0.03	0.02	0.01
MW118D	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW119S	<0.01	<0.01	<0.01	<0.01 – 0.08	0.09	0.09
MW120I	<0.01	<0.01	<0.01	<0.01 - 0.01	0.01	<0.01
MW121D	<0.01	<0.01	<0.01	<0.01 – 0.02	<0.01	<0.01
MW122S	<0.01	<0.01	<0.01	<0.01 – 0.11	0.13	0.03
MW123I	<0.01	<0.01	<0.01	0.07 – 0.24**	0.12	0.07
MW124D	<0.01	<0.01	<0.01	<0.01 – 0.02	<0.01	<0.01
On-site Boundary						
MW125S	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW126I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW128D	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW129S	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW130D	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW131D	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW132I	<0.01	<0.01	<0.01	<0.01 – 0.06	0.04	0.02
MW133D	<0.01	<0.01	<0.01	<0.01 – 0.04	0.02	0.01
MW134D	<0.01	NS	<0.01	<0.01	NS	<0.01
MW135I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW136D	<0.01	<0.01	<0.01	<0.01 – 0.01	0.02	0.04
MW138S	<0.01 – 0.01	<0.01	<0.01	0.08 – 0.44	0.10	0.01
MW139I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW140D	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
New Maximum	New Minimum			New Exceedance		

Notes:

NS – Not sampled

**calculated from PFHxS and PFOS concentrations, PFOS+PFHxS was not reported in 2018 laboratory results.

PFAS concentrations recorded during the monitoring period were within the same order of magnitude as historical data. Exceedances of the drinking water criteria for PFOS+PFHxS were recorded at inner perimeter wells (MW116, MW119S, MW122S, MW123I). No exceedances of the recreational use criteria were recorded.

The following new minimums/maximums are noted:

> New maximum concentrations:

- MW116S: Concentrations of PFOS+PFHxS were recorded at a new maximum of 0.12 µg/L in September 2022, however, concentrations decreased by one order of magnitude in April 2023.
- MW119S: Concentrations of PFOS+PFHxS were recorded at a new maximum of 0.09 µg/L in September 2022 and remained at that concentration in April 2023.
- MW122S: Concentrations of PFOS+PFHxS were recorded at a new maximum of 0.13 µg/L in September 2022.
- MW136D: Concentrations of PFOS+PFHxS were recorded at a new maximum of 0.02 µg/L in September 2022 and then again to 0.04 µg/L in April 2023.

> New minimum concentrations:

- MW138D: Concentrations of PFOS+PFHxS were recorded as a new minimum of 0.01 µg/L in April 2023.

Concentrations of PFOA were not reported above the LOR at any monitoring wells during the monitoring period which is consistent with previous monitoring periods.

Based on the majority of the concentrations recorded being reported below LOR, a trend graph has not been developed for the inner perimeter and boundary well network.

7.1.3.4 Off-site

One off-site background well; MW137S is sampled post-winter and post-summer. Monitoring wells MW141S, MW142S and MW143S are sampled on a quarterly basis as part of the ongoing monitoring program to provide an indication of any change in the nature or magnitude of PFAS migrating off-site to the south (if any). The DWER well MW403, located between the site and the Water Corporation production bores, is also monitored quarterly to provide an early indication of PFAS migrating further off-site (if any). The Water Corporation production bores P140 and P145 are situated 7.5km south/southwest of site

The results for PFOA and PFOS+PFHxS are displayed in Table 7-6. A concentration trend graph for PFOS+PFHxS for the off-site wells is presented in Figure 7-8.

Table 7-6 Off-site PFOA and PFOS+PFHxS Concentrations

Well ID	Historical Range	Sept -22	Jan-23	Apr-23	Jul-23	Historical Range	Sept-22	Jan-23	Apr-23	Jul-23
PFOA (µg/L)						PFOS+PFHxS (µg/L)				
Background										
MW137S	<0.01	<0.01	NS	<0.01	NS	<0.01 – 0.02	<0.01	NS	<0.01	NS
Off-site south										
MW141S	0.02 – 0.05	0.01	0.01	0.01	<0.01	0.42 – 1.52	0.35	0.32	0.11	<0.01
MW142S	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW143S	<0.01 – 0.01	<0.01	NS	<0.01	<0.01	0.01 – 0.02	0.02	NS	0.02	0.02
MW403	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
New Maximum			New Minimum				New Exceedance			

Note:

N/S – Not sampled, wells found to be dry or well not sampled on a quarterly basis.

PFAS results (August 2018 – July 2023) for off-site production bores Pinjar bore P140 (superficial aquifer) and Pinjar bore P145 (Leederville aquifer), provided by the Water Corporation were reviewed and found to be below the laboratory LOR for PFOA (<0.001 µg/L), PFOS (<0.004 µg/L) and PFHxS (<0.002 µg/L) across the monitoring period.

Concentrations of PFOA and PFOS+PFHxS were reported below the LOR at MW137S, MW403 and MW142S. However, concentrations of PFOA and PFOS+PFHxS were recorded above the LOR at MW141S, exceeding the drinking water guidelines for PFOS+PFHxS in September 2022, January 2023 and April 2023. Concentrations of both PFOA and PFOS+PFHxS decreased to below the LOR throughout the monitoring period at MW141S, reporting new minimums in July 2023.

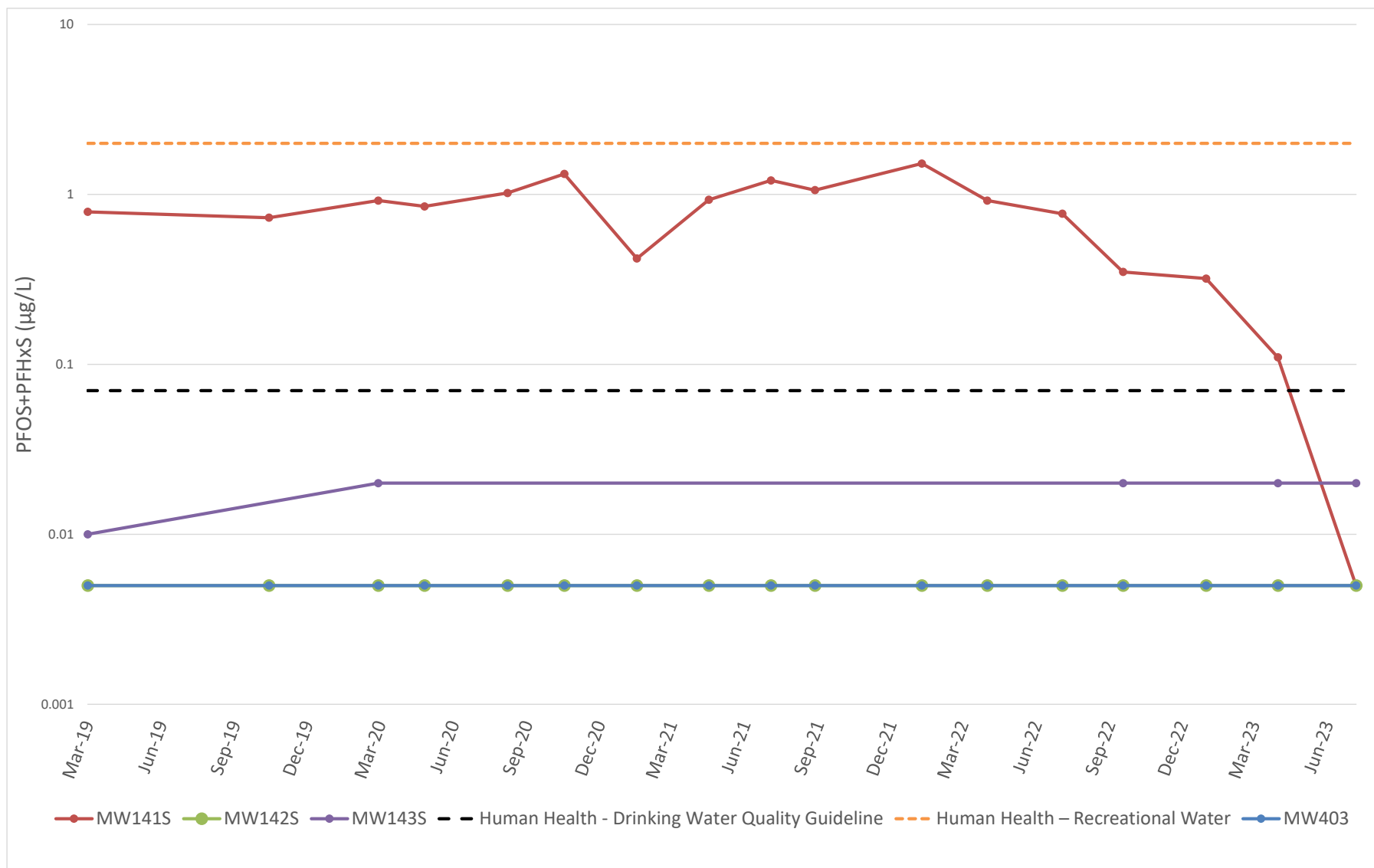


Figure 7-8 Off-site wells PFOS+PFHxS Concentration Trends

A logarithmic scale is used for the vertical axis. Non-detectable concentrations were replaced by half of the LOR value (0.005 µg/L).

7.2 Tap Water

7.2.1 Tap Water Physicochemical Parameters

Tap water physicochemical parameters recorded during the biannual and quarterly monitoring events are summarised in Table 7-7 and provided within Table 2, Appendix D.

Tap water physicochemical parameters recorded during the monitoring period were consistent with historical data range

Table 7-7 Tap Water Physicochemical Parameters

Parameter	Post-winter 2022 (September 2022)	Q1 2023	Post-summer 2023(April 2023)	Q3 2023
EC	1,017 µS/cm (POT104) – 1,050 µS/cm (POT103) <i>Fresh conditions</i>	1,237 µS/cm (POT102) – 1,295 µS/cm (POT103) <i>Fresh conditions</i>	995 µS/cm (POT102) – 1,067 µS/cm (POT103) <i>Fresh conditions</i>	978 µS/cm (POT104) – 1,016 µS/cm (POT102) <i>Fresh conditions</i>
pH	4.37 (POT102) – 5.29 (POT104) <i>Acidic conditions</i>	6.49 (POT104) – 6.95 (POT102) <i>Slightly acidic to neutral conditions</i>	6.29 (POT102) – 8.37 (POT103) <i>Slightly acidic to Alkaline conditions</i>	6.74 (POT104) – 6.97 (POT102) <i>Neutral conditions</i>
ORP	257.6 mV (POT103) – 342.6 mV (POT102) <i>Oxidising conditions</i>	212.2 mV (POT102) – 326.6 mV (POT102) <i>Oxidising conditions</i>	190.9 mV (POT103) – 400.5 mV (POT104) <i>Oxidising conditions</i>	337.6 mV (POT102) – 606 mV (POT104) <i>Oxidising conditions</i>

Note: ORP values have been corrected from field readings (i.e. field readings+200mV)

7.2.2 Tap Water Results Summary

The tap water analytical results are provided in Table 4, Appendix D.

The recreational criteria for PFOS+PFHxS and PFOA of 2 µg/L and 10 µg/L respectively, were not exceeded at any time during the monitoring period. PFOS+PFHxS concentrations regularly exceeded the drinking water criteria at all taps which is consistent with historical data. All PFOA and PFOS+PFHxS results were within the historical ranges.

The results for PFOA and PFOS+PFHxS are displayed in Table 7-8.

Table 7-8 Tap Water PFOA and PFOS+PFHxS Concentrations

ID	Sample Date									
	Historical Range	Sept- 22	Jan- 23	Apr -23	Jul- 23	Historical Range	Sept- 22	Jan-23	Apr- 23	Jul- 23
PFOA (µg/L)						PFOS+PFHxS (µg/L)				
POT102	<0.01 – 0.04	0.03	0.02	0.02	0.04	0.06 – 1.16	0.42	0.27	0.43	0.84
POT103	0.01 – 0.04	0.03	0.02	0.03	0.04	0.25 – 1.06	0.52	0.30	0.54	0.97
POT104	<0.01 – 0.05	0.02	0.02	0.02	0.04	0.27 – 1.28	0.56	0.29	0.50	0.96
New Maximum		New Minimum					New Exceedance			

PFOS+PFHxS concentrations over time for the tap water samples are presented in Figure 7-9.

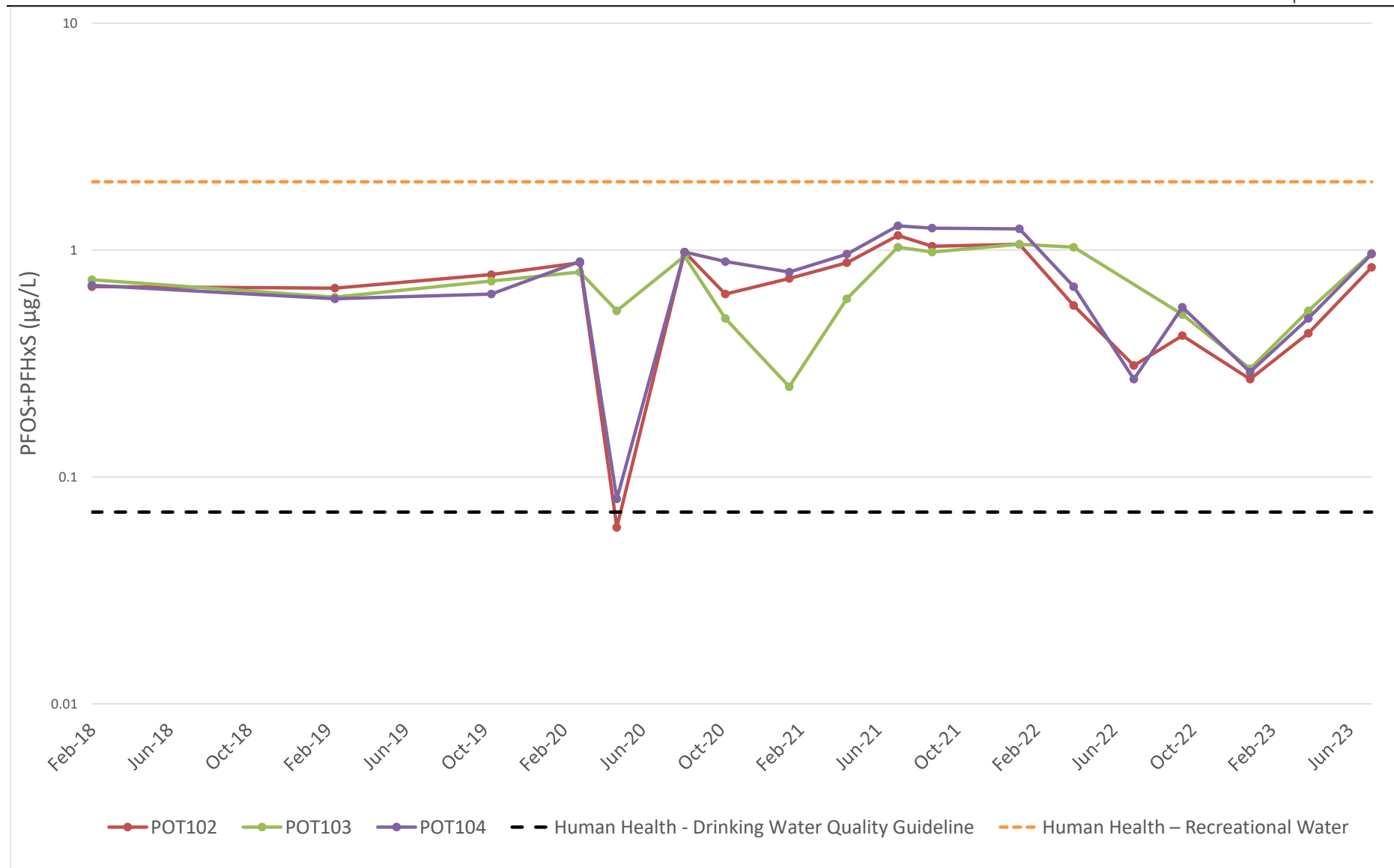


Figure 7-9 Tap Water PFOS+PFHxS Concentration Trends

A logarithmic scale is used for the vertical axis. Non-detectable concentrations were replaced by half of the LOR value (0.005 µg/L).

8 Interpretive Analysis

This section discusses the results of the post-winter 2022, post-summer 2023, first quarterly and second quarterly monitoring events conducted during the monitoring period. Potential trends in concentrations and PFAS migration are discussed in the following sections.

Trends in concentrations over time have been assessed using the Mann Kendall test. A minimum of four results per monitoring location are required to calculate a trend (i.e. increasing, stable or decreasing). The Mann Kendall test relies on three statistical metrics (GSI, 2012), as follows:

- > The **'S' Statistic** indicates whether concentration trend versus time is generally decreasing ($S < 0$) or increasing ($S > 0$).
- > The **Confidence Factor (CF)** value indicates the degree of confidence in the trend result as in "Decreasing" vs. "Probably Decreasing" or "Increasing" vs. "Probably Increasing". A CF between 90% and 95% indicate a "Probably" increasing or decreasing trend, when $CF > 95\%$ the data demonstrate a statistically significant trend, either "Increasing" or "Decreasing".
- > The **Coefficient of Variation (CoV)** is used to distinguish between a 'No Trend' result and a 'Stable' result for dataset with no significant increasing or decreasing trend.

8.1 Groundwater

The spatial extent of PFAS concentrations in groundwater is shown in (Appendix A):

- > Figures 6A and 6B (PFOS+PFHxS) and Figures 10A and 10B (PFOA) for the September 2022 event.
- > Figure 7 (PFOS+PFHxS) and Figure 11 (PFOA) for the January 2023 event.
- > Figures 8A and 8B (PFOS+PFHxS) and Figures 12A and 12B (PFOA) for the April 2023 event; and
- > Figure 9 (PFOS+PFHxS) and Figure 13 (PFOA) for the July 2023 event.

8.1.1 On-site – Source Areas

At the primary source areas on-site, namely the Former Fuel Farm, Fire House and Refuelling Area, Landfills and the Powerhouse, there were localised increases and decreases in PFOA and PFOS+PFHxS concentrations over time.

PFAS stability (using Mann Kendall test) has been calculated for each monitoring location for PFOA and PFOS+PFHxS. Groundwater monitoring data recorded between February 2018 and August 2023 was used for the assessment, with outputs of the Mann Kendall test presented in Appendix D. Statistical trend analysis outcomes are summarised in Table 8-1.

Table 8-1 Mann Kendall Trend Analysis Summary – On-site Source Areas

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFOS+PFHxS Trend	Confidence Factor (%)
Former Fuel Farm	MW101I	Stable	47	Stable	<1
	MW102D	No clear trend	48	No clear trend	17
	MW112S	NA	NA	Stable	83
	MW113S	NA	NA	Possibly decreasing	95
	MW301 ⁽¹⁾	Increasing	>99	No clear trend	63
	MW302 ⁽¹⁾	Stable	37	Stable	28
	MW303	Decreasing	97	Decreasing	97
Fire House and Refuelling Area	MW104I	Increasing	99	Increasing	98
	MW105D	No clear trend	8	No clear trend	28
	MW504	No clear trend	74	No clear trend	74
	MW304	Stable	15	No clear trend	88
	MW305	Decreasing	99	No clear trend	29
	MW306	Stable	51	Stable	68
	MW307 ⁽²⁾	Stable	89	Stable	19
Powerhouse	MW308	No clear trend	46	Stable	<1
	MW309	No clear trend	72	Stable	61
	MW310	No clear trend	5	Stable	8
Eastern Leach Field	MW505	No clear trend	<1	No clear trend	<1

Notes:

(1) February 2019 outlier values not included in the Mann Kendall test.

(2) MW307 was not sampled during the September 2022 – August 2023 monitoring period. 2013-2022 data was used for the statistical analysis.

NA = Mann Kendall test not able to be undertaken given the reporting of concentrations below the LOR. Considered to be stable for the purpose of interpretation.

The results of the trend analysis, supported by the Mann Kendall test indicate:

- > Downgradient monitoring wells of the Former Fuel Farm, MW101I and MW102D, have stable or no clear trends of PFOA and PFOS+PFHxS concentrations. PFOS+PFHxS concentrations at the wells were recorded above the drinking water criteria but below the recreational criteria.
- > Different trends of PFOA concentrations were reported at wells positioned within the Former Fuel Farm. MW301 reports an increasing trend whilst MW302 and MW303 report stable and decreasing trends respectively. Stable or no clear trends of PFOS+PFHxS were identified with concentrations exceeding the recreational criteria. MW113S and MW303 identified possibly decreasing and decreasing trends.
- > Wells located within the Fire House and Refuelling Area indicated stable or no clear trend for PFOS+PFHxS with concentrations exceeding the recreational criteria. MW305 indicated a decreasing trend for PFOA, MW304 and MW306 indicated stable trends, whilst MW504 indicated no clear trend.
- > The monitoring well MW104I, downgradient of the Firehouse and Refuelling Area, shows increasing concentrations of both PFOA and PFOS+PFHxS. Despite recording new maximums (as presented in Section 7.1.3.1) concentrations at MW104I remained within the same order of magnitude as historical data, above the drinking water criteria, and are likely related to PFAS migrating with groundwater flow from the Firehouse and Refuelling Area source area. Concentrations at adjacent well MW105D displayed

no clear trends from the Mann Kendall test but are noted to have been decreasing since September 2021 with no detection above LOR during the monitoring period (refer to Figure 7-2).

- > No clear trends or stable trends for PFOA and PFOS+PFHxS were indicated at the wells located in the immediate vicinity of the Powerhouse with PFOS+PFHxS concentrations exceeding the recreational criteria.
- > MW505 (Eastern Leach Field) identified no clear trends for PFOA or PFOS+PFHxS. MW111S was able to be sampled for the first time since 2018 in September 2022 as it has historically been found dry. PFOS+PFHxS concentrations reported exceeded the recreational criteria. Insufficient temporal data (i.e. less than four results) at this location does not allow for trend analysis.

Overall, the groundwater monitoring results are consistent with historical data and do not suggest a change in the understanding of contamination or risk at the source areas from previous assessments.

8.1.2 On-site – Secondary Sources

Secondary sources area groundwater concentration trends for PFOA and PFOS+PFHxS are summarised in Table 8-2.

Table 8-2 Mann Kendall Trend Analysis Summary – On-site Secondary Sources Area

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFOS+PFHxS Trend	Confidence Factor (%)
Sewerage System and Western Leach Field	MW114S	Stable	<1	Stable	57
Site Drainage	MW115S	No clear trend	51	No clear trend	<1
Water Supply Infrastructure	MW312	No clear trend	73	Stable	38
	MW313	Possibly Decreasing	93	Stable	53
Landfills	MW106S	NA	NA	NA	NA
	MW109S	No clear trend	46	No clear trend	72
	MW110S	NA	NA	No clear trend	86
Abstraction Bore 1	MW401	NA	NA	NA	NA
Abstraction Bore 2	MW402	Possibly increasing	92	No clear trend	72

Notes:

NA = Mann Kendall test not able to be undertaken given the reporting of concentrations below the LOR. Considered to be stable for the purpose of interpretation.

The results of the Mann Kendall trend analysis indicated the following:

- > Overall, PFOS+PFHxS concentrations were indicated to be stable or did not display a clear trend across the secondary sources monitoring well network, therefore, and concentrations were within historical range, mostly below the recreational criteria. No change to the risk profile is interpreted.
- > A possibly decreasing trend in PFOA concentrations was identified at MW313 (Water Supply Infrastructure).
- > It is noted that MW107S and MW108S (Landfills) have consistently been found dry during the monitoring period and therefore no data was collected at these locations. Insufficient temporal data (i.e. less than four results) at these wells does not allow for trend analysis. Other wells at the Landfills indicated stable trends or no clear trends with concentrations reported within historical range.
- > PFOA and PFOS+PFHxS continued to be reported below the LOR at MW401 (Abstraction Bore 1).
- > PFOA concentrations at MW402 were indicated to be possibly increasing which is consistent with the previous monitoring period. Concentrations however remained within the historical range and were relatively low (i.e. within the same order of magnitude as the LOR).

8.1.3 On-site – Other wells

Inner perimeter and boundary groundwater monitoring well trends for PFOA and PFOS+PFHxS are summarised in Table 8-3.

Table 8-3 Mann Kendall Trend Analysis – On-site Other Areas

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFOS+PFHxS Trend	Confidence Factor (%)
Inner Perimeter	MW116S	NA	NA	Stable	42
	MW117I	NA	NA	Stable	9
	MW118D	NA	NA	NA	NA
	MW119S	NA	NA	No clear trend	71
	MW120I	NA	NA	No clear trend	<1
	MW121D	NA	NA	No clear trend	27
	MW122S	NA	NA	No clear trend	76
	MW123I	NA	NA	Decreasing	96
	MW124D	NA	NA	No clear trend	44
Boundary	MW125S	NA	NA	NA	NA
	MW126I	NA	NA	NA	NA
	MW128D	NA	NA	NA	NA
	MW129S	NA	NA	NA	NA
	MW130D	NA	NA	NA	NA
	MW131D	NA	NA	NA	NA
	MW132I	NA	NA	No clear trend	<1
	MW133D	NA	NA	No clear trend	17
	MW134D	NA	NA	NA	NA
	MW135I	NA	NA	NA	NA
	MW136D	NA	NA	Increasing	99
	MW138S	No clear trend	44	Decreasing	99
	MW139I	NA	NA	NA	NA
	MW140D	NA	NA	NA	NA

Notes:

NA = Mann Kendall test not able to be undertaken given the reporting of concentrations below the LOR. Considered to be stable for the purpose of interpretation.

The results of the Mann Kendall trend analysis are summarised as follows:

- > No trend was able to be interpreted with Mann Kendall test for PFOA since concentrations were reported below the LOR at most monitoring wells.
- > PFOS+PFHxS concentrations were indicated to be increasing at boundary well MW136D located downgradient to the southwest of the source areas.
- > Concentrations of PFOS+PFHxS at MW138S have indicated to be decreasing.

Overall, the groundwater monitoring results do not suggest a change in the understanding of contamination or risk profile at these locations. There is indication that off-site PFAS migration to the southwest with groundwater flow could be occurring. This was identified during previous monitoring periods and should be further investigated with off-site groundwater sampling and ongoing monitoring.

8.1.4 Off-site wells

Off-site groundwater monitoring well trends for PFOA and PFOS+PFHxS are summarised in Table 8-4.

Table 8-4 Mann Kendall Trend Analysis – Off-site

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFOS+PFHxS Trend	Confidence Factor (%)
Off-site	MW141S	Stable	86	Possibly Decreasing	99
	MW142S	NA	NA	NA	NA
	MW143S	No clear trend	28	No clear trend	71
	MW403	NA	NA	NA	NA
Background	MW137S	Stable	44	No clear trend	15

Notes:

NA = Mann Kendall test not able to be undertaken given the reporting of concentrations below the LOR. Considered to be stable for the purpose of interpretation.

The results of the Mann Kendall trend analysis are summarised as follows:

- > Concentrations of PFOA and PFOS+PFHxS are considered to be stable at wells MW142S and MW403 as these are consistently reported below the LOR.
- > Stable concentrations of PFOA were identified at wells MW141S and MW137S. MW141S has recorded decreasing concentrations of PFOS+PFHxS since April 2022 (refer to Section 7.1.3.4) and a possibly decreasing trend was identified.

Concentrations of PFAS at the background monitoring well MW137S continued to be reported below the LOR.

Overall, the off-site groundwater monitoring results do not suggest a change in the understanding of contamination or risk at these locations.

8.2 Tap Water

The spatial extent of PFAS concentrations in tap water are shown in Appendix A:

- > Figures 6A and 6B (PFOS+PFHxS) and Figures 10A and 10B (PFOA) for the September 2022 event.
- > Figure 7 (PFOS+PFHxS) and Figure 11 (PFOA) for the January 2023 event.
- > Figures 8A and 8B (PFOS+PFHxS) and Figures 12A and 12B (PFOA) for the April 2023 event.
- > Figure 9 (PFOS+PFHxS) and Figure 13 (PFOA) for the July 2023 event.

PFOA concentrations did not exceed the assessment criteria and no clear trends were identified.

PFOS+PFHxS concentrations exceeded the drinking water criteria, 0.07 µg/L, at POT102, POT103 and POT104 at each monitoring period sampling event. Stable or no clear trends were identified at each tap water monitoring location.

Tap water monitoring data recorded between February 2018 and July 2023 was used for the assessment, with outputs presented in Appendix D. Trends in tap water for PFOA and PFOS+PFHxS are summarised in Table 8-5.

Table 8-5 Mann Kendall Trend Analysis – Tap Water

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFOS+PFHxS Trend	Confidence Factor (%)
Air Traffic Control Tower (Outdoor)	POT102	No clear trend	19	Stable	38
Crew Huts Kitchenette (Indoor)	POT103	No clear trend	85	No clear trend	16
Fire House Kitchenette (Indoor)	POT104	No clear trend	19	Stable	6

No clear trend for PFOA was identified at all tap water locations. Stable or no clear trend (POT103) were identified for PFOS+PFHxS with concentrations recorded within historical range and above drinking water criteria during the monitoring period. These locations are not used for potable water use (with “not for drinking water use” signage). As a result, there is no change in the understanding of the contamination or risk at these sampling locations.

9 Conceptual Site Model

A review of the conceptual site model (CSM) presented in the PMAP (Defence, 2018b) has been undertaken.

The evaluation of analytical results within this report does not suggest the nature and extent of PFAS in groundwater and tap water has significantly changed compared to that interpreted from previous reporting. No new pathway, exposure scenario or potential receptors were identified.

The predominant stability in PFAS trends in groundwater at the on-site boundary wells and off-site wells also suggests the risk profile of the Management Area has not changed.

The data presented in this report does not trigger the need to update the current CSM. Future monitoring will continue to contribute to an evaluation of any potential changes to the CSM understanding.

10 Discussion

10.1 Risk Profile

The Tier 2 (semi-quantitative) Human Health Risk Assessment (HHRA) – Offsite Receptors (Jacobs, 2018d) and Tier 3 (quantitative) Human Health Risk Assessment – Onsite Receptors (Jacobs, 2018e) indicated that *“while the potential for PFAS impacts to the Gnangara UWPCA cannot be ruled out, it was considered that the risk to the current identified off-site receptors - the Pinjar Production Bores – has not occurred and future risk of this occurring is acceptably low. This determination was based on consideration of the following:*

- > *PFAS had not been detected by WA Water Corporation at the Pinjar P140 and P145 abstraction bores;*
- > *PFAS had not been detected in monitoring well GC19 (MW403) located half way between the boundary of the site and the two abstraction bores. The location of this well is such that it can be used to provide a reliable early indication as to whether PFAS might be detected in the Pinjar abstraction bores at some point in the future [i.e. it is highly unlikely that PFAS would be detected in the Pinjar abstraction bores without first being detected in MW403 (GC19)]; and*
- > *A highly conservative analysis of PFOS + PFHxS dispersion away from the identified source areas has been performed. The results indicate that the time period before which PFOS + PFHxS (or other PFAS compounds) would theoretically be detected at concentrations in exceedance of the drinking water criteria at the GC19 sentinel monitoring well location would be substantial - ranging from 50 years to 150 years.”*

In addition, it was determined that *“the risks to typical base personnel at the site from chronic exposure to non-potable water impacted with PFAS was low and acceptable. This was on the basis that whilst tap water at the site did contain levels of PFAS and the water is used for various non-drinking purposes, incidental exposure from the PFAS is low and acceptable and thus the potential consequences to health are insignificant”*.

The findings of the OMP implementation at the site supports the outcomes of the above risk assessments.

The risk to off-site receptors (Water Corporation production bores and Gnangara aquifer) remains low and acceptable based on the following:

- > The groundwater characteristics and flow direction have been consistent since the start of the groundwater investigations.
- > PFAS concentrations in MW403 located further downgradient were consistently below the LOR.
- > PFAS concentrations are considered to be stable at off-site well MW142S as these are consistently reported below the LOR.
- > PFAS concentrations appear stable at off-site well MW143S and remained within the same order of magnitude as the LOR.
- > MW141S has recorded decreasing concentrations of PFOS+PFHxS since April 2022.

The risk to site users remains low and acceptable based on the following:

- > The taps on-site are not used for potable water (with “not for drinking water use” signage on all taps)
- > Stable or no clear trends were identified for PFAS concentrations at each tap water location.
- > PFAS concentrations at on-site wells were predominantly identified as being stable.
- > Monitoring results do not suggest a change in the understanding of contamination or risk at the source areas.

However, it is noted that PFOS+PFHxS concentrations were recorded above the LOR at two south and southwest inner perimeter and boundary monitoring wells (MW122S and MW136D respectively), downgradient of the on-site source areas, with increasing concentration trends. Consistent with previous OMR findings, this indicates a potential off-site migration (i.e. PFAS movement) with groundwater flow to the west/southwest. There was no off-site monitoring well to the west/southwest of the site to confirm the extent of PFAS within this area during the monitoring period. The concentrations detected were less than an order of magnitude above the LOR, therefore the risk is considered to be unchanged from the previous assessments, however, further investigation off-site should be considered.

10.2 Triggers for OMP Review

The OMP is reviewed annually considering existing trend data available to tailor the monitoring program to site-specific characteristics. A review of the OMP may be required for several reasons including (but not limited to):

- > Policy changes, regulatory requirements, or regulator advice.
- > Feedback and information received as part of stakeholder engagement activities.
- > A change in the understanding of the risk for the site.
- > Significant changes of land use within the Management Area or at close proximity.
- > Impacts of remediation works.
- > The requirements of a post-remediation Site Management Plan.

The monitoring period results identified a potential off-site migration of PFAS in groundwater and a review of the OMP should consider if further off-site investigation to the southwest of the site is required to confirm the extent of PFAS.

11 Conclusions

Groundwater and tap water monitoring were completed at the site between September 2022 and August 2023 in general accordance with the SAQP (Cardno, 2023). The monitoring conducted between September 2022 and August 2023 is considered to have met the OMP objectives outlined in Section 1.2.

Groundwater

The concentrations of PFAS in groundwater during the monitoring period reported concentrations within the same order of magnitude as historical monitoring results. The drinking water and recreational use criteria were exceeded at monitoring wells positioned in the immediate vicinity of the source areas, with the highest concentrations located downgradient of the Powerhouse.

Most wells from the source areas (primary and secondary) reported concentrations within historical range and stable or no clear trends. Increasing or decreasing trends were also identified at several monitoring wells for PFOA and/or PFOS+PFHxS. Exceedances of the drinking water or recreational criteria indicate PFAS in groundwater remain at higher concentrations within the source areas.

PFOS+PFHxS were previously reported at off-site monitoring wells MW141S and MW143S suggesting a potential migration of PFAS to the south (Cardno, 2024). Concentrations recorded at MW141S showed a decrease over the monitoring period, however, MW143S could not be sampled as it was dry. Southwest boundary monitoring well MW136D, downgradient of the source areas, identified an increasing PFOS+PFHxS trend, and inner perimeter well MW122S reported new PFOS+PFHxS concentration maximums. Consistent with previous OMR findings, this indicates potential off-site migration (i.e. PFAS movement) with groundwater flow to the southwest. There were no off-site monitoring wells sampled during the monitoring period to the west/southwest of the site to confirm the extent of PFAS within this area. However, the concentrations detected at MW136S and MW141S were less than an order of magnitude above the LOR, therefore the risk is interpreted to be unchanged from the previous assessments. Ongoing monitoring will continue to assess any changes and further off-site monitoring will be considered.

Tap Water

PFAS concentrations across the tap water network on-site generally display a stable or no clear significant trend. No new exceedances or maximum concentrations of PFOA and PFOS+PFHxS were recorded during the monitoring period. PFOA concentrations did not exceed the assessment criteria. PFOS+PFHxS concentrations exceeded the drinking water criteria at POT102, POT103 and POT104 by an order of magnitude, however, no clear concentration trend was identified (i.e. trend considered stable).

On-site abstraction bores, understood to be connected to the site's water tanks and tap network, will continue to be monitored for PFAS as part of the OMP.

CSM and risk profile

The current available data does not identify the need for a CSM update. No new source, pathway or receptor were identified, and the exposure pathways identified in the PMAP still exist.

The data evaluated in this report does not indicate changes to the nature and extent of PFAS in groundwater which would lead to a change in the risk understanding. The risk profile for the Management Area or the Monitoring Area remains low and acceptable. The monitoring period results did not identify a change in the risk profile for the Monitoring Area (including the Management Area) that would trigger the need for further management actions.

The OMP is currently being reviewed with consideration of the OMP data collected to date to ensure that the ongoing monitoring program continues to appropriately monitor the PFAS extent in and around site.

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APPENDIX

A

FIGURES



now





Legend

 Site Boundary / Management Area

 Monitoring Area

FIGURE 1
1:60,000 Scale at A3

Metres

0 1,000 2,000

Site Location

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-11 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-001_RegionalLocation 03.mxd
Aerial Imagery Supplied by Nearmap (Dec 2019)

Source Area	Description
SA01	Former Fuel farm
SA02	Firehouse, refuelling area and washdown bay
SA03	Powerhouse
SA04	Eastern Leach Field



Legend

 Management Area

 PFAS Source Areas (Jacobs, 2018)

FIGURE 2

1:12,000 Scale at A3

Metres

0

200

400

Management Area

2023 ONGOING MONITORING REPORT

GINGIN SATELLITE AIRFIELD

DEPARTMENT OF DEFENCE



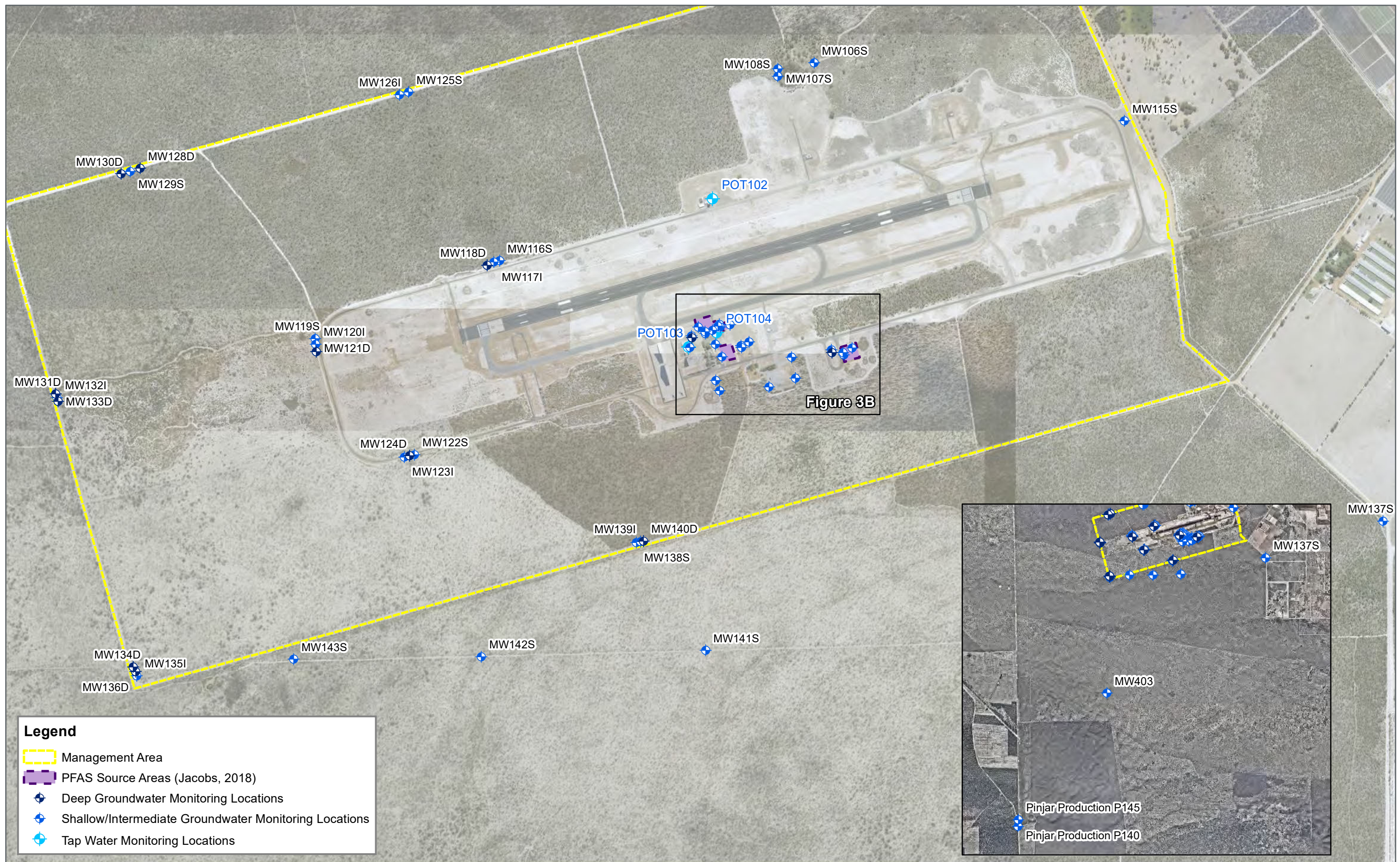
Map Produced by Cardno WA

Date: 2024-03-11 | Project: DEF19009

Coordinate System: GDA 1994 MGA Zone 50

Map: 304700525_WA_0958-GS-002_ManagementAreas 02.mxd

Aerial Imagery Supplied by Aerometrex



Legend

- Management Area
- PFAS Source Areas (Jacobs, 2018)
- ◆ Deep Groundwater Monitoring Locations
- ◆ Shallow/Intermediate Groundwater Monitoring Locations
- ◆ Tap Water Monitoring Locations

FIGURE 3A
 1:12,500 Scale at A3

Metres

0 200 400

Monitoring Locations

2023 ONGOING MONITORING REPORT
 GINGIN SATELLITE AIRFIELD
 DEPARTMENT OF DEFENCE

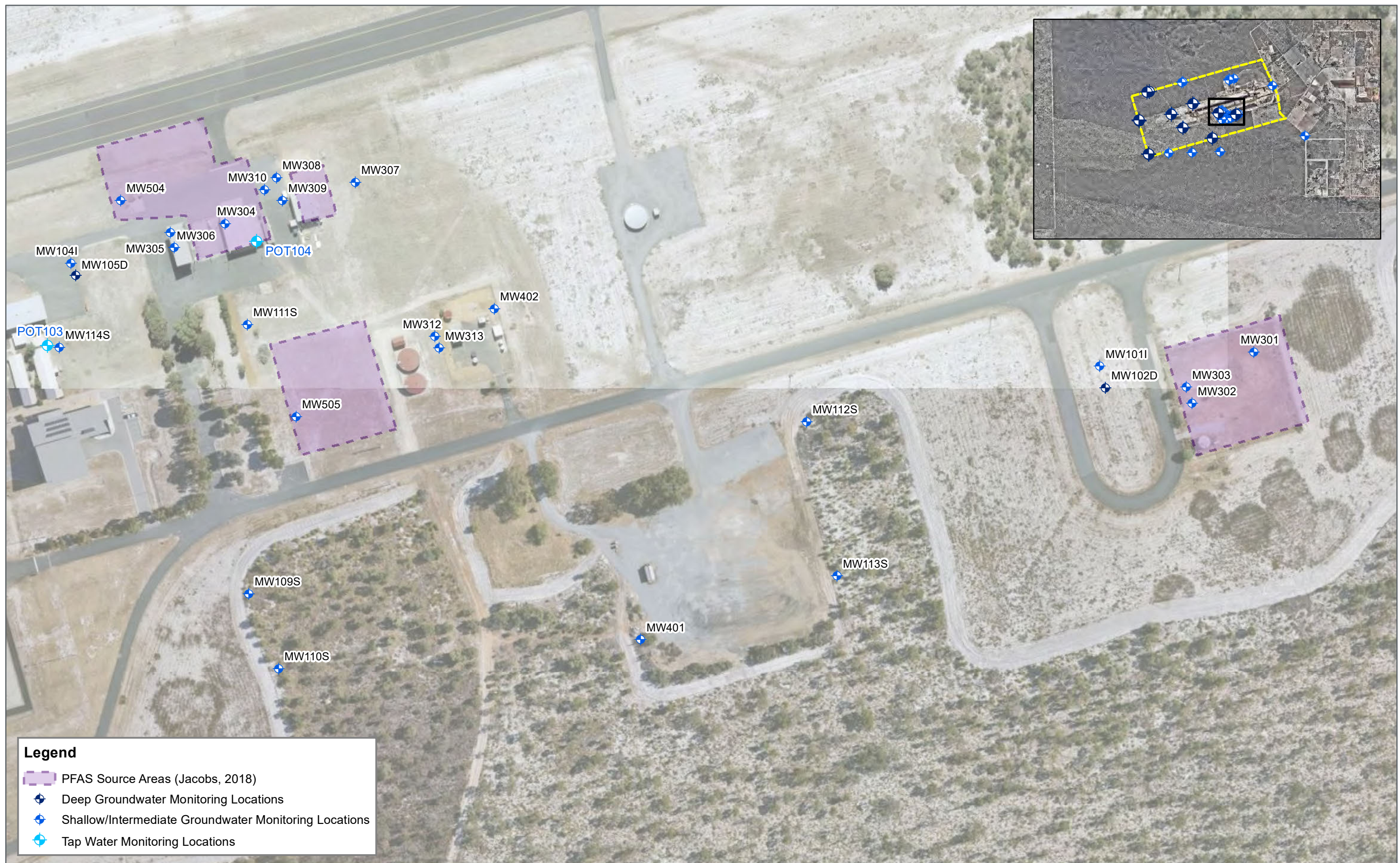


FIGURE 3B
1:1,700 Scale at A3

Metres
0 50 100

Monitoring Locations

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
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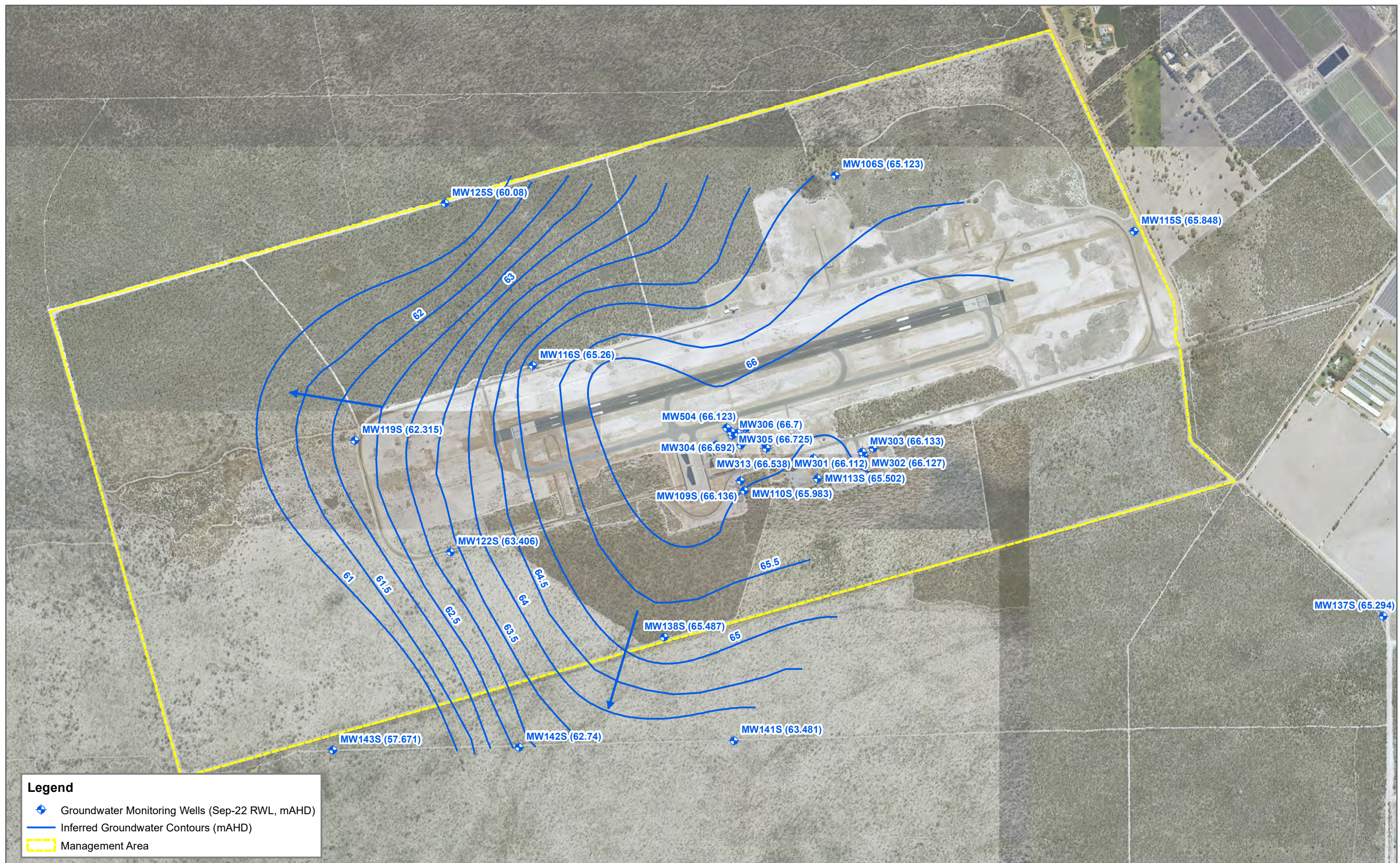


FIGURE 4A
1:13,000 Scale at A3

Metres

0 200 400

September 2022 Groundwater Contours (Shallow Aquifer)

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-06-13 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-004A_Sep-22ShallowGroundwaterContours 01.mxd
Aerial Imagery Supplied by Aerometrex

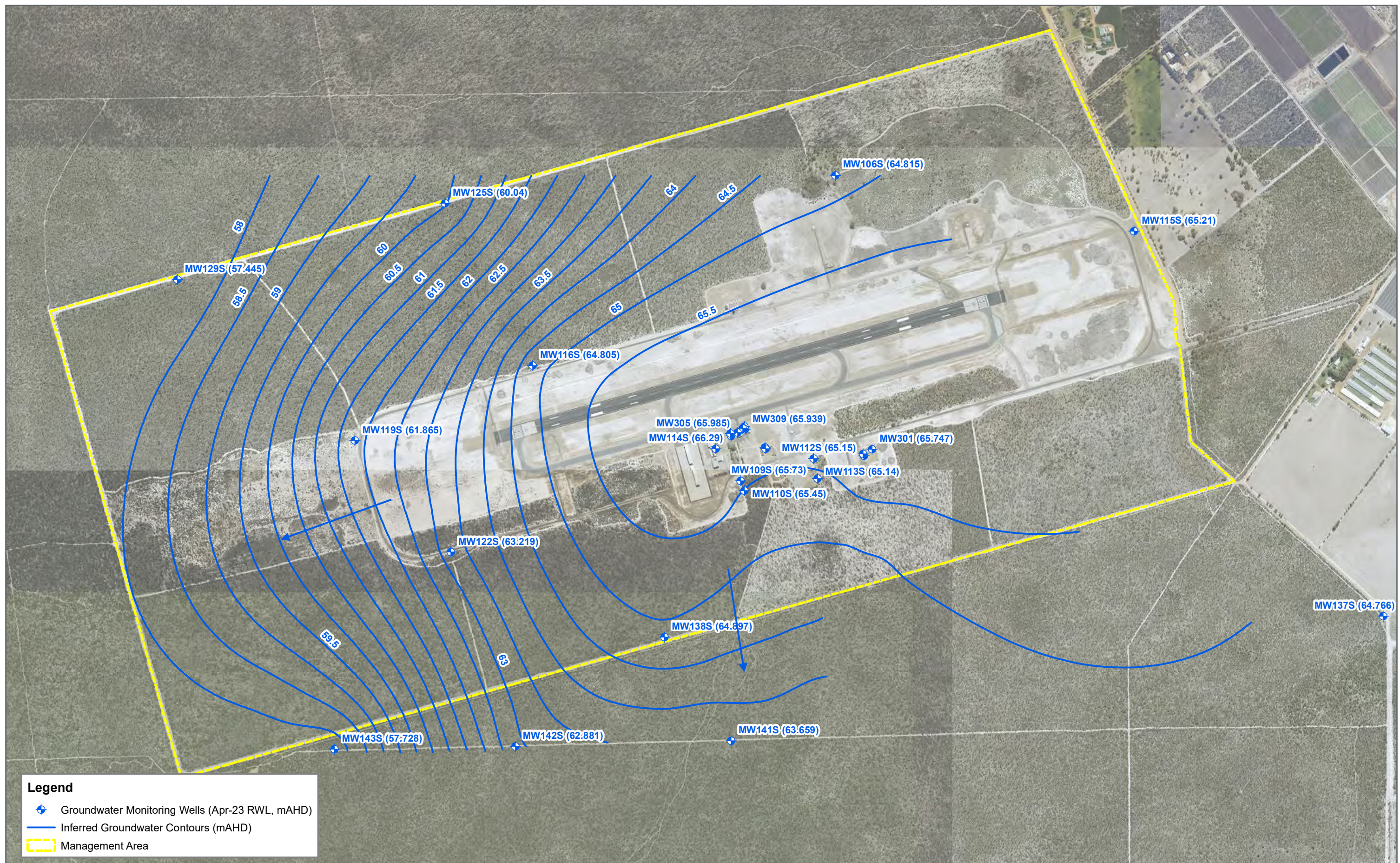


FIGURE 4B
1:13,000 Scale at A3

Metres
0 200 400

April 2023 Groundwater Contours (Shallow Aquifer)

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-12 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-004B_Apr-23ShallowGroundwaterContours 01.mxd
Aerial Imagery Supplied by Aerometrex



FIGURE 5A
1:13,000 Scale at A3

Metres
0 200 400

September 2022 Groundwater Contours (Deep Aquifer)

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-06-13 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-005A_Sep-22DeepGroundwaterContours 01.mxd
Aerial Imagery Supplied by Aerometrex



FIGURE 5B
1:13,000 Scale at A3

Metres
0 200 400

April 2023 Groundwater Contours (Deep Aquifer)

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-12 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
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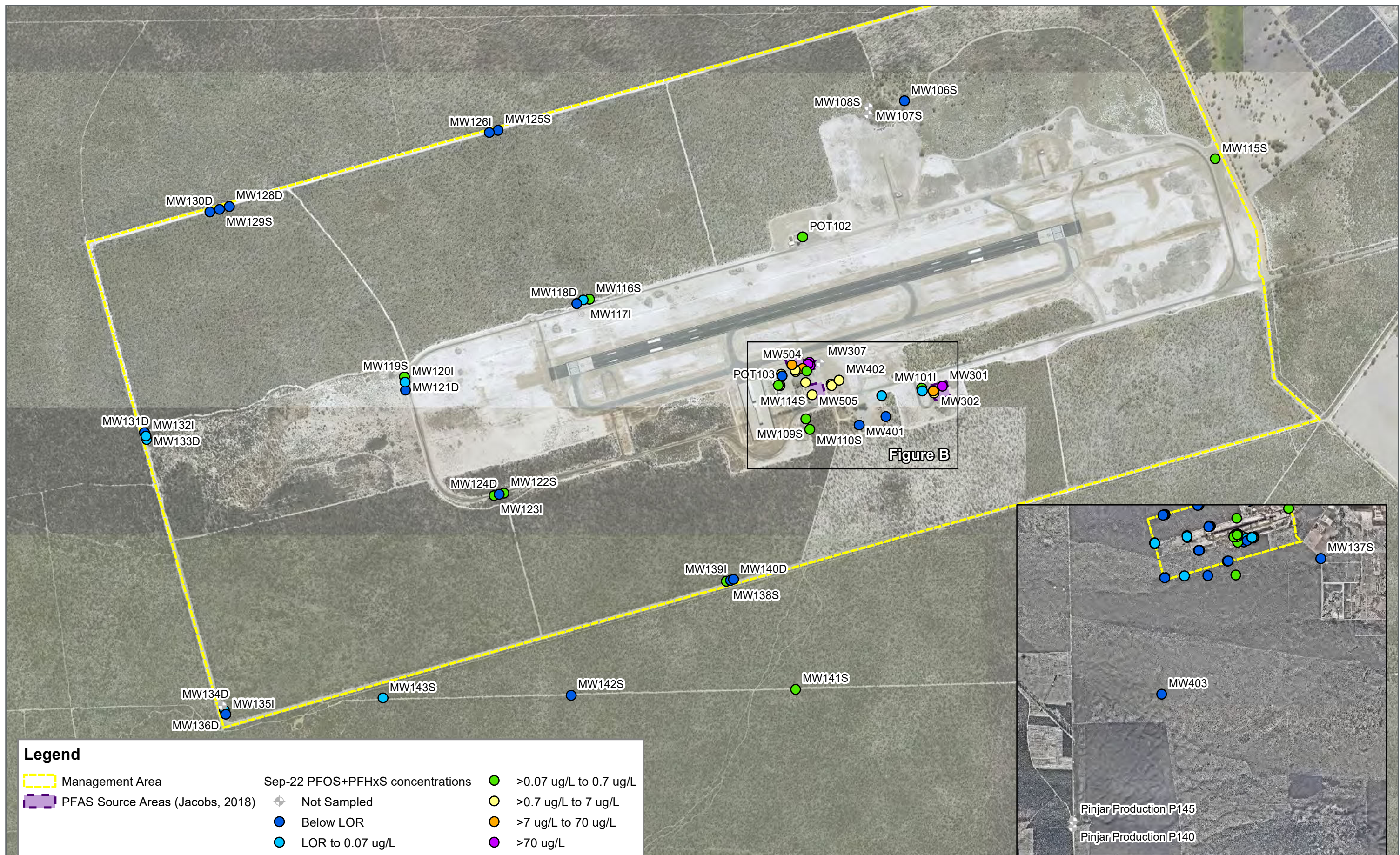


FIGURE 6A
1:12,500 Scale at A3

Metres
0 200 400

PFOS+PFHxS Concentrations in Groundwater - September 2022

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-12 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
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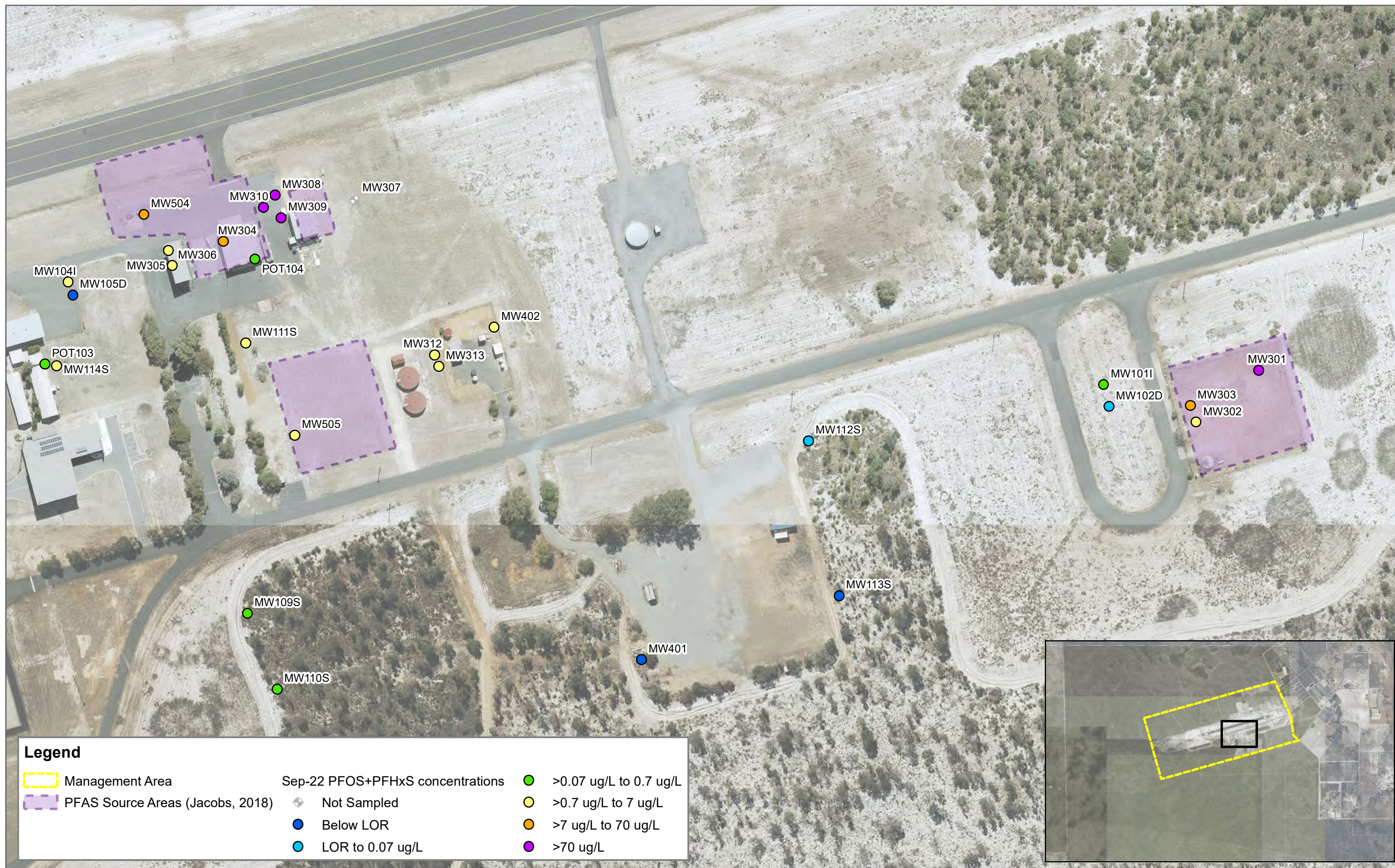
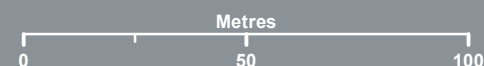


FIGURE 6B
1:1,700 Scale at A3



PFOS+PFHxS Concentrations in Groundwater - September 2022

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-006B_PFOs+PFHxS_Sept-22 01.mxd
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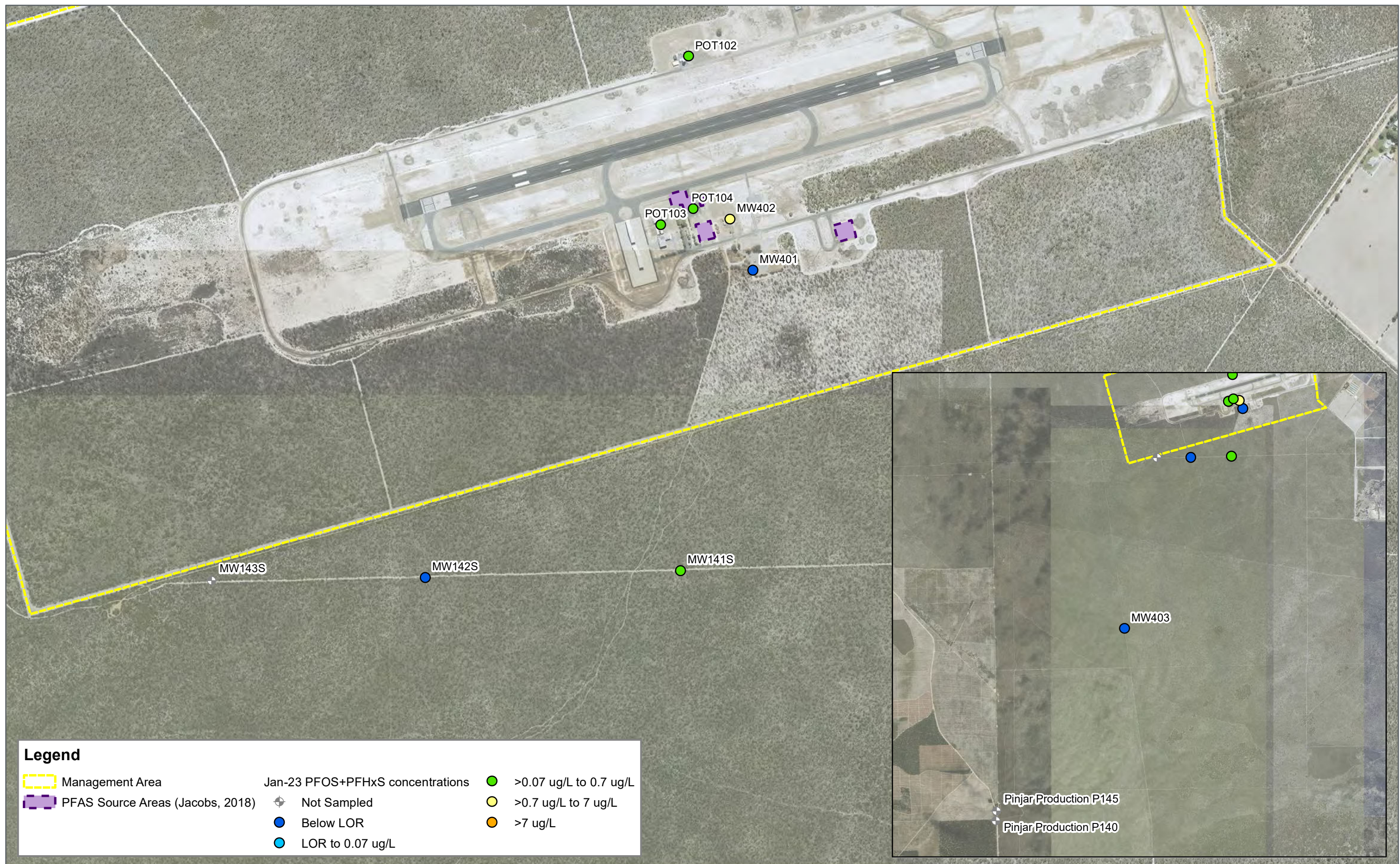


FIGURE 7
1:11,000 Scale at A3

Metres

0 200 400

PFOS+PFHxS Concentrations in Groundwater - January 2023

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
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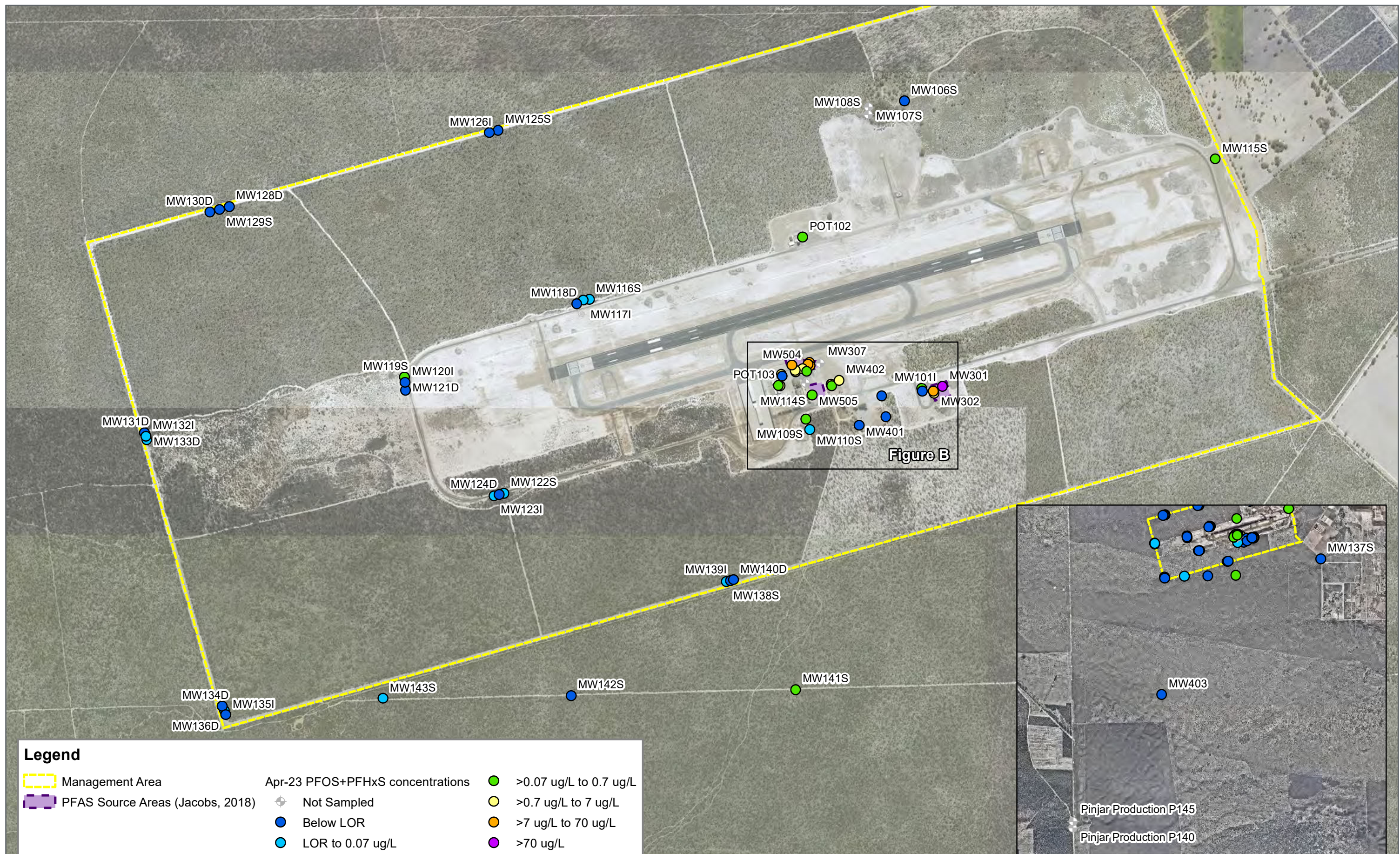


FIGURE 8A
1:12,500 Scale at A3

Metres
0 200 400

PFOS+PFHxS Concentrations in Groundwater - April 2023

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
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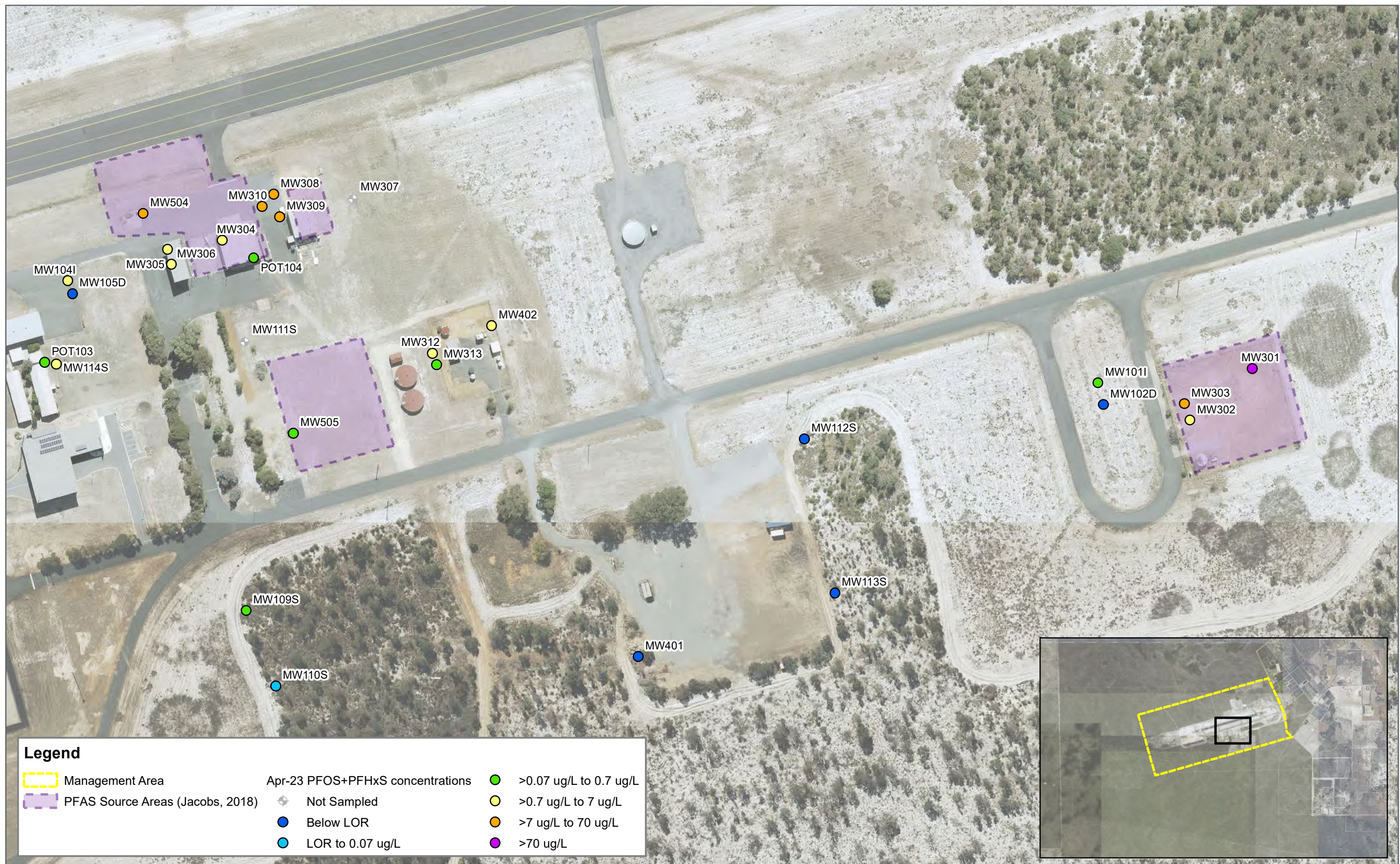
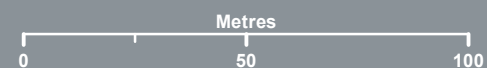


FIGURE 8B
1:1,700 Scale at A3



**PFOS+PFHxS Concentrations
in Groundwater - April 2023**
2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
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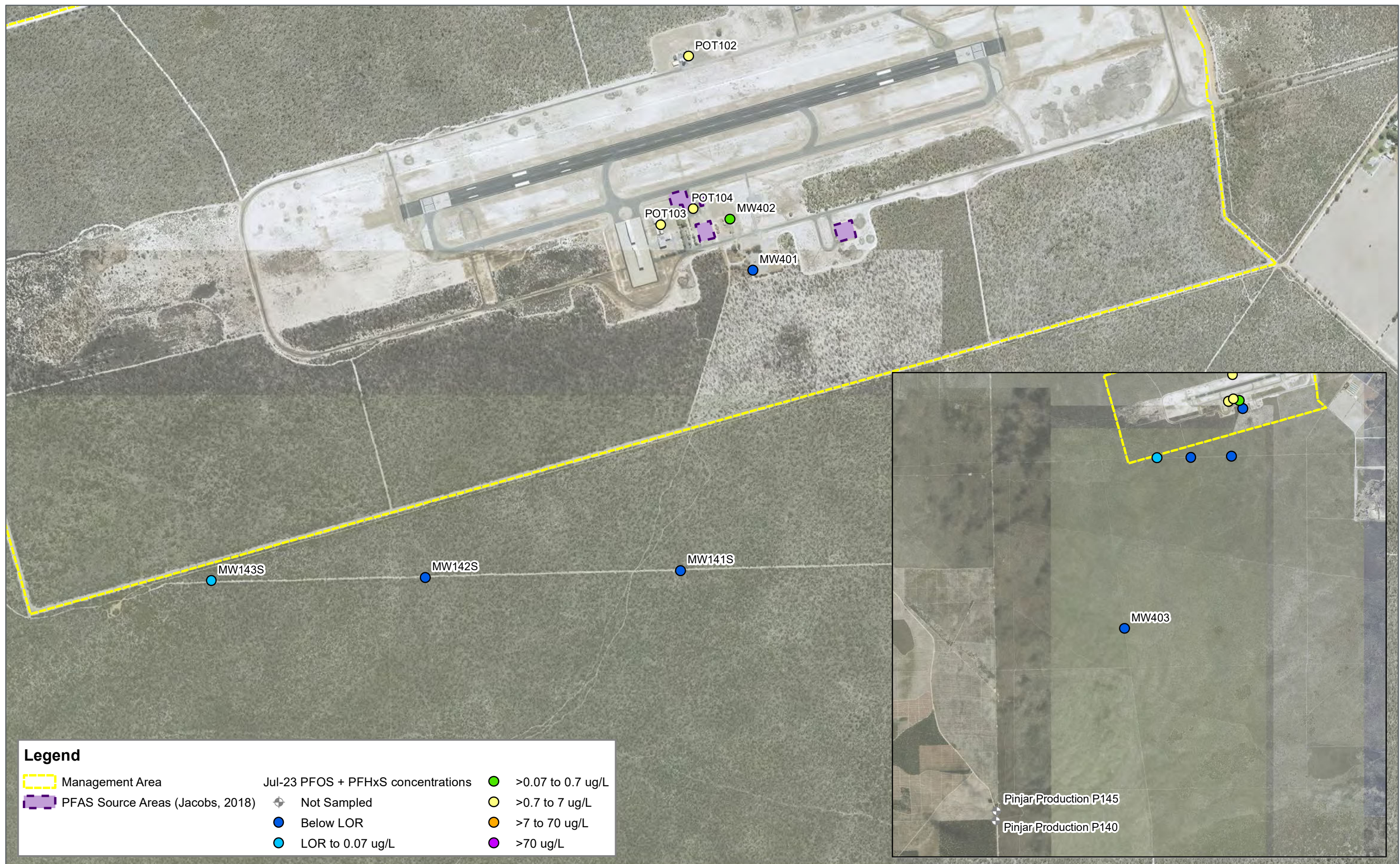


FIGURE 9
1:11,000 Scale at A3

Metres

0 200 400

**PFOS+PFHxS Concentrations
in Groundwater - July 2023**

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE

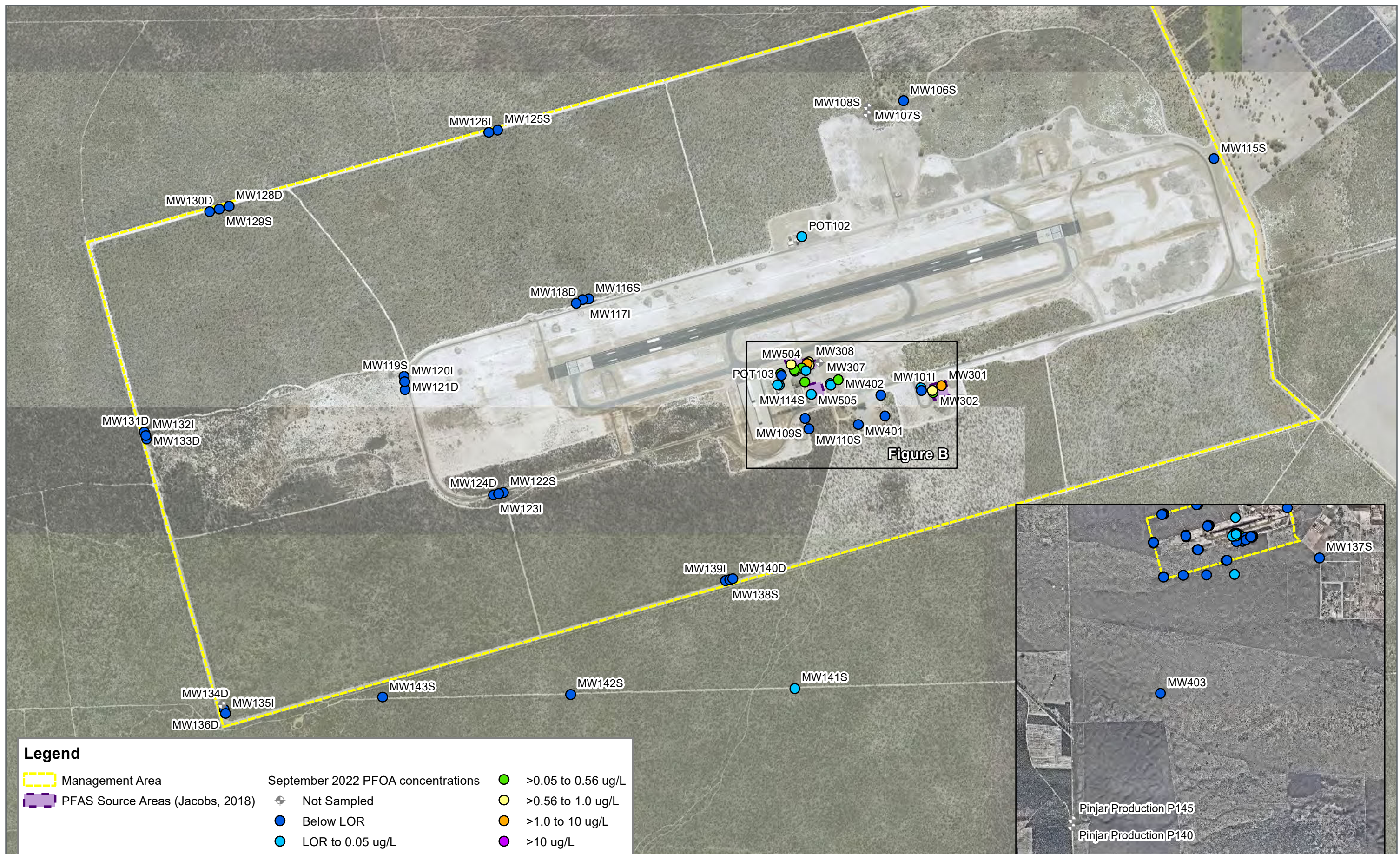
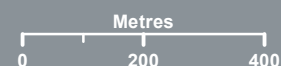


FIGURE 10A
1:12,500 Scale at A3



PFOA Concentrations in Groundwater - September 2022

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
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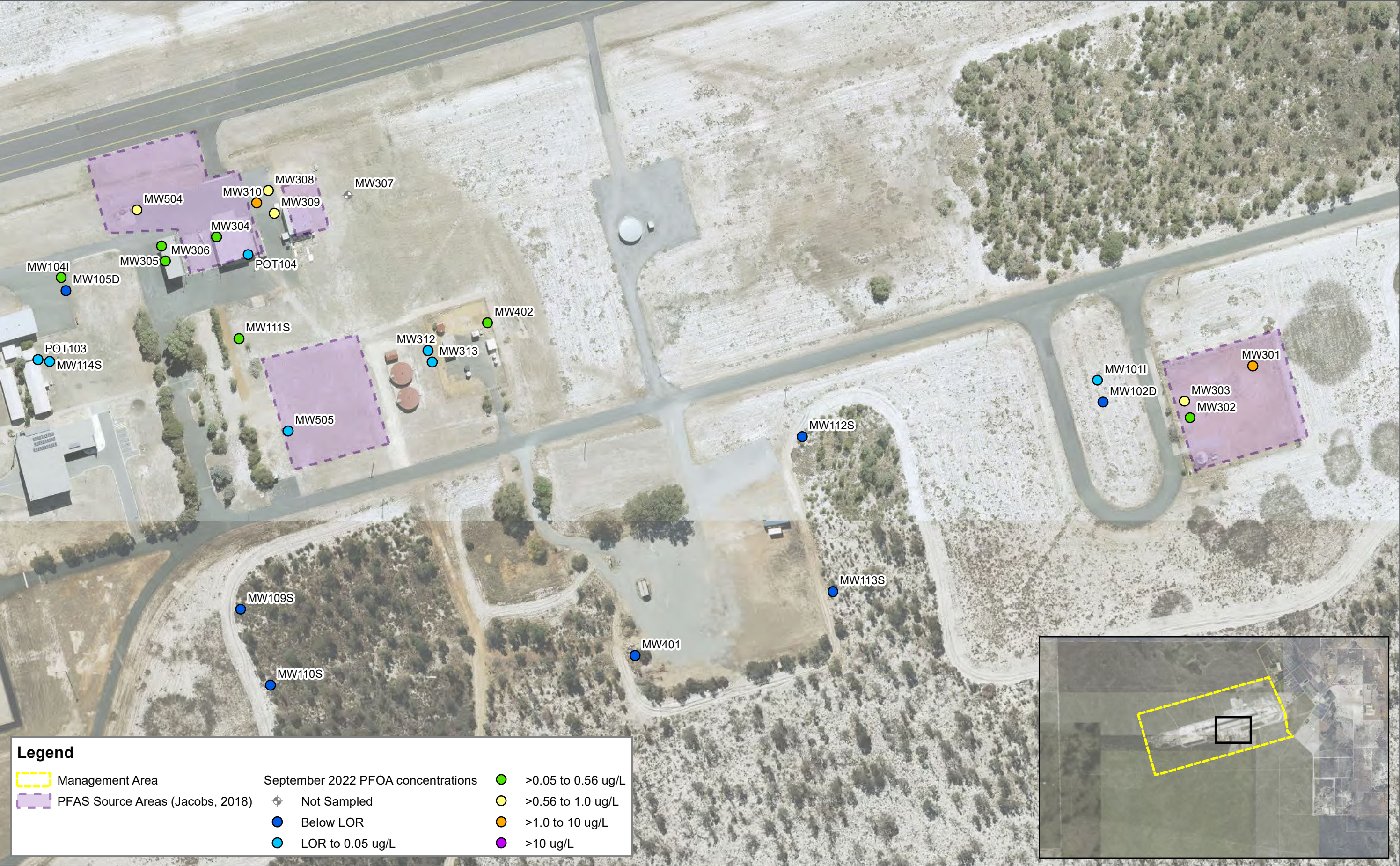
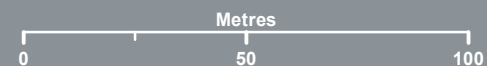


FIGURE 10B
1:1,700 Scale at A3



**PFOA Concentrations
in Groundwater - September 2022**
2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-010B_PFOA_Sept-22 01.mxd
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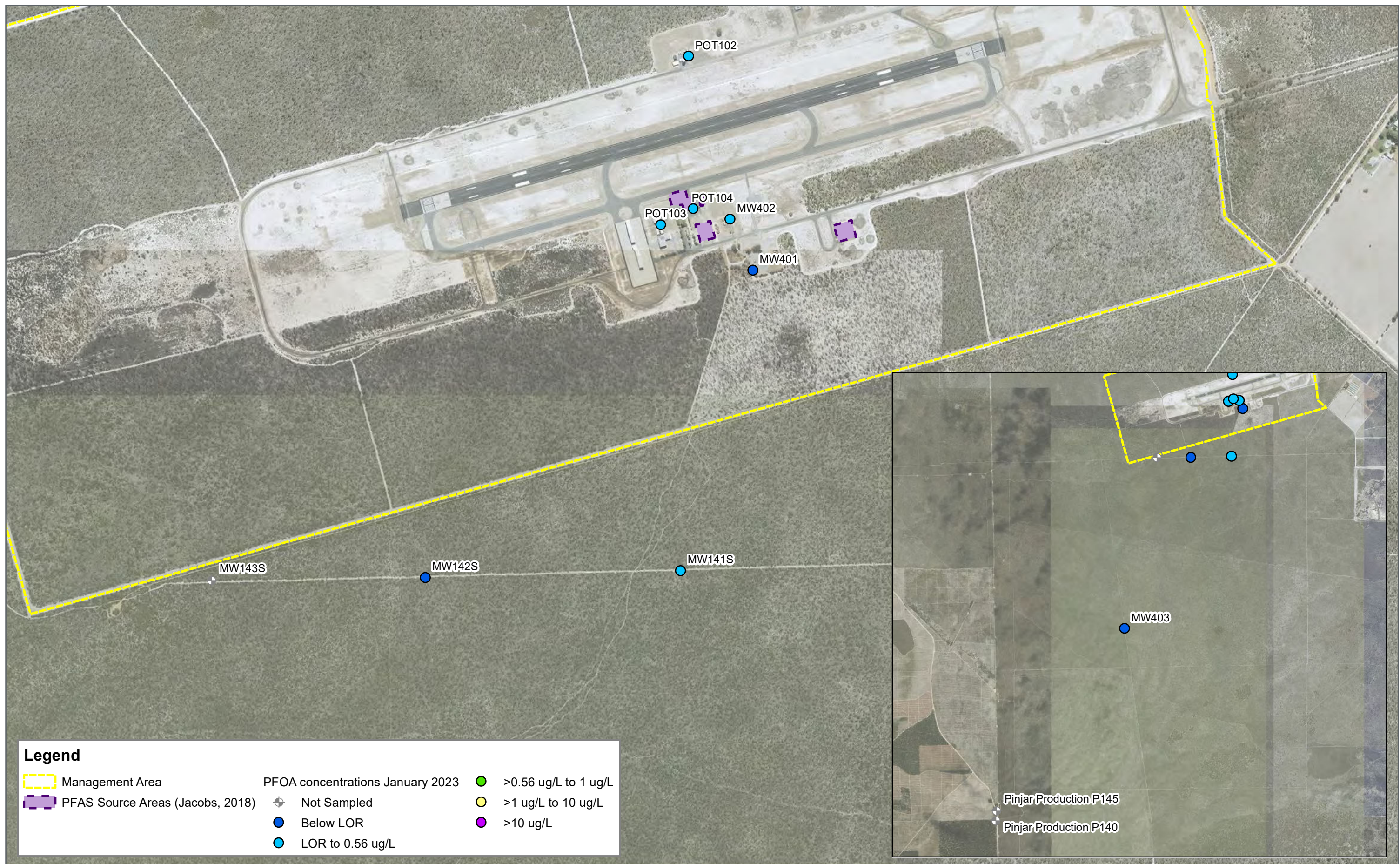


FIGURE 11
1:11,000 Scale at A3

Metres

0 200 400

PFOA Concentrations in Groundwater - January 2023

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE

Cardno

Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-011_PFOA_Jan-23 01.mxd
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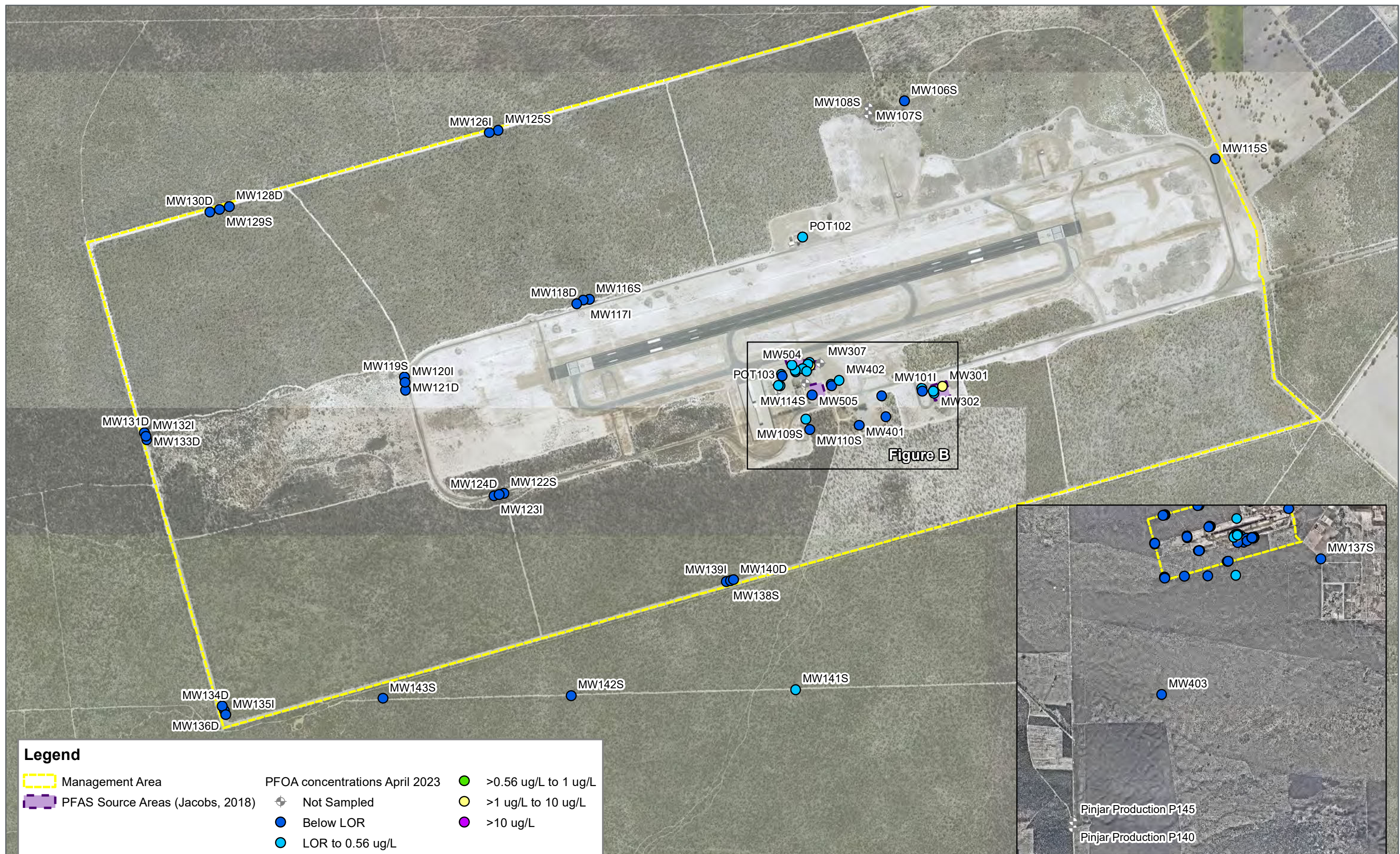


FIGURE 12A
1:12,500 Scale at A3

Metres
0 200 400

PFOA Concentrations in Groundwater - April 2023 2023 ONGOING MONITORING REPORT GINGIN SATELLITE AIRFIELD DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-012A_PFOA_Apr-23 01.mxd
Aerial Imagery Supplied by Aerometrex & Nearmap

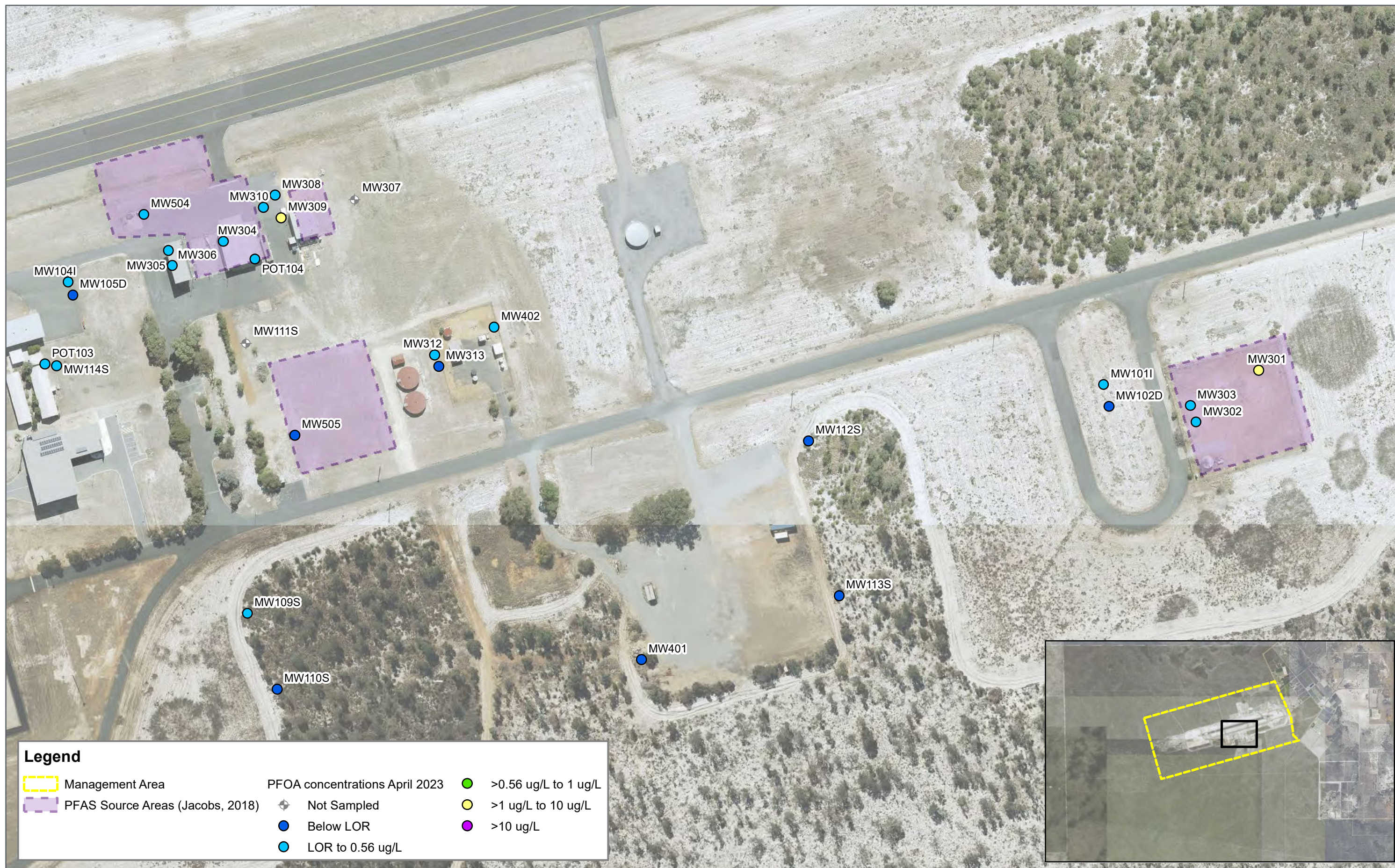
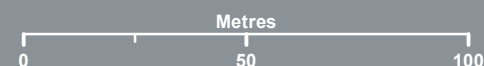


FIGURE 12B
1:1,700 Scale at A3



PFOA Concentrations in Groundwater - April 2023

2023 ONGOING MONITORING REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-03-13 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-012B_PFOA_Apr-23 01.mxd
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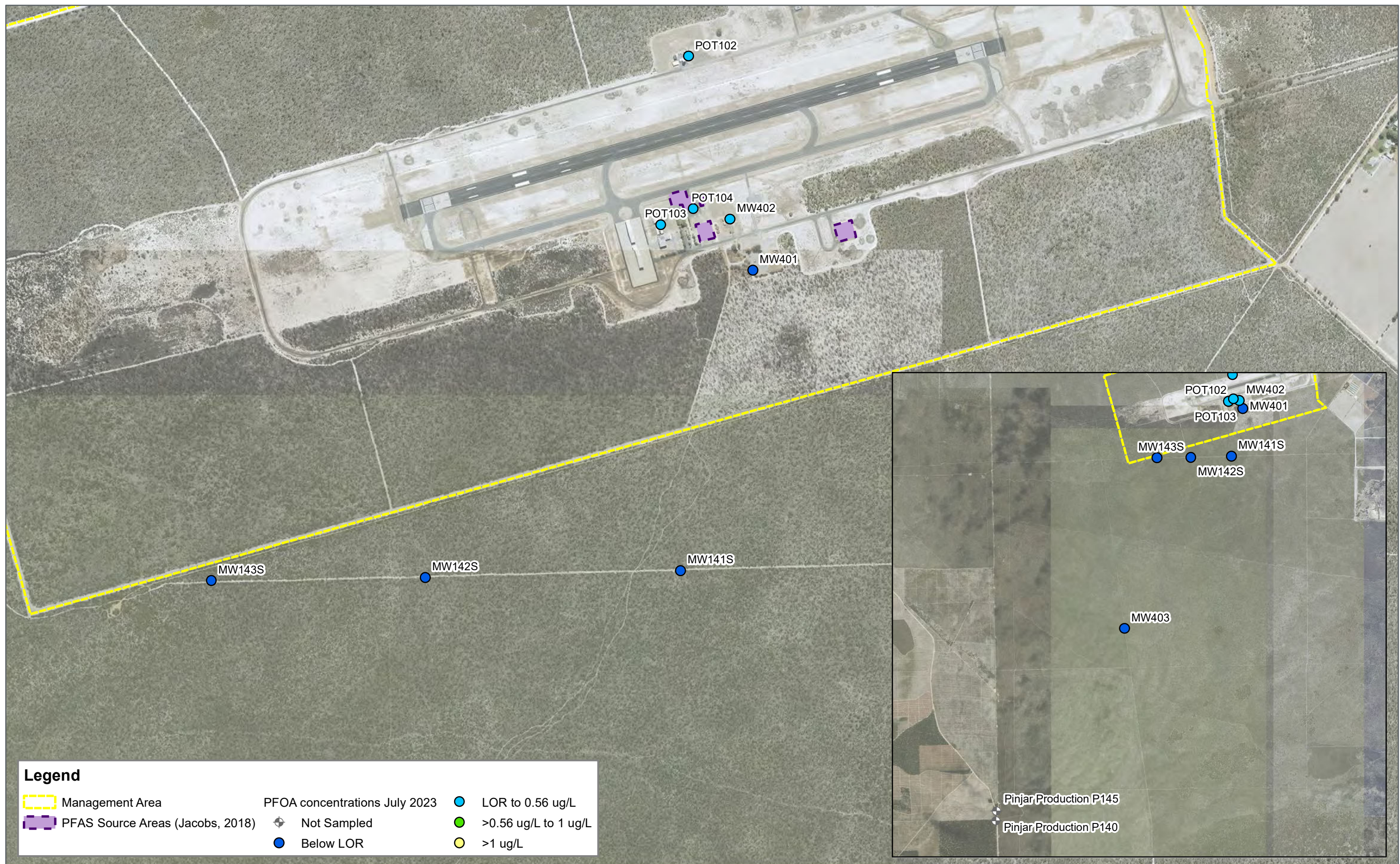


FIGURE 13
 1:11,000 Scale at A3

Metres
 0 200 400

PFOA Concentrations in Groundwater - July 2023 2023 ONGOING MONITORING REPORT GINGIN SATELLITE AIRFIELD DEPARTMENT OF DEFENCE

APPENDIX

B

SAQP



now





PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP)

Gingin Satellite Airfield

Prepared for
Department of Defence

24 August 2023



Contact Information

Cardno, now Stantec

ABN 17 007 820 322

226 Adelaide Terrace

Perth WA 6000

Australia

www.stantec.com

Document Information

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Appendices

Appendix A	Figures
Appendix B	Full PFAS Analytical Suite

1 Introduction

Cardno have been engaged by the Australian Department of Defence ('Defence' or 'Client') to prepare a Sampling and Analysis Quality Plan (SAQP) as part of the Ongoing Monitoring Plan (OMP). The purpose of which is to monitor trends in the extent and concentration of per- and poly-fluoroalkyl substances (PFAS) impacts identified on and around the Royal Australian Airforce (RAAF) Gingin Satellite Airfield ("the site"). The site is located in Yeal, Western Australia and is displayed in Figure 1 of Appendix A.

This SAQP applies to the "Management Area" and "Monitoring Area" as defined in the OMP (Department of Defence, 2018). The Management Area is defined as the area for which active management of risks relating to PFAS contamination are required. The Monitoring Area is defined as the area where risks relating to PFAS contamination are currently considered to be acceptably low and therefore active management of these risks is not considered necessary. However, ongoing monitoring is required to assess any changes in PFAS concentrations over time that may alter the potential risks (Defence, 2018).

For the purposes of this report:

- > Management Area was defined as Gingin Satellite Airfield (Figure 1, Appendix A).
- > Monitoring Area was defined as comprising the site, plus the parcel of Crown Land that represents the Yeal Swamp Nature Reserve (Figure 2, Appendix A).

The site is located on Commonwealth Land and is regulated under Commonwealth environmental legislation. The OMP outlines the rationale and scope for the monitoring of the concentrations and extent of PFAS in groundwater originating from the site. The monitoring consists of biannual groundwater monitoring of all onsite groundwater wells, quarterly monitoring of taps and abstraction bores onsite, and quarterly monitoring of selected offsite groundwater monitoring wells and abstraction bores.

1.1 Purpose & Objectives

The objective of the SAQP is to present the specific monitoring locations, sampling methodologies and quality control/quality assurance (QA/QC) measures for the monitoring of the concentrations and extent of PFAS in groundwater (on and off-site), tap water (non-potable) and existing abstraction bores. These findings will inform risk management decisions by Defence and the Western Australian Government to protect human health and the environment.

The specific purposes of the monitoring specified in the OMP is to set out a program of monitoring of groundwater (on and off-site), tap water (non-potable) and existing abstraction bore water quality to continue to assess the changes in the nature and extent of PFAS within the environment, where there is an identified potentially elevated risk to a receptor or a potential future risk to a receptor associated with Defence's historical use of legacy aqueous film-forming foam (AFFF).

1.2 Previous Reports

The following key reports prepared in relation to the Gingin Satellite Airfield PFAS Investigation have been used as a basis to develop this OMP SAQP:

- > Department of Defence, 2018a, *Gingin Satellite Airfield PFAS Ongoing Monitoring Plan*.
- > Department of Defence, 2018b, *Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan*.
- > Jacobs, 2018a, *Preliminary Conceptual Site Model - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0001).
- > Jacobs, 2018b, *Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0002).
- > Jacobs, 2018c, *Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0003).
- > Jacobs, 2018d, *Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations, Tier 2 Human Health Risk Assessment - Offsite Receptors* (No. IS219200-0000- NP- RPT-0005).

- > Jacobs, 2018e, *Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations, Tier 3 Human Health Risk Assessment - Onsite Receptors* (No. IS219200-0000- NP- RPT-0006).
- > Jacobs, 2019a, *PFAS Ongoing Groundwater Monitoring Report* (No. IS219200-0000-NP-RPT-0008).
- > Cardno, April 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2019*.
- > Cardno, May 2020, *PFAS OMP Quarterly Sampling Event Factual Report – March 2020*.
- > Cardno, June 2020, *Biannual Monitoring Factual Report – post-summer 2020*.
- > Cardno, December 2020, *PFAS OMP Quarterly Sampling Event Factual Report – August 2020*.
- > Cardno, December 2020, *PFAS OMP Biannual Monitoring Factual Report – post-winter 2020*.
- > Cardno, March 2021, *PFAS OMP Quarterly Sampling Event Factual Report – January 2021*.
- > Cardno, April 2021, *PFAS OMP – 2020 Annual Interpretive Report*.
- > Cardno, August 2021, *PFAS OMP Biannual Monitoring Factual Report – post-summer 2021*.
- > Cardno, August 2021, *PFAS OMP Quarterly Sampling Event Factual Report – July 2021*.
- > Cardno, November 2021, *PFAS OMP Biannual Monitoring Factual Report – post-winter 2021*.
- > Cardno, January 2022, *PFAS OMP Quarterly Sampling Event Factual Report – January 2022*.
- > Cardno, August 2022, *PFAS OMP Biannual Monitoring Factual Report – post-summer 2022*.
- > Cardno, October 2022, *PFAS OMP Quarterly Sampling Event Factual Report – July 2022*.
- > Cardno, December 2022, *PFAS OMP Biannual Monitoring Factual Report – post-winter 2022*.
- > Cardno, February 2023, *PFAS OMP Quarterly Sampling Event Factual Report – January 2023*.
- > Cardno, May 2023, *PFAS OMP – 2021 Annual Interpretive Report*.
- > Cardno, May 2023, *PFAS OMP Biannual Monitoring Factual Report – post-winter 2022*.

1.3 Responsible Parties

Responsible parties and responsibilities associated with the implementation of the OMP are detailed in Table 1-1.

Table 1-1 Responsible Parties

Role	Responsibilities
Department of Defence – PFAS Investigation and Management Branch	<ul style="list-style-type: none"> ▪ Implement this OMP. ▪ Engage suitably qualified environmental consultants/contractors to carry out the works specified in the OMP
RAAF Gingin Satellite Airfield – Base Support Manager and Environment and Sustainability Manager	<ul style="list-style-type: none"> ▪ Review and approve all necessary permits required for implementation of the works outlined in the OMP.
Environmental Consultant	<ul style="list-style-type: none"> ▪ Obtain necessary permits from RAAF Gingin Satellite Airfield to implement the works outlined in the OMP. ▪ Liaise with State regulators (e.g. Department of Water and Environmental Regulation and Water Corporation) to arrange sampling of off-site monitoring wells, as required. ▪ Undertake the monitoring activities outlined in this SAQP. ▪ Produce a monitoring report that summarises the data and findings of each monitoring event and is consistent with the requirements of this SAQP. ▪ Produce an ongoing monitoring interpretative report including recommendations for any potential changes in the location and frequency of sampling which may be incorporated in the revision of the OMP. ▪ Upload analytical data from each monitoring event to the relevant Defence ESdat database.
Department of Defence (lead) and Environmental Consultant	<ul style="list-style-type: none"> ▪ Liaise with off-site private property owners to arrange private property access to conduct sampling.

1.4 Relevant Guidelines

This SAQP has been prepared in general accordance with the WA *Contaminated Sites Act 2003* (CS Act), applicable industry standards and guidelines relevant to an assessment of this type, and has been formulated in reference to the following:

- > National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure (as amended 2013)* (ASC NEPM).
- > Heads of Environmental Protection Authority's Australia and New Zealand (HEPA), January 2020, *PFAS National Environmental Management Plan (NEMP) 2.0*.
- > Standards Australia 1998. AS/NZ 5667:1998 *Water quality – sampling*.
- > Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.
- > Department of Defence, Department of Energy, 2018, *Quality System Manual Schedule B15*.
- > U.S. Environmental Protection Agency (EPA), 2000, 'Guidance for the Data Quality Objectives Process (EPA QA/G-4)'.
- > USEPA, 2002, 'Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8)'.
- > Department of Environment and Regulation (DER), 2014, *Assessment and Management of Contaminated Sites*¹.
- > National Health and Medical Research Council (NHMRC), August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.

1.5 Standards of Assessment and Limitations

This SAQP has been prepared in general accordance with the current industry standards for an assessment of this type for the purpose, objectives and scope identified in this report.

The scope presented in this SAQP report are derived only from available desk-based information and site inspection undertaken. This SAQP is not any of the following:

- > A Mandatory Audit Report (MAR) or Voluntary Audit Report (VAR) as defined under the *Contaminated Sites Act 2003* (CS Act).
- > A Geotechnical Assessment.
- > A Detailed Site Investigation (DSI).
- > A Detailed Hydrogeological Assessment.
- > A Remediation Action Plan (RAP) or Site Remediation & Validation (SRV) report.
- > A Site Management Plan (SMP).

2 Site Description and Management Areas

Gingin Satellite Airfield is located approximately 55 km north of Perth within the suburb of Yeal and approximately 15 km southwest of the Gingin town centre. It covers an area of 706 hectares (ha).

The site has operated as a Satellite Airfield since the mid-1960s and is used by RAAF and visiting allied forces to support flying training. The RAAF operations includes firefighting services. The firefighting services are operated by a Defence contractor, Broadspectrum. There is a Fire House located onsite which includes a fire response vehicle.

¹ It is noted that the site is located on Commonwealth Land and is regulated under the Commonwealth environmental legislation, the State based DWER guidelines are relevant for the sampling of off-site private properties and waterways.

The majority of the buildings and associated infrastructure and support services include:

- > Power house and associated transformers and fuel infrastructure;
- > Pump house and associated water supply infrastructure;
- > Former fuel farm compound (decommissioned);
- > Fire house and adjoining vehicle refuelling area;
- > Vehicle wash down bay;
- > Runway, taxiways and air traffic control tower;
- > Aircraft hangers;
- > Administration and change rooms / crew huts (for pilots);
- > Caretaker's accommodation;
- > Asset services yard compound;
- > Buildings formerly used by Pearce Flying Club (vacated);
- > Radio tower and associated buildings.

2.1 Site Definition and Planning

For the purposes of this SAQP report, "the site" was defined as the satellite airfield (Figure 1). A detailed description of the site is provided in Jacob's OMP Report (Jacobs 2019).

Key site identification details are presented in Table 2-1.

Table 2-1 Site Identification Details

Details	Description
Site Address	1 Airfield Rd, Yeal, WA, 6503
Land Description	RAAF Satellite Airfield
Owner	Commonwealth of Australia
Title Details	Lot 1 on Deposited plan 49337 Certificate of Title 192/157A
Planning Zone / Land use	Public Purposes – Commonwealth Government
Local Government Authority (LGA)	Shire of Gingin & City of Wanneroo
Boundary corner coordinate (GDA94, Zone 50)	392015.05E 6518261.57N

Source: Department of Defence, 2018a, Gingin Satellite Airfield PFAS Ongoing Monitoring Plan.

2.2 Surrounding Land Uses

The surrounding land uses are outlined in Table 2-2.

Table 2-2 Surrounding Land Uses

Direction	Land Use
North	<ul style="list-style-type: none"> ▪ Yeal Swamp Nature Reserve (including ephemeral wetlands)
East	<ul style="list-style-type: none"> ▪ Duffy Road ▪ strawberry farms ▪ hobby farm ▪ broiler farms
South	<ul style="list-style-type: none"> ▪ Yeal Swamp Nature Reserve
West	<ul style="list-style-type: none"> ▪ Yeal Swamp Nature Reserve
Other	<ul style="list-style-type: none"> ▪ The site is located within the boundary of the Gnangara Underground Water Pollution Control Area (UWPCA).

3 Environmental Setting

Key details defining the site are summarised in Table 3-1.

Table 3-1 Key Site Details

Setting	Description
Climate	<p>The area has a Mediterranean climate with hot dry summers and cool, wet winters. The highest volume of rainfall typically occurs during the month of July. The mean annual rainfall is recorded as 738 mm (BoM, 2023).</p> <p>February is generally the hottest month and July the coolest.</p>
Topography	<p>The topography across the site undulates and generally grades from west to east, however, the landform occupied by the Airfield has been substantially modified, regraded and levelled to accommodate the runway, infrastructure and buildings. Ground elevation generally ranges between approximately 75 – 80 mAHd, with the runway at 75 mAHd.</p>
Geology	<p>Regional Geology</p> <p>The Airfield is located on the Swan Coastal Plain, which extends up to 36 km wide and is bounded by the Darling Fault and associated Darling Scarp to the east and the Indian Ocean to the west. The Bassendean Dune System lies beneath the site, which generally consists of calcareous sand with quartz sand. The sands inter-finger with the Guildford Clay to the east and overlies the Gnangara Sand. To the west, the sands are overlain by the Tamala Limestone.</p> <p>Site Specific Geology</p> <p>Soil logging was completed during the DSI undertaken by Jacobs in 2018. The core recovery showed the superficial aquifer to be primarily characterised as a fine to coarse grained sand or silty sand to the maximum depth of investigation being 56 m below ground level (mBGL).</p> <p>Multiple sandy silt units were identified during drilling, from approximately 9-10 mBGL, 14-16 mBGL, and 20-21 mBGL. The layers were of various thicknesses, ranging from 0.1 to 2 m thick, and locally discontinuous. These silts may act as local or partially confining layers.</p>
Acid Sulfate Soil	<p>A review of the Acid Sulphate Soils (ASS) risk mapping, available on the National Map online database indicates that majority of the area encompassing the site is classified as having a low to moderate known ASS risk within 3m of soil surface but high to moderate risk beyond 3m of soil surface. There was one area in the northern portion of the site, and multiple surrounding areas that had identified a high to moderate risk of ASS occurring within 3m of the natural soil surface (DWER, 2019).</p>
Hydrology	<p>There are no permanent surface water features located at the site. The closest water bodies to the site include:</p> <ul style="list-style-type: none"> ▪ Lake Bambun – approximately 3km northeast, up hydraulic gradient. ▪ Bindjar Lake – approximately 7.2 km to the west, down hydraulic gradient. ▪ Lake Mungala – approximately 2.2 km to the northeast, up hydraulic gradient. ▪ Lake Nambung – approximately 2.2 km to the northeast, up hydraulic gradient. ▪ Gregadoo Creek – approximately 4.0 km to the northeast, up hydraulic gradient. <p>East of the airfield is a dampland classified for conservation purposes (Jacobs, 2019d). Stormwater drainage from the site is conveyed towards the dampland via artificial channels. However, due to the sandy surface soil conditions, water readily infiltrates during rainfall events. Offsite migration of stormwater is noted to be rare.</p>

Setting	Description
Hydrogeology	<p>Regional Hydrogeology</p> <p>The Airfield is located on the Gngangara groundwater system, which covers approximately 2,200 km² along the coastal plain north of the Swan River to Gingin and east to the Darling Scarp. It comprises four main aquifers that are of relevance to the site:</p> <ul style="list-style-type: none"> ▪ The shallow, unconfined superficial aquifer (the Gngangara Mound). ▪ The semi-confined Mirrabooka aquifer. ▪ The deep, mostly confined Leederville aquifer. ▪ The deepest, mostly confined Yarragadee aquifer. <p>Groundwater Use</p> <ul style="list-style-type: none"> ▪ The Gngangara groundwater system is a crucial part of Perth's public water supply, but similarly supplies water for public open spaces, local agriculture and gardens (DWER, 2018). It also supports nationally significant groundwater-dependent ecosystems (GDEs), such as wetlands and Banksia woodlands. ▪ There are two abstraction bores located on the Airfield: <ul style="list-style-type: none"> - Abstraction bore 1 (MW401) is located adjacent to the former Caretaker's House. This bore is understood to intersect the Leederville aquifer. Since 2010 the bore has been active and now supplies two large water tanks (each 144 kL) which are used to supply a network of fire hydrants across the Airfield. - Abstraction bore 2 (MW402) is located within the Pump House compound and is understood to intersect the superficial aquifer. Groundwater from Abstraction bore 2 is extracted for non-potable use at the Airfield (including bathing, laundry, general site water supply, vehicle / equipment washdown and irrigation). Water from this bore is treated by a reverse osmosis unit and chlorine and more recently with a granular activated carbon filtration system following an upgrade of the water supply system. ▪ The site is situated within the boundary of the Gngangara UWPCA, the central area of the Gngangara groundwater system that provides public drinking water supply, as part of the Integrated Water Supply Scheme (IWSS). The Gngangara UWPCA covers an area of nearly 815 km² within the cities of Wanneroo, Swan and Stirling, and the shires of Gingin and Chittering (Water Corporation, 2007). ▪ The Water Corporation extract water from a large number of bores for the Perth Integrated Water Supply System. The closest to site include: <ul style="list-style-type: none"> - Pinjar production bore P140 (reference code 61618216) located 7.3 km south-southwest of the site boundary. This bore is screened from 53 – 70 mBGL which is inferred to be in the superficial aquifer; - Pinjar production bore P145 (reference code 61615123) located 7.3 km south-southwest of the site boundary. This bore is screened from 111 – 183 mBGL which is inferred to be in the Leederville aquifer. <p>Groundwater Elevation</p> <p>During the DSI, groundwater levels varied across the site from 66.315 mAHD to 57.30 mAHD. Groundwater levels recorded during the OMP are consistent with the DSI records.</p> <p>Groundwater Flow</p> <p>The regional groundwater flow direction is expected to be predominantly westwards. Based on information collected during gauging events to date [i.e. Jacobs (2018c) and OMP], the inferred regional groundwater flow direction is interpreted as to the west-south-west. A component of groundwater flow to the south is observed in the southern portion of the site. The groundwater gradient was calculated as approximately 0.0004 m/m Jacobs (2018c).</p>
Environmental Sensitive Areas	<ul style="list-style-type: none"> ▪ The Yeal Nature Reserve and Gngangara-Moore River State Forest to the north, south and west of the site are classified as protected areas. ▪ In addition, there are a number of smaller protection areas to the east of the site including the Timaru Nature Reserve, Breera Road Nature Reserve and Chandala Nature Reserve. ▪ Chandala Swamp is located approximately 7.0 km to the east of the site, at its closet point.

Setting	Description
	<ul style="list-style-type: none"> There is a regional forest agreement approximately 15 km to the east of the site.
Further information can be found in the OMP (Defence, 2018a) and Jacobs DSI (Jacobs 2018c).	

4 Source Areas

The site has been subject of numerous PFAS investigation leading to the implementation of the PFAS OMP, including:

- > Department of Defence, 2018a, *Gingin Satellite Airfield PFAS Ongoing Monitoring Plan*.
- > Department of Defence, 2018b, *Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan*.
- > Jacobs, 2018a, *Preliminary Conceptual Site Model – Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0001).
- > Jacobs, 2018b, *Sampling, Analysis and Quality Plan – Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0002).
- > Jacobs, 2018c, *Detailed Site Investigation – Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-003).
- > Jacobs, 2019, *PFAS Ongoing Groundwater Monitoring Report* (No. IS219200-0000-NP-RPT-0008).

4.1 Source Areas

The primary PFAS Source Areas identified based on the previous investigation reports (refer to Figure 2, Appendix A) include the following:

- > **The former fuel farm (SA01):** together with a firefighting deluge system, the former fuel farm was located at the east of the main buildings. Previous reports indicated that PFAS contamination found could have resulted from periodic testing and maintenance of this system.
- > **Firehouse and refuelling area (SA02):** located at the south of the taxiway. The refuelling area consisted of three above ground storage tanks connected to a series of fuel pumps. The firehouse was formerly used to store legacy AFFF and conduct maintenance of firefighting equipment. Indications of high PFAS presence in this areas soils and groundwater could have been due to a combination of firefighting equipment testing and maintenance activities.
- > **Powerhouse (SA03):** east of firehouse and refuelling area. Although no records of AFFF use were reported around this building, elevated concentrations of PFAS were reported in soil and groundwater.
- > **The eastern leach field (SA04):** located at the south of the firehouse. Wastewater contamination was found in this area from the sewerage system where water is disposed via an infiltration system. It is understood that PFAS contamination resulted from the historic use of this area for the testing of firefighting equipment, which involved the release of AFFF.

5 Data Quality Objectives

Development of data quality objectives (DQOs) for the OMP SAQP is based on guidance presented in the ASC NEPM (NEPC 2013) and are consistent with 'Gingin Satellite Airfield PFAS Investigation PFAS Ongoing Monitoring Plan' (Jacobs 2019). The DQO process comprises the following seven steps:

- > Step 1: State the problem
- > Step 2: Identify the decision/principal study question(s)
- > Step 3: Identify the Inputs into the Decision
- > Step 4: Study Boundaries
- > Step 5: Decision rules
- > Step 6: Tolerable limits on decision errors
- > Step 7: Optimisation of the data collection process

The DQOs are detailed in Table 5-1.

Table 5-1 Data Quality Objectives

Data Quality Step	Description
State the Problem	<p>Four primary sources of PFAS contamination were identified at the site during the DSI undertaken by Jacobs in 2018.</p> <p>Onsite Groundwater PFAS contamination in groundwater wells exceeding the investigation criteria for drinking water is evident in the shallow aquifer beneath the site. Exceedances were generally concentrated to the central area of the site, in the vicinity of the former fuel farm, fire house, power house and firefighting equipment testing area.</p> <p>Offsite Groundwater Offsite migration of PFAS in the groundwater has been identified in the 2018 DSI, and detections of PFAS above adopted assessment criteria noted in boundary monitoring wells during the PFAS OMP.</p> <p>Tap Water An abstraction bore located on site is used to provide the site water supply. Samples collected from this bore, as well as taps located across the site contain concentrations of PFAS above the drinking water criteria. Some samples also reported concentrations above the criteria for the recreational use of water. While this water supply is not currently used for drinking, it is used for laundry, bathing, irrigation and other uses that may result in incidental ingestion by individuals that work at the site.</p> <p>A robust dataset is required to assess trends in the nature, extent and magnitude of PFAS concentrations within groundwater to validate/improve the understanding of the conceptual site model (CSM) in relation to spatial and temporal variability of PFAS concentrations within the Management Area and associated receptors.</p>
Identify the decision/principal study question(s)	<p>This SAQP is to provide further data to assess the following principal study questions:</p> <ul style="list-style-type: none"> ▪ What are the changes and trends in the nature, extent and magnitude of PFAS concentrations in the groundwater and tap water within the Monitoring Area? ▪ Has the nature, extent and magnitude of PFAS concentrations changed significantly to warrant a revision of the human health and ecological risk assessment (HHERA)? ▪ Has the nature, extent and magnitude of PFAS concentrations changed significantly to warrant refinement of any existing management measures? ▪ Is the water fit for potable use? ▪ What is the level of contamination in the aquifer where the potable supply is drawn from? ▪ How is this changing over time?
Identify the Inputs into the Decision	<p>The following inputs are required to resolve the principal study questions outlined in Step 2:</p> <ul style="list-style-type: none"> ▪ PFAS concentrations in groundwater, and onsite tap water

Data Quality Step	Description
	<ul style="list-style-type: none"> Field data (i.e. groundwater levels, physio-chemical parameters) for groundwater, from previous and future monitoring events. An appropriate statistical evaluation of the data (e.g. using Mann-Kendall or similar analysis) including short- and long-term trends. Historical monitoring results from previous investigations to assess data trends (spatially and temporally). Factual and ongoing monitoring interpretive reports from the start of the OMP implementation (2020). Comparison of data sets to relevant endorsed assessment levels (refer to Section 7).
Study Boundaries	<p>Ongoing monitoring will generally be undertaken within the boundaries of the Monitoring Area (Figure 2, Appendix A) at the groundwater, and tap monitoring locations outlined in Sections 6.</p> <p>Undertake biannual groundwater monitoring of all onsite groundwater wells, quarterly monitoring of taps and abstraction bores onsite, and quarterly monitoring of selected offsite groundwater monitoring wells and abstraction bores.</p>
Develop a Decision Rule	<ul style="list-style-type: none"> The analytical and field data will be used to assess changes to the nature, extent and magnitude of PFAS in tap water and groundwater and to provide supporting data for assessment of management actions, where relevant. Trends in PFAS concentrations, including an assessment of temporal and spatial changes, should be assessed using an appropriate statistical analysis approach (e.g. using Mann- Kendall or similar analysis), with a specified level of confidence based upon the number of monitoring rounds completed. The analytical data will be compared to the relevant assessment levels presented in Section 7 and to the concentrations recorded during prior monitoring rounds [i.e. during the DSI (Jacobs 2018c)] to evaluate changes in the risk profile and whether revision of the HHERA or implemented management measures is warranted. <p>Where exceedances of adopted assessment criteria levels (presented in Section 7) or new detections are reported, further interrogation of data will be undertaken to the extent relevant to assess the risk profile and location. A summary of the key decision rules as detailed below:</p> <ol style="list-style-type: none"> Have the analytical data collected as part of the monitoring program met the DQI (refer Table 5-2.below)? If yes, then the data can be used to answer the decision rule below and the decision statements developed in Step 2. If no, then an assessment of the need to collect additional data will be required. Do PFAS concentrations exceed the investigation criteria? If no, then the contamination would be considered not to pose an unacceptable risk. If yes, do PFAS concentrations reported indicate an increasing trend or exceed historic maximum concentrations? Do results indicate a potential risk to receptors and changes to the risk profile? Further risk assessment, and potentially additional investigations, may be required to determine the potential for unacceptable impacts. Has PFAS been detected in any of the off-site bores previously not detected? If yes, do PFAS concentrations reported indicate an increasing trend and/or exceed historic maximum concentrations? Do results indicate a potential risk to associated receptors including associated risks that PFAS may present towards human receptors (i.e. consumers of abstracted water). Further risk assessment, and potentially additional investigations, will be required to determine the potential for unacceptable impacts.
Specify Limits on Decision Error	<p>The potential for significant decision errors will be minimised by completing a robust QA/QC program in accordance with DWER and NEPM guideline requirements. Standard operating procedures will be closely followed in the field to ensure accurate and representative data acquisition. DQIs will be applied to assess usability of data prior to making decisions, based on precision, accuracy, representativeness, comparability and completeness. The acceptable limit on decision error is 95% compliance with the applied DQIs (see Table 5-2). If any of the DQIs are not met, further assessment will be necessary to evaluate the significance of the non- conformance and any corrective actions.</p>
Optimise the Design for Obtaining the Data	<p>The design of the OMP has been made in consideration of historical activities at the site, historical investigations (and findings i.e. DSI, HRE AND ERA reports), in the</p>

Data Quality Step	Description
	<p>context of developing responses to the principal study questions outlined in Step 2 and to meet the DQOs, ensuring that a representation of the current site condition can be achieved.</p> <p>The OMP scope is outlined in Section 6. Following initial implementation, the available data should be reviewed and evaluated to determine if the frequency of monitoring should increase or decrease to provide better understanding of PFAS concentration fluctuations and potential risks to receptors.</p> <p>As additional information is gathered during the course of this monitoring, it may be beneficial for the proposed scope of works to be altered from the initial design. Changes to the proposed monitoring, if considered necessary, will be made in consultation with the Client</p> <p>Other factors that will optimise the design for obtaining data will include the use of laboratories that are NATA accredited for PFAS analysis and ensure laboratory LORs are suitable to meet the relevant adopted assessment levels (where possible), experienced field scientist(s), robust field and laboratory quality assurance/quality control protocols are adopted and Field and analytical data are collected in accordance with the PFAS NEMP (HEPA 2020), ASC NEPM (NEPC 2013) and DWER (2021).</p>

An assessment of the Data Quality Indicators (DQIs) relating to both field and laboratory procedures will be undertaken with appropriate documentation provided for each environmental element or media assessed. The DQIs adopted for the DSI are summarised in Table 5-2.

Table 5-2 Data Quality Indicators

Data Quality Indicator	Detail
QA Documentation	Provision of appropriate work plans, DQI and DQO defined for the site and all QA/QC aspects documented.
Bias	<p>A measure of the potential distortion in an analysis which can result in errors in one direction (e.g. one laboratory consistently higher results or consistent poor spiked matrix recovery).</p> <p>Bias will be assessed with reference to the analysis of spiked matrix samples (NEPC 1999b).</p>
Representativeness	A qualitative measure of the confidence that data is representative of each medium present on the site. Use of appropriate and documented sampling methods, sampling handling, preservation and transport and holding times.
Precision:	<p>A quantitative measure of data variability or reproducibility, measured by the calculation of %RPD values for duplicate samples (i.e. measure of agreement).</p> <p>Precision in DQI is considered an important assessment in an environmental study (USEPA, 2002, Guidance on Environmental Data Verification and Data Validation). It can be measured as follows:</p> <ul style="list-style-type: none"> Percentage of the mean of the measurement such as Relative Percent Difference (i.e. %RPD). The %RPD will be calculated for the field and secondary duplicate (i.e. inter and intra-laboratory analysis); and Use of similar analytical method and instrument (e.g. for inter-laboratory assessment). <p>The %RPD will be considered as acceptable if the values are less than 30% (NEPC, 2013). Should there be a result that is greater than 30% difference, then a "review should be conducted of the cause (e.g. instrument calibration, appropriateness of method used)" (NEPC, 2013).</p> <p>For the purpose of this OMP field and secondary duplicates should be collected at a rate of 1 in 10 samples (HEPA 2020).</p>
Accuracy	A quantitative measure of the closeness of data to a 'true value', measured by the analysis of spike, blank and laboratory control samples (LCS). The LCS consists of a standard reference material or a matrix of known concentration.

Data Quality Indicator	Detail
	For the purpose of assessing accuracy it is required that at least one LCS for each process batch ^[2] be analysed (NEPC, 2013).
Comparability	A qualitative measure of the confidence that data may be considered to be equivalent for each sampling and analytical event. By use of standard procedures, comparable methods, qualified personnel and review of sample integrity.
Completeness	A measure of the amount of usable data (expressed as a percentage - %) from a data collection activity, based on completeness of test program, overall QA/QC completeness and validity of data set.

^[2] The NEPM Schedule B3 – *Guideline on Laboratory Analysis of Potentially Contaminated Soil* defines a laboratory process batch to consist of up to “20 samples that are similar in term of matrix and test procedure, and are processed as one unit for the QC purposes” (NEPC, 2013).

6 Ongoing Monitoring Program

6.1 OMP SAQP History

Changes and updates made to the OMP SAQP are documented in Table 6-1.

Table 6-1 OMP SAQP History

SAQP Version	Date	Report Section	Description of changes
Rev 2	06/11/2019	-	Defence review comments
Rev 3	11/05/2020	7	Update of assessment criteria and reference to HEPA (2020).
Rev 4	10/03/2021	6.3	Table 6-4 'Wells construction details' added.
			Wells ID updated as per DCARM update
			MW103S (lost) replaced by MW504 MW311 (damaged) replaced by MW505
		App A	Figures updated
		6	Methodology table updates
Rev 5	23/08/2021	6	Laboratory testing – non-PFAS analytes removed from the analytical suite.
Rev 6	11/04/2022	6.4	Remove redundant tap water monitoring locations POT101 & POT105.
Rev 7	20/01/2023	7	Defence review comments.
Rev 8	16/02/2023	8	Minor methodology updates, Defence review comments
Rev 9	17/07/2023	-	Minor Formatting updates
Rev 10	24/08/2023	-	Defence review

6.2 Monitoring Area Description

The OMP includes sampling and analysis not only from the site, but also from off-site Crown Land. The site and surrounding areas are collectively referred to as the "Monitoring Area". The Monitoring Area boundaries are presented on Figure 2, Appendix A.

For Gingin Satellite Airfield, the Monitoring Area is limited to the boundary of the base, as well as the parcel of Crown Land that represents the Yeal Swamp Nature Reserve – an area that surrounds much of the southern, western and northern extents of the Base. The lateral extents of the Monitoring Area are aligned with the boundary of the adjoining Crown Lands property.

6.3 Groundwater Monitoring

6.3.1 Groundwater Monitoring Network

The network of on- and off-Site groundwater monitoring wells is summarised in Table 6-2.

Table 6-2 Gingin Groundwater Monitoring Network

Aquifer (total number of monitoring wells)	Average screen interval (mBGL)	Location (on-site/off-site)	Monitoring Well / Bore ID	Frequency
Shallow groundwater wells (33)	7 – 9	Onsite	MW106S, MW107S, MW108S, MW109S, MW110S, MW111S, MW112S, MW113S, MW114S, MW115S, MW116S, MW119S, MW122S, MW125S, MW128S, MW137S, MW138S, MW301, MW302, MW303, MW304,	Biannual

Aquifer (total number of monitoring wells)	Average screen interval (mBGL)	Location (on-site/off-site)	Monitoring Well / Bore ID	Frequency
			MW305, MW306, MW307, MW308, MW309, MW310, MW312, MW313, MW504, MW505.	
Deep groundwater wells (9)	35 - 40	Onsite	MW102D, MW105D, MW118D, MW121D, MW124D, MW130D, MW131D, MW133D, MW134D, MW136D, MW140D	Biannual
Intermediate depth wells (14)	12 - 16	Onsite	MW101I, MW104I, MW117I, MW120I, MW123I, MW126I, MW129I, MW132I, MW135I, MW139I	Biannual
		Off-site	MW141S, MW142S, MW143S, MW403 (DWER bore GC19)	Quarterly
Abstraction bores (4)		Off-site	Pinjar Production P140, Pinjar Production P145	Quarterly
		Onsite	MW401 & MW402 (Abstraction bores 1 and 2)	Quarterly

The groundwater wells and bores selected for monitoring are presented in Table 6-3, along with the rationale for the selection, and are shown on Figures 3A&B, Appendix A. Construction details are provided in Table 6-4.

Table 6-3 OMP Groundwater Monitoring Locations

Area	Monitoring Well / Bore ID	Rationale
On-site – Source Areas	Former fuel farm (SA01) - MW112S, MW113S, MW101I, MW102D, MW301, MW302, MW303	Monitoring wells within these Source Areas were found to contain PFAS at concentrations above the relevant assessment level for the Site. Monitoring of these wells will provide an understanding of the nature, extent and magnitude of PFAS concentrations owing to seasonal fluctuations or implemented management measures at the main identified Source Areas. The monitoring will also allow refinement or implementation of additional measures to manage exposure to site personnel working within these impacted areas.
	Fire house and Refuelling area (SA02) - MW504, MW104I, MW105D, MW304, MW305, MW306	
	Powerhouse (SA03) - MW307, MW308, MW309, MW310	
	Landfills - MW106S, MW107S, MW108S, MW109S, MW110S	
On-site – secondary sources	Sewage system and leach field (SA04): MW114S	
	Site Drainage - MW115S	
	Water Supply Infrastructure –MW505, MW312, MW313, MW111S.	
	Abstraction bore 1 - MW401	
On-site - other	Abstraction bore 2 –MW402	Detections of PFAS in exceedance of drinking water guidelines has been recorded in shallow southern boundary bore MW138S (Jacobs 2019, Jacobs 2018c). This indicates migration of groundwater off-site. Monitoring of these wells will provide an indication of any change in the nature or magnitude of PFAS migrating off-site and will help in determining changes attributable to seasonal fluctuations or implemented management measures.
	Airside perimeter –MW116S, MW117I, MW118D, MW119S, MW120I, MW121D, MW122S, MW123I, MW124D	
	Site boundary –MW125S, MW126I, MW128S, MW129I, MW130D, MW131D, MW132I, MW133D, MW134D, MW135I, MW136I, MW138S, MW139I, MW140D	
	Background - MW137S	
Off-site	UWPCA: Pinjar Production P140, Pinjar Production P145	Monitoring of these wells will provide an indication of any change in the nature or magnitude of PFAS migrating off-site and will help in determining changes attributable to seasonal fluctuations or implemented management measures. The monitoring will also allow refinement of current measures, or implementation of additional measures (if necessary) to manage exposure to off-site groundwater users.
	Public Land: MW143S, MW142S, MW141S, MW403	

Table 6-4 OMP Groundwater Monitoring Wells Construction Details

Well ID	Date drilled	Easting ¹	Northing ¹	RL TOC (mAHD)	Depth (mBGL)	Screen interval (mBGL)
MW101I	08/02/18	392365.354	6518050.237	73.50	23.5	19.78-22.78
MW102D	07/02/18	392362.712	6518060.772	73.41	43.4	40.02-43.02
MW104I	21/03/18	391866.667	6518104.696	73.74	22.9	19.5-22.9
MW105D	22/03/18	391865.254	6518111.631	73.79	42.3	39-42.5
MW106S	21/02/18	392300.981	6519081.431	71.54	11.0	6.8-10.8
MW107S	21/02/18	392172.956	6519059.739	71.60	9.5	5.5-9.5
MW108S	21/02/18	392172.721	6519032.509	70.90	9.0	5.0-9.0
MW109S	20/02/18	391948.725	6517949.616	73.45	10.3	5.8-10.3
MW110S	20/02/18	391965.223	6517913.989	73.74	10.0	6.5-10.0
MW111S	23/02/18	391950.19	6518080.847	73.87	9.5	6.5-9.5
MW112S	23/02/18	392220.246	6518034.27	73.69	10.5	7.5-10.5
MW113S	22/02/18	392233.637	6517959.169	73.79	9.6	6.5-9.5
MW114S	09/03/18	391857.399	6518077.121	73.68	8.0	5.0-8.0
MW115S	22/02/18	393404.748	6518871.879	70.79	8.0	5.0-8.0
MW116S	26/02/18	391180.405	6518376.095	74.43	11.0	8.0-11.0
MW117I	27/02/18	391159.363	6518372.391	74.19	23	21.3-23.3
MW118D	26/02/18	391136.531	6518361.179	74.19	43	41-43
MW119S	26/02/18	390522.99	6518100.215	74.06	13.1	10.1-13.1
MW120I	01/03/18	390524.512	6518080.028	73.84	23	19.94-22.94
MW121D	28/02/18	390527.072	6518052.331	73.96	42.8	39.8-42.8
MW122S	27/02/18	390878.357	6517687.55	75.84	13.5	10.5-13.5
MW123I	06/03/18	390842.439	6517678.613	76.03	23	20-23
MW124D	02/03/18	390860.885	6517683.114	75.87	42.5	39.5-42.5
MW125S	22/02/18	390857.354	6518977.058	74.88	18	14.25-17.25
MW126I	22/02/18	390825.625	6518968.422	73.50	36.5	33.5-36.5
MW128D	15/03/18	389901.663	6518706.163	74.40	50	47-50
MW129I	21/02/18	389866.739	6518695.714	73.51	18	15.3-18.3
MW130D	20/02/18	389833.153	6518686.763	72.77	36.5	33.5-36.5
MW131D	14/03/18	389600.508	6517902.704	76.59	55.5	52.5-55.5
MW132I	16/02/18	389608.966	6517878.026	76.43	21.0	18.5-21.5
MW133D	15/02/18	389605.327	6517890.365	76.49	43.5	40.9-43.9
MW134D	12/03/18	389870.816	6516942.416	78.48	56	53-56
MW135I	13/02/18	389881.796	6516899.339	77.67	24	21.1-23.6

Well ID	Date drilled	Easting ¹	Northing ¹	RL TOC (mAHD)	Depth (mBGL)	Screen interval (mBGL)
MW136D	14/02/18	389876.659	6516917.12	78.24	44.9	41-44
MW137S	09/03/18	394323.666	6517449.703	73.12	8.7	4.7-8.7
MW138S	14/06/18	391668.714	6517373.994	74.17	15.0	9.0-15.0
MW139I	14/06/18	391683.61	6517377.962	73.99	30.0	27.0-30.0
MW140D	13/06/18	391694.005	6517380.345	73.90	54.0	51.5-54.5
MW141S	06/03/19	391915.097	6516990.331	74.36	16.5	13.5-16.5
MW142S	05/03/19	391116.695	6516968.991	76.34	15.5	12.4-15.4
MW143S	05/03/19	390447.934	6516958.991	75.81	18.5	14-18.5
MW301	13/04/12	392437.274	6518067.714	74.547	10	7-10
MW302	13/04/12	392406.8485	6518042.406	74.712	10	7-10
MW303	13/04/12	392404.5085	6518050.688	74.574	10	7-10
MW304	18/04/12	391935.1745	6518126.53	74.094	9.5	6.5-9.5
MW305	18/04/12	391913.0305	6518125.358	73.885	9	6.0-9.0
MW306	18/04/12	391914.8445	6518118.044	73.965	9	6.0-9.0
MW307	17/04/12	392002.4455	6518149.752	73.635	8.5	5.5-8.5
MW308	17/04/12	391964.2945	6518151.916	73.691	9	6.0-9.0
MW309	17/04/12	391967.1975	6518140.975	73.899	9.5	6.5-9.5
MW310	17/04/12	391958.6615	6518146.062	73.806	9	6.0-9.0
MW312	16/04/12	392041.0045	6518075.125	74.541	9.5	6.5-9.5
MW313	16/04/12	392043.0275	6518069.532	74.688	10.5	7.5-10.5
MW401	-	392140.5162	6517928.635	N/A	N/A	N/A
MW402	-	392069.7036	6518088.4608	N/A	N/A	N/A
MW403	28/07/1977	389846.389	6513602.556	73.84	26	14-26
MW504	14/10/20	391887.555	6518145.096	72.82	13.0	10.0-13.0
MW505	14/10/20	391972.852	6518036.711	73.832	13	10-13

Notes:

1. MGA94 zone 50

RL – Relative Level

TOC – Top of Casing

6.3.2 Monitoring Frequency

Groundwater samples will be collected from selected monitoring wells at the frequency outlined below:

- > Biannual monitoring of all onsite groundwater wells. This frequency is considered appropriate to capture seasonal change in groundwater levels and flow direction, as well as corresponding changes in PFAS concentration in the vicinity of and immediately beyond the identified source zones. Quarterly monitoring of offsite wells is detailed in point three below to monitor risk to identified receptors.
- > Sampling from selected taps and abstraction bores at the site on a quarterly basis
- > Monitoring of selected offsite groundwater monitoring wells and abstraction bores on a quarterly basis, specifically:
 - Two Water Corporation production bores (Pinjar Production Bore P145 and P140).
 - Three shallow and one deep groundwater monitoring wells located between the Water Corporation bores and the site boundary.
- > In relation to the two Water Corporation production bores, these are currently being sampled by the Water Corporation. Results are provided to Defence for review.

Biannual sampling will be undertaken post-summer (March/April) and post-winter (September/October) while additional quarterly events will occur in June/July and December/January. Monitoring frequency will be re-evaluated as part of OMP reviews.

6.3.3 Groundwater Sampling Methodology

Groundwater sampling methodology are detailed in the following sections.

6.3.3.1 Groundwater Monitoring Wells

Groundwater monitoring will be undertaken by no purge HydraSleeve® method as detailed in Table 6-5. Abstraction bores will be sampled as per the tap water methodology outlined in Section 6.4.

Table 6-5 Groundwater Monitoring Wells – Sampling Method

Activity	Details
Well Gauging	Standing Water Level (SWL) will be gauged in each well prior to sampling using an interface probe. All wells will be measured against a specified mark at the top of the well casing.
Groundwater Field Parameters	<p>Groundwater field parameters will be recorded via a water quality meter prior to deployment of HydraSleeves® or pre-sample collection. The following field parameters will be recorded:</p> <ul style="list-style-type: none"> ▪ pH. ▪ electrical conductivity (EC). ▪ oxidation reduction potential (ORP). ▪ Dissolved oxygen (DO). ▪ Temperature. <p>Once field parameters have stabilised (as indicated by at least three consecutive measurements falling within +/- 10% of each other) measurement will be recorded on field data records.</p> <p>All field instruments (e.g. water quality meter) will be calibrated by the equipment supplier and daily readings of reference solutions (bump tests) completed to optimise the accuracy of the measurements taken.</p>
Deployment of HydraSleeve®	<p>HydraSleeves® will be deployed with top weight sample collection to begin at the lowest point.</p> <p>Following sampling, HydraSleeves® will be deployed in preparation for the next OMP monitoring event using the same string for consistency (same depth of sampling i.e. within screen depth).</p>
Retrieval of HydraSleeves® (Sample Collection)	HydraSleeve® sampling devices will be left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment.

Activity	Details
	<p>Samples will be collected via continuous pull method at a rate allowing the water to pass through the check valve into the sample sleeve.</p> <p>Samples will be discharged immediately (minimise changes in chemistry) via discharge tube.</p>
Alternative sampling methodology (hand bailing)	<p>Disposable HDPE hand bailers, attached to a polypropylene string, will be used in the event that the water column isn't sufficient to fill the HydraSleeve®. Purging of the well (i.e. removal of 3x well volume) will be undertaken prior to sampling to ensure that a sample representative of the aquifer is taken. Field parameters will be regularly recorded during the bailer purge to confirm field parameter stability is achieved.</p>
Field Records	<p>Field records will include the following information:</p> <ul style="list-style-type: none"> Sampling time, date and name of the sampler. Weather conditions. Sample Collection method. Stabilised field parameters (three readings required when a bailer is used). Sampling equipment decontamination procedures where non-disposable sampling equipment is utilised. Calibration and daily bump test records. <p>All sample documentation including field notebooks, reporting records, COC and equipment calibration certificates and procedures will be retained within project files.</p>
Decontamination procedure	<p>Dedicated HydraSleeves® will be used at each groundwater bore thus removing the need for decontamination.</p> <p>All re-usable sampling equipment will be thoroughly washed using PFAS-free detergent, then double rinsed with clean water before the sample collection.</p>
Sample identification, preservation transport and holding times	<p>Each sample will be pre-labelled by the laboratory with a unique barcode for identification.</p> <p>Samples will be collected directly in into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under Chain of Custody (CoC) documentation.</p> <p>Sample containers, preservation procedures, sample storage requirements and holding times will be undertaken in accordance with those recommended by Standards Australia.</p>
Laboratory Testing	<p>Allowance for the following analysis per groundwater bore:</p> <ul style="list-style-type: none"> Full PFAS analytical suite (see Appendix B).
Laboratory Testing – Quality Control	<p>Groundwater QC samples will be collected at the following frequencies as detailed in the OMP:</p> <ul style="list-style-type: none"> Field duplicate (intra-laboratory) samples at 1 per 10 water samples or 1 per batch if the batch is less than 20 samples. Field triplicate (inter-laboratory) samples at 1 per 10 water samples should be sent to a secondary laboratory. Rinsate blank sample at 1 per day per sampler [collected off re-used sampling equipment (e.g. interface probe)]. Field blank samples at 1 per day per sampler. Additional sample volume will be collected to allow for laboratory internal QA/QC.
Laboratory Accreditation and Limits of Reporting	<p>All groundwater analysis will be undertaken by laboratories accredited by the NATA.</p> <ul style="list-style-type: none"> Primary analysis will be undertaken by ALS Global Laboratories (Perth) Secondary analysis will be undertaken by Eurofins (Perth). <p>Laboratory LORs will be suitable to meet the relevant adopted assessment levels (0.01 µg/L).</p>

6.4 Tap Water Monitoring

The Tap water locations are presented on Figures 3A&B (Appendix A) and are summarised in Table 6-6.

Table 6-6 Summary of Tap Water Monitoring Locations

Monitoring locations	Rationale	Monitoring Frequency
POT102	Air Traffic Control Tower: External tap at the air traffic control tower.	Quarterly
POT103	Crew Hut: External tap at the crew huts	
POT104	Fire House: Internal tap at the kitchen sink in the Fire House	

6.4.2 Abstraction bores and tap water Sampling Methodology

Water samples from abstraction bores (equipped with a pump, sampled directly from the bore's headwork valves) and taps will be collected via the 'first flush' sampling method. The primary objective of the 'first flush' sampling method is to collect groundwater representative of the user, who may not purge the water line.

The 'first flush' sampling method involves collecting the first draw of water from the tap or bore outlet tap. Field parameters (pH, temperature, EC, ORP and DO) will be recorded post sampling collection via flow cell, samples will be analysed for the full PFAS analytical suite (see Appendix B).

7 Assessment Criteria

7.1 Groundwater and Tap water

The assessment levels adopted for groundwater and tap water in this OMP are based upon the Heads of Environmental Protection Authorities Australia and New Zealand (2020) PFAS National Environmental Management Plan 2.0 (NEMP; HEPA 2020) and finding of previous site assessment i.e. DSI (Jacobs 2018c). The adopted assessment criteria for groundwater and tap water are detailed in Table 7-1.

Table 7-1 Criteria for Groundwater and Tap Water

Location	Adopted Assessment Criteria	
Groundwater and tap water	Human Health	Ecological
On-Site and Off-Site	Drinking water: <ul style="list-style-type: none"> PFOS + PFHxS – 0.07 µg/L PFOA – 0.56 µg/L 	-
	Recreational Use: <ul style="list-style-type: none"> PFOS + PFHxS – 2.0 µg/L PFOA – 10 µg/L 	

8 Reporting

8.1 Factual Reporting

A factual report will be produced at the completion of each monitoring event that summarises the data and findings of each monitoring event. Each factual report will present the findings, in accordance with the *PFAS OMP Factual Report Guidance* (Defence, 2021), and contain the following information:

- > Introduction.
- > Scope of work completed.
- > Description of sampling methodologies used.
- > Field observations (e.g. condition of monitoring wells, description of purged water) and water quality parameter measurements.
- > Summary of any changes to the monitoring network condition that may affect data integrity, or require rectification works, and recommendations for repair, replacement or decommissioning of a location.
- > Evaluation of the applicability of adopted assessment levels.
- > Review of the suitability of the data for assessment purposes (QA/QC evaluation).
- > Summary tables presenting gauged groundwater levels.
- > Presentation of inferred groundwater contours and inferred groundwater flow direction in a figure.
- > Summary tables of analytical results in comparison to adopted assessment levels.
- > Laboratory reports, Chain of Custody (CoC) documentation, field sampling records, data validation and QA/QC details, equipment calibration certificates and other relevant documentation.

In the event that further investigation, management and/or remediation are required, recommendations will be presented in a separate 'technical memorandum'.

8.2 Ongoing Monitoring Interpretive Reporting

Upon completion of each year's monitoring period an ongoing monitoring interpretative report will be prepared in accordance with the *PFAS OMP Annual Interpretive Report Guidance* (Defence, 2022). As a minimum, each interpretative report should include the following:

- > The factual information described in Section 8.1.
- > Evidence of compliance with the requirements of the SAQP and meeting stated objectives of the OMP.
- > Relevant figures depicting sampling locations and site specific hydrogeological features.
- > Laboratory results and analysis including comparison with relevant screening criteria as identified in each OMP.
- > Assessment and commentary on appropriate QA/QC procedures.
- > Graphs showing historical concentrations of PFOS, PFOA and PFOS plus PFHxS.
- > A discussion of analytical results in relation to the following:
 - Trends in PFAS concentrations, including an assessment of temporal changes and/or changes to the extent of PFAS impacts. Trends should be assessed using an appropriate statistical analysis approach (e.g. using Mann-Kendall or similar analysis), with a specified level of confidence based upon the number of monitoring rounds completed.
 - Consideration, based on data trends, as to whether any of the existing remediation / management measures should be re-assessed, with a view to potential modification, supplementation or cessation.
 - Assessment of whether changes to the CSM and/or risk assessment are required.
 - Whether recalibration or changes to the groundwater model are required to provide a better understanding of the potential future extent of PFAS impact in groundwater.

- > Based on the data obtained, an assessment of the OMP sampling requirements with a view to establishing whether:
 - The number of locations monitored could be reduced, such as where PFAS concentrations are stable and are considered to present a low risk to receptors.
 - Additional monitoring locations are required, including the installation of new monitoring wells or sampling of additional existing wells (and/or private bores) to provide better understanding of the nature, extent or magnitude of PFAS impacts in a particular portion of the Monitoring Area.
 - The frequency of monitoring should increase or decrease to provide better understanding of PFAS concentration fluctuations and potential risks to receptors.
 - Monitoring of additional media should be included in the OMP.
- > An overview of remedial works or construction and maintenance activities undertaken in the management area during the reporting period, which may impact the CSM.
- > A statement as to whether the risk profile has changed overall, or for any specific location at the Site, and a recommendation as to whether this should trigger an OMP and/or PMAP review, or other action.

9 References

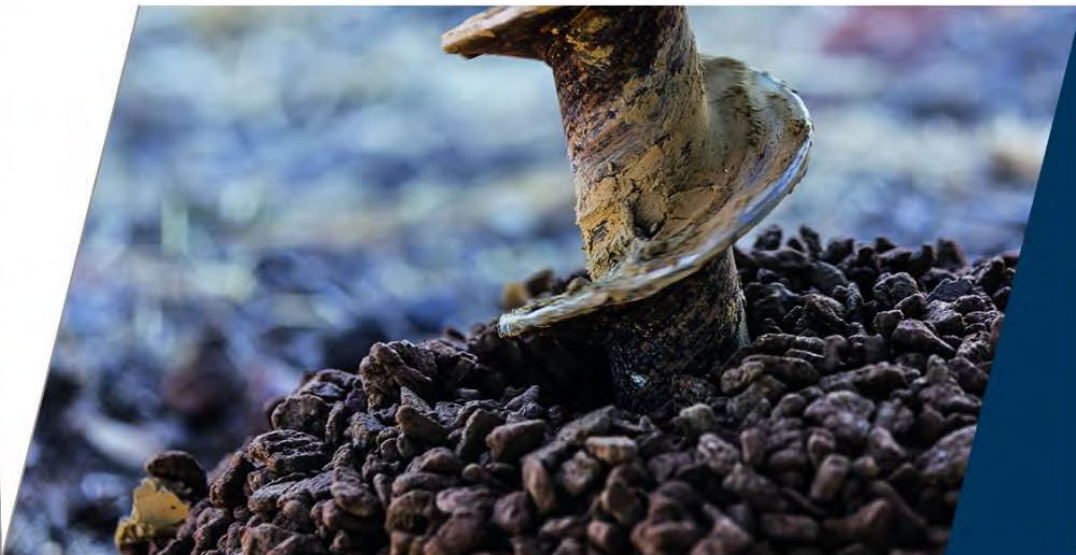
General References

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APPENDIX

A

Figures



Legend

 Monitoring Area

 Site Boundary / Management Area

FIGURE 1
1:60,000 Scale at A3

Metres

0 1,000 2,000

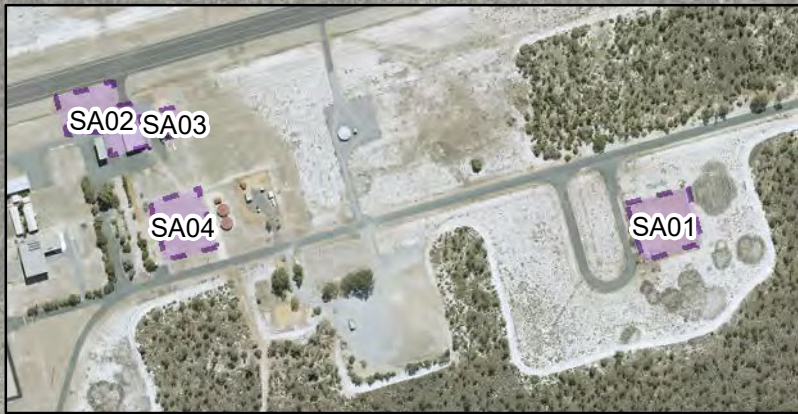
Site Location

SAMPLING AND ANALYSIS QUALITY PLAN
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-02-23 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-001_RegionalLocation 02.mxd
Aerial Imagery Supplied by Aerometrex

Source Area	Description
SA01	Former Fuel farm
SA02	Firehouse, refuelling area and washdown bay
SA03	Powerhouse
SA04	Eastern Leach Field



Legend

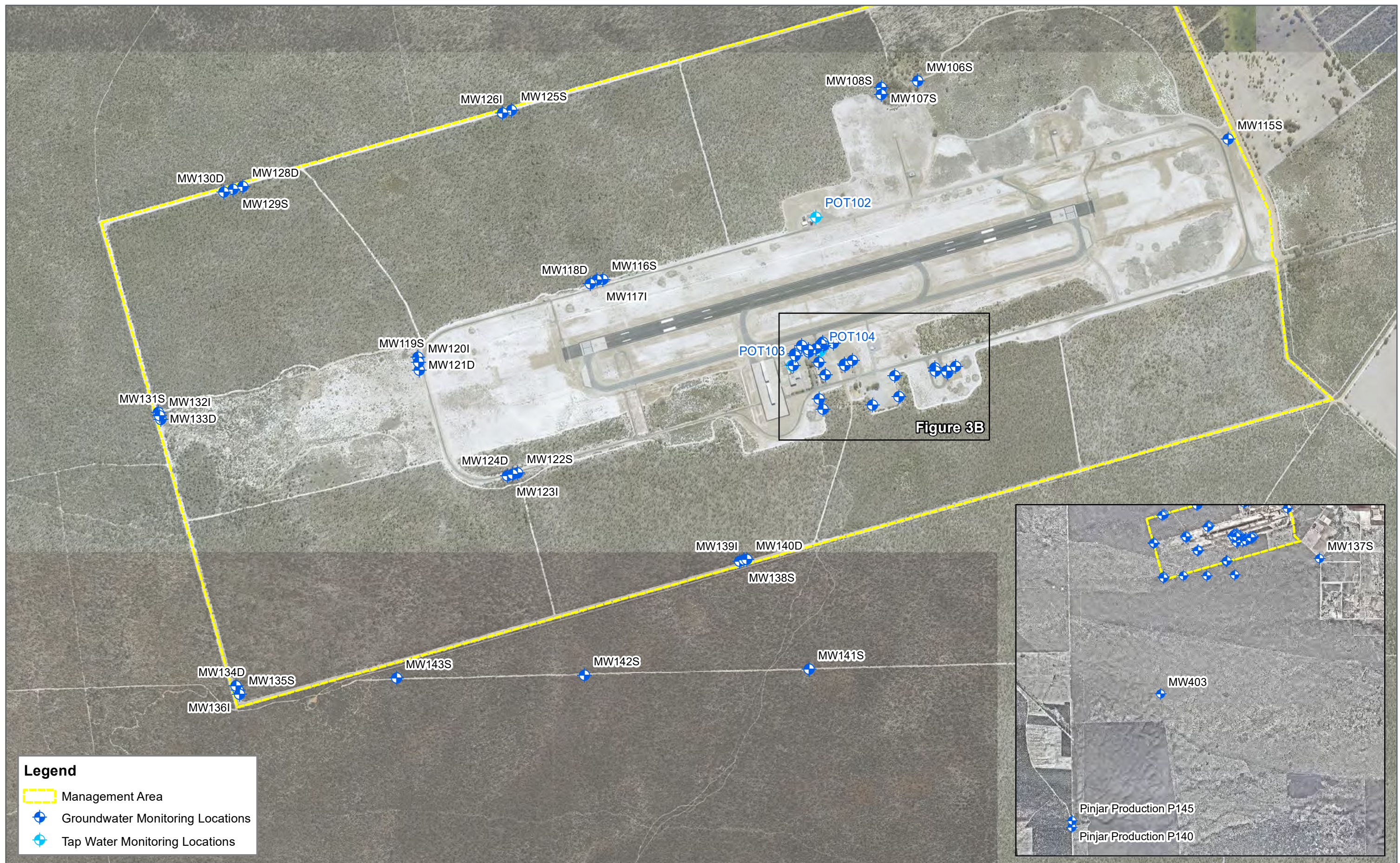
Management Area

PFAS Source Areas (Jacobs, 2019)

FIGURE 2
 1:12,000 Scale at A3

Management Area
 SAMPLING AND ANALYSIS QUALITY PLAN
 GINGIN SATELLITE AIRFIELD
 DEPARTMENT OF DEFENCE

Map Produced by Cardno WA
 Date: 2023-02-23 | Project: DEF19009
 Coordinate System: GDA 1994 MGA Zone 50
 Map: DEF19009_WA_0958-GS-002_ManagementAreas 02.mxd
 Aerial Imagery Supplied by Nearmap (January 2021)



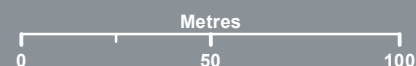
Map Produced by Cardno WA
Date: 2023-02-23 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-003A_GroundwaterMonitoringLocations 03.mxd
Aerial Imagery Supplied by Nearmap (January 2021)



Legend

- Groundwater Monitoring Locations
- Tap Water Monitoring Locations
- PFAS Source Areas (Jacobs, 2019)

FIGURE 3B
1:2,000 Scale at A3

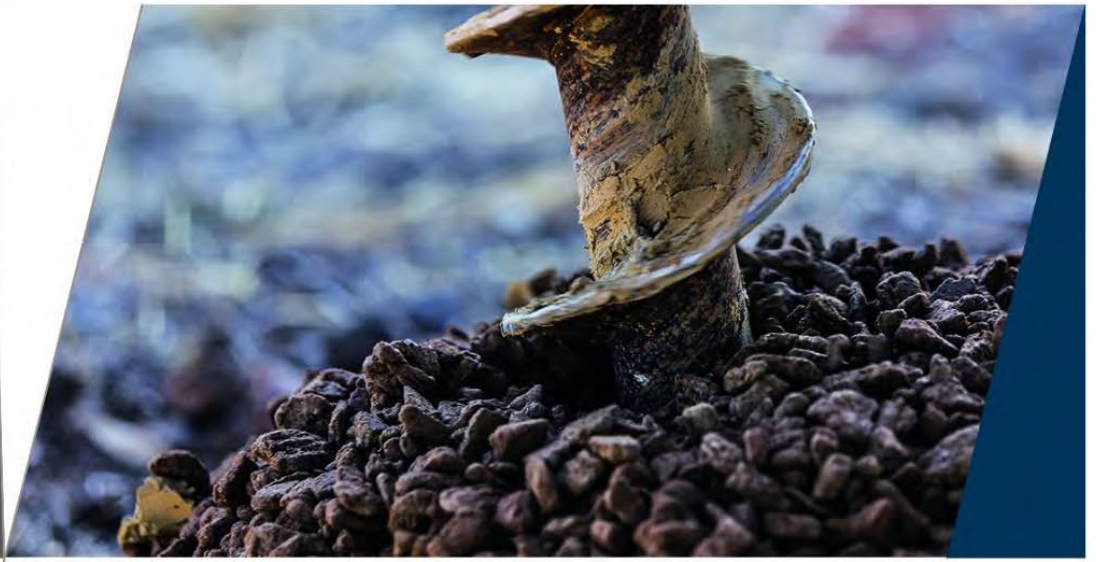


Monitoring Locations

SAMPLING AND ANALYSIS QUALITY PLAN
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-02-23 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-003B_GroundwaterMonitoringLocations 03.mxd
Aerial Imagery Supplied by Aerometrex



APPENDIX

B

Full PFAS Analytical Suite

Full PFAS Analytical Suite

Group	Analyte	CAS No.
Perfluoroalkane Sulfonic Acids	Perfluorobutane sulfonic acid (PFBS)	375-73-5
	Perfluoropentane sulfonic acid (PFPeS)	2706-91-4
	Perfluorohexane sulfonic acid (PFHxS)	355-46-4
	Perfluoroheptane sulfonic acid (PFHpS)	375-92-8
	Perfluorooctane sulfonic acid (PFOS)	1763-23-1
	Perfluorodecane sulfonic acid (PFDS)	335-77-3
Perfluoroalkane Carboxylic Acids	Perfluorobutanoic acid (PFBA)	375-22-4
	Perfluoropentanoic acid (PFPeA)	2706-90-3
	Perfluorohexanoic acid (PFHxA)	307-24-4
	Perfluoroheptanoic acid (PFHpA)	375-85-9
	Perfluorooctanoic acid (PFOA)	335-67-1
	Perfluorononanoic acid (PFNA)	375-95-1
	Perfluorodecanoic acid (PFDA)	335-76-2
	Perfluoroundecanoic acid (PFUnDA)	2058-94-8
	Perfluorododecanoic acid (PFDoDA)	307-55-1
	Perfluorotridecanoic acid (PFTTrDA)	72629-94-8
	Perfluorotetradecanoic acid (PFTeDA)	376-06-7
Perfluoroalkyl Sulfonamides	Perfluorooctane sulphonamide (FOSA)	754-91-6
	N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2
	N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9
	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6
(n:2) Fluorotelomer Sulfonic Acids	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4
	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2
	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0

APPENDIX

C

FACTUAL REPORTS



now



PFAS OMP Biannual Sampling Event Factual Report

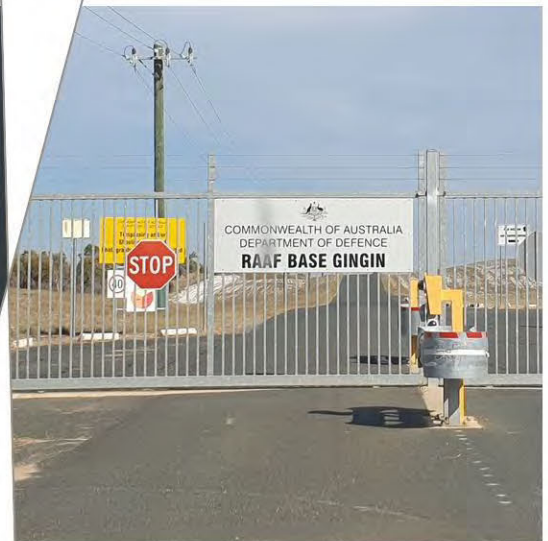
Post-winter 2022

Gingin Satellite Airfield

304700525

Prepared for
Department of Defence

21 December 2022



 **Cardno**

now

 **Stantec**

Contact Information

Stantec Australia Pty Ltd

Cardno, now Stantec
ABN 77 009 119 000

11 Harvest Terrace
West Perth WA 6005
Australia

www.stantec.com

Phone +61 8 9273 3888

Fax +61 8 9486 8664

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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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Chemical Names

DOC	Dissolved Organic Carbon
DO	Dissolved Oxygen
PFAS	Per- and Poly-fluoroalkyl Substances
PFOA	Per-fluoro-octanoic Acid
PFOS	Per-fluoro-octane Sulfonate
TDS	Total Dissolved Solids (salinity of water)
TSS	Total Suspended Solids

Technical Terms

AFFF	Aqueous Film Forming Foam
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AS	Australian Standard
AST	Above-ground Storage Tank
BGL	Below Ground Level
COC	Chain of Custody
DQI	Data Quality Indicator
DQO	Data Quality Objective
EC	Electrical Conductivity
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
HIL	Health Investigation Level
HSL	Health Screening Level
LOR	Limit of Reporting
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
QA	Quality Assurance

QC	Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan
SEPP	State Environment Protection Policy

Units

ha	Hectares
mAHD	Metres relative to the Australian Height Datum
mBGL	Metres Below Ground Level
mbTOC	Metres below Top of Casing
mg/kg	Milligram per Kilogram (approximately equivalent to ppm)
mg/L	Milligram per Litre
µg/L	Micrograms per Litre
ppm	Parts per Million
µS/cm	Micro Siemens per Centimetre (Electrical Conductivity - Water)

Site Specific

OMP	Ongoing Monitoring Plan
FTG	Fire Training Ground

1 Introduction

1.1 Background

Cardno, now Stantec (“Cardno”) was engaged by the Australian Department of Defence (“the Client”) to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) at Royal Australian Air force (RAAF) Gingin Satellite Airfield (“the site”). The site is located in Yeal, Western Australia and is displayed in Figure 1 of Appendix A.

The OMP was carried out in accordance with the scope and limitations presented in Cardno’s Sampling and Analysis Quality Plan (SAQP):

- > Cardno, 11 April 2022, Reference: DEF19009, ‘PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Gingin Satellite Airfield’ Rev6.

The SAQP was reviewed prior to the monitoring event and no changes were required.

For the purposes of this report:

- > Management Area was defined as Gingin Satellite Airfield (Figure 1, Appendix A).
- > Monitoring Area was defined as comprising the site, plus the parcel of Crown Land that represents the Yeal Swamp Nature Reserve – an area that surrounds much of the southern, western and northern extent of the Base. The lateral extents of the Monitoring Area are aligned with the boundary of the adjoining Crown Lands property (Figure 1, Appendix A).

1.2 Purpose & Objectives

The objective of the OMP is to assess the changes in the nature and extent of PFAS within the environment, specifically where there is an identified potentially elevated risk to a receptor or a potential future risk to a receptor associated with Defence’s historical use of legacy Aqueous Film Forming Foam (AFFF).

The purpose of this PFAS OMP Factual Report is to provide an up-to-date status of the condition of the site as it is currently understood in relation to the most recent sampling event.

The objectives of the report are:

- > To provide a succinct summary of the post-winter 2022 sampling event and provision of analytical results with supporting tables and figures.
- > To provide confirmation of the current understanding of risk.
- > To provide supporting data for the assessment of management actions, where relevant.

1.3 Relevant Guidelines

This assessment has been undertaken in general accordance with applicable industry standards for a site investigation for the purpose, objectives and scope identified in this report. These standards are set out in:

- > National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended 2013) (ASC NEPM).
- > Heads of Environmental Protection Authority’s Australia and New Zealand (HEPA), January 2020, *PFAS National Environmental Management Plan (NEMP) 2.0*.
- > Standards Australia 1998. AS/NZ 5667:1998 *Water quality – sampling*.
- > Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.
- > Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*¹.

¹ It is noted that the site is located on Commonwealth Land and is regulated under the Commonwealth environmental legislation, the State based DWER guidelines are relevant for the sampling of off-Site private properties and waterways.

- > Department of Defence, Department of Energy, 2018, *Quality System Manual Schedule B15*.
- > U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process (EPA QA/G-4)*.
- > USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8)*.
- > National Health and Medical Research Council (NHMRC), August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.

2 Scope of Work

Cardno carried out the tasks detailed in the following sections in order to satisfy the purpose and objectives of this assessment.

2.1 Groundwater Monitoring

Sampling of selected groundwater bores was generally performed in accordance with the SAQP (Cardno, 2022), applying methods set out in Section 3 of this report. The groundwater bores monitored as part of the OMP biannual monitoring event are presented in Table 2-1, and are shown on Figure 2A and 2B, Appendix A.

Table 2-1 Groundwater Monitoring Locations

Monitoring Area	Location ID	Number of locations
On-Site – Source Areas	Former fuel farm (SA01) - MW112S, MW113S, MW101I, MW102D, MW301, MW302, MW303.	22
	Fire house and Refuelling area (SA02) - MW504, MW104I, MW105D, MW304, MW305, MW306.	
	Powerhouse (SA03) - MW307, MW308, MW309, MW310.	
	Landfills - MW106S, MW107S, MW108S, MW109S, MW110S.	
On-Site – secondary sources	Sewage system and leach field (SA04) : MW114S.	8
	Site Drainage - MW115S.	
	Water Supply Infrastructure –MW505, MW312, MW313, MW111S.	
	Abstraction bore 1 - MW401.	
On-site - other	Abstraction bore 2 –MW402.	24
	Airside perimeter – MW116S, MW117I, MW118D, MW119S, MW120I, MW121D, MW122S, MW123I, MW124D.	
	Site boundary –MW125S, MW126I, MW128S, MW129I, MW130D, MW131D, MW132I, MW133D, MW134D, MW135I, MW136D, MW138S, MW139I, MW140D.	
	Background - MW137S.	
Off-Site	Water Corporation Production bores⁽¹⁾ : Pinjar Production P140, Pinjar Production P145.	6
	Public land⁽²⁾ : MW143S, MW142S, MW141S, MW403.	

Notes: (1) These are Water Corporation production bores being sampled by the Water Corporation.

(2) Yeal Swamp Nature Reserve managed by the Department of Parks and Wildlife (DPaW) / Vacant Crown Land managed by the Department of Planning, Lands and Heritage (DLPH)

2.2 Tap Water Monitoring

Water samples were collected from the tap water monitoring locations listed in Table 2-2 in accordance with the SAQP (Cardno, 2022) and sampling methodology detailed in section 3.2. The tap water monitoring locations are shown on Figure 2A and 2B, Appendix A.

Table 2-2 Tap Water Monitoring Locations

Monitoring Area	Location ID	Number of locations
On-Site	POT102; POT103; POT104.	3

2.3 Data Management

All the data included in this report has been collected, uploaded to the ESdat database and reviewed according to the data management requirements of the *Defence Contamination Management Manual* (DCMM) Annex L, including:

- > All field data collected was uploaded;
- > Laboratory data was uploaded and approved; and
- > QA/QC data was reconciled.

The sample naming convention detailed in the DCMM Annex L was used in the field.

2.4 Deviations from the OMP SAQP

Deviations from the SAQP for the post-winter 2022 monitoring event are presented in Table 2-3 below.

Table 2-3 Deviations from the OMP SAQP

Location	Deviation	Comments
MW107S, MW108S	Not sampled	These wells were found dry. Impact on the OMP program is moderate as these wells are constantly dry and therefore no data is obtained for the landfills in this area.
MW134D		This well was found blocked at 22mBGL. Impact on the OMP is limited as two other adjacent wells (including deep well MW136D) were sampled. However, MW136D is now recording PFAS detections and MW134D should be repaired to continue monitoring potential offsite or vertical migration of the PFAS plume.
MW307		This well has been destroyed. Impact on the OMP program is moderate, this location is the only monitoring well up gradient of the powerhouse source area.
MW505	SWL record not used for groundwater contours	Bore monument has been damaged, therefore the survey data for this bore is no longer reliable. SWL not used to infer groundwater contours.

3 Methodology

3.1 Groundwater Sampling Methodology

Groundwater monitoring was undertaken by no purge HydraSleeve® method as detailed in Table 3-1.

Table 3-1 Groundwater Sampling Method

Activity	Details
Well Gauging	Standing Water Level (SWL) was gauged in each well prior to sampling using an interface probe. All wells were measured against a specified mark at the top of the well casing.
Groundwater Field Parameters	<p>Groundwater field parameters were recorded via a water quality meter prior to deployment of HydraSleeves® or pre-sample collection. The following field parameters were recorded:</p> <ul style="list-style-type: none"> pH. electrical conductivity (EC). oxidation reduction potential (ORP). Dissolved oxygen (DO). Temperature. <p>Once field parameters had stabilised (as indicated by at least three consecutive measurements falling within +/- 10% of each other) measurement were recorded on field data records.</p> <p>All field instruments (e.g. water quality meter) were calibrated by the equipment supplier and bump tested on the field daily to optimise the accuracy of the measurements taken. Calibration certificates and bump test records are provided in Appendix D.</p>
Deployment of HydraSleeve®	HydraSleeve® were deployed with top weight sample collection to begin at the lowest point.
Retrieval of HydraSleeves® (Sample Collection)	<p>HydraSleeve® sampling devices were left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment. Samples were collected via continuous pull method at a rate allowing the water to pass through the check valve into the sample sleeve.</p> <p>Samples were discharged immediately (minimise changes in chemistry) via discharge tube.</p> <p>Following sampling, HydraSleeves® were deployed in preparation for the next OMP monitoring event using the same string for consistency between event (same depth of sampling i.e. within screen).</p>
Decontamination procedure	<p>Dedicated HydraSleeves® were used at each groundwater bore thus removing the need for decontamination.</p> <p>All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.</p>
Sample identification, preservation transport and holding times	<p>Each sample was labelled with the sample location, date, project identification number. Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under Chain of Custody (CoC) documentation.</p> <p>Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).</p>
Laboratory Testing	<p>Groundwater samples were submitted for the following analysis:</p> <ul style="list-style-type: none"> Full PFAS analytical suite (refer to the SAQP for full list of analytes). <p>The primary laboratory was ALS Global Laboratories (Perth), and the secondary laboratory (quality control) was Eurofins (Perth). Both laboratories are NATA-accredited for the parameters tested. Copies of the NATA stamped laboratory reports and CoC documentation are included in Appendix C.</p>

3.2 Tap water Sampling Methodology

Water samples from abstraction bores and taps were collected via the 'first flush' sampling method. The primary objective of the 'first flush' sampling method is to collect water representative of the user, who may not purge the water line.

Field parameters (pH, temperature, EC, ORP and DO) were recorded post sampling collection, samples were analysed for the full PFAS analytical suite (refer to SAQP for full list of analytes).

3.3 Quality Control / Quality Assurance

A critical aspect of site assessments is the demonstration of the quality of the data used as the basis for the assessment. This is achieved through a Data Validation process which includes a review of the following data quality indicators, as described in the SAQP:

- > QA documentation.
- > Bias.
- > Data Representativeness.
- > Data Precision & Accuracy.
- > Laboratory Performance.
- > Data Comparability.
- > Data Set Completeness.

A detailed review of these aspects has been undertaken, the results of which are presented in Appendix E.

The data quality review indicates no significant systematic errors in the data collection process for groundwater and tap water and therefore, the data set used as the basis for this assessment is considered valid and complete.

3.4 Assessment Criteria

3.4.1 Groundwater and Tap water

The adopted assessment criteria for groundwater and tap water are detailed in Table 3-2.

Table 3-2 Criteria for Groundwater and Tap water

Exposure Scenario	Adopted Assessment Criteria		
	PFHxS / PFOS µg/L	PFOA	Guidance
Human Health - Drinking Water Quality Guideline	0.07	0.56	HEPA 2020
Human Health – Recreational Use Guideline	2.0	10	HEPA 2020

4 Field Observations and Results

4.1 General Site Observations

No significant weather event or site activities that could have impacted the monitoring event or results obtained were noted during the post-winter 2022 monitoring event. No rainfall occurred during the post-winter 2022 monitoring event and the daily maximum temperatures varied between 19.5 and 29.1°C.

4.2 Groundwater

4.2.1 Summary of Field Observations

4.2.1.1 Physicochemical parameters

Stabilised physicochemical parameters, water colour and turbidity observations recorded during the groundwater and tap water sampling event are presented in field sampling records, included in Appendix D. Parameters were generally consistent with historical data for the site. Groundwater pH was acidic to slightly acidic, water colour was generally clear and, in some instances, cloudy. DO readings indicate aerobic groundwater conditions and TDS indicate fresh water conditions.

4.2.1.2 Groundwater gauging

Groundwater depth ranged from 52.405 mAHD (MW403) to 67.016 mAHD (MW114S) which is consistent with historical data. Gauging records are presented in Appendix D. Inferred groundwater contours and flow direction are presented on Figures 3 and 4, Appendix A. Groundwater is inferred to flow from the site in a west/south-westerly direction, which is consistent with previous monitoring events.

4.2.2 Groundwater Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria. A summary of results exceeding the adopted criteria is presented in Table 4-1. Laboratory results have also been compared to available historical data in order to identify monitoring locations where a first-time detection of PFOA or PFOS+PFHxS or a new exceedance of a guideline value were reported. Figures 2A & 2B in Appendix A present the groundwater monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-1 Summary of Groundwater Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	MW301, MW303, MW308, MW309, MW310, MW504.	0.56 ²	3.93 (MW301)	54	6
Sum of PFHxS and PFOS	MW101I, MW104I, MW109S, MW110S, MW111S, MW114S, MW115S, MW116S, MW119S, MW122S, MW123I, MW138S, MW141S, MW301, MW302, MW303, MW304, MW305, MW306, MW308, MW309, MW310, MW312, MW313, MW402 MW504, MW505.	0.07 ²	139 (MW310)	54	27

Notes:

1. Non-inclusive of quality control samples
2. PFAS NEMP guideline value for human health – drinking water

Findings are summarised as follows:

- > No first-time detection or new exceedance of a guideline value was reported for the groundwater monitoring locations during the post-winter 2022 monitoring event.

4.3 Tap water

4.3.1 Summary of Field Observations

Stabilised physiochemical parameters and observations recorded during the tap water sampling event are presented in field sampling records, included in Appendix D. Parameters were generally consistent with the previous monitoring event. Tap water pH was slightly acidic, water was observed to be clear and fresh to brackish. DO readings indicate aerobic tap water conditions. No visual or olfactory evidence of contamination were recorded.

4.3.2 Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria. A summary of results exceeding the adopted criteria is presented in Table 4-1. Laboratory results have also been compared to available historical data in order to identify monitoring locations where a first-time detection of PFOA or PFOS+PFHxS or a new exceedance of a guideline value were reported. Figures 2A and 2B in Appendix A present the tap water monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-2 Summary of Tap Water Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	0.56 ²	0.03	3	0
Sum of PFHxS and PFOS	POT102, POT103, POT104.	0.07 ²	0.56 (POT104)	3	3

Note:

1. Non-inclusive of quality control samples
2. PFAS NEMP guideline value for human health – drinking water

Findings are summarised as follows:

- > No first time detection of PFOA or Sum of PFOS and PFHxS were reported for the tap water locations.
- > All three tap water samples reported Sum of PFOS and PFHxS concentrations above the drinking water guideline value but below the recreational use value, which is similar to previous monitoring events.
- > All samples reported a detectable concentration of PFOA (i.e. above laboratory LOR) but below the adopted assessment criteria.

4.4 Changes to the Monitoring Network Condition

The following changes to the monitoring network condition were noted during the post-winter 2022 event:

- > The monument of monitoring well MW505 was no longer present, and it appeared that the well was driven over and damaged.

The Department of Defence has been advised that the Water Corporation will continue to sample for PFAS at production bores Pinjar bore 140 (Superficial aquifer) and Pinjar bore 145 (Leederville aquifer) on a quarterly basis.

5 Summary and Conclusions

Cardno undertook the post-winter 2022 groundwater and tap water monitoring event at Gingin Satellite Airfield as part of the PFAS OMP. Groundwater sampling and testing was undertaken at 54 monitoring wells on- and off-site, two abstraction bores and three tap water locations. Four groundwater monitoring wells couldn't be sampled as these wells were found to be dry (MW107S, MW108S), blocked (MW134D) or destroyed (MW307).

The groundwater laboratory results reported the following:

- > Of the 54 groundwater samples tested, Sum of PFOS and PFHxS (27 samples) and PFOA (6 samples) reported exceedances of the adopted assessment criteria.
- > No first-time detection of PFOA or Sum of PFOS and PFHxS, or new exceedance of a guideline value was reported for the groundwater monitoring locations during the post-winter 2022 monitoring event.

Groundwater results were generally consistent with the previous monitoring events.

The tap water laboratory results reported the following:

- > All three samples tested reported Sum of PFOS and PFHxS concentrations above the drinking water criteria but below the recreational use criteria, which is similar to the previous monitoring events.
- > All samples reported PFOA concentrations above the laboratory LOR but below the adopted assessment criteria.
- > No first-time detection of PFOA or Sum of PFOS and PFHxS, or new exceedance of guideline values were reported for the tap water monitoring locations.

PFAS concentrations at the groundwater and tap water locations sampled during the post-winter 2022 monitoring event were generally of the same order of magnitude as historical events.

It is recommended that MW134D is repaired and MW307 is replaced prior to the next biannual monitoring event.

The next OMP sampling event for Gingin Satellite Airfield is the quarterly monitoring event (Q1 2023), scheduled for January 2023. An annual interpretive report will be prepared for the September 2021 – August 2022 monitoring period.

6 References

General References

1. *Australian and New Zealand Guidelines (ANZG) for fresh and marine water quality*, 2018.
2. *Contaminated Sites Act 2003*, Western Australia.
3. Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*.
4. Environmental Protection Agency (United States EPA), November 2002, Reference: EPA/240/R-02/004, 'Guidance on Environmental Data Verification and Data Validation'.
5. The Heads of EPAs Australia and New Zealand (HEPA; 2020) *PFAS National Environmental Management Plan (NEMP) 2.0*, January 2020.
6. National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended), registered May 2013.
7. National Health and Medical Research Council (NHMRC) (2011 – updated 2022) *National Water Quality Management Strategy - Australian Drinking Water Guidelines 6*, January 2022
8. NHMRC, August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.
9. Standards Australia/Standards New Zealand (1998) AS5667.1:1998 'Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples'.
10. U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process (EPA QA/G-4)*.
USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8)*.
11. Australian Department of Defence, March 2018 amended June 2021, Defence Contamination Management Manual (DCMM). Annex L, 'Data Management'.

Site Specific References

12. Cardno, 2022, *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan*, Rev6.
13. Cardno, April 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2020*.
14. Cardno, December 2020, *PFAS OMP, Biannual Monitoring Factual Report - August 2020*.
15. Cardno, December 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2020*.
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APPENDIX

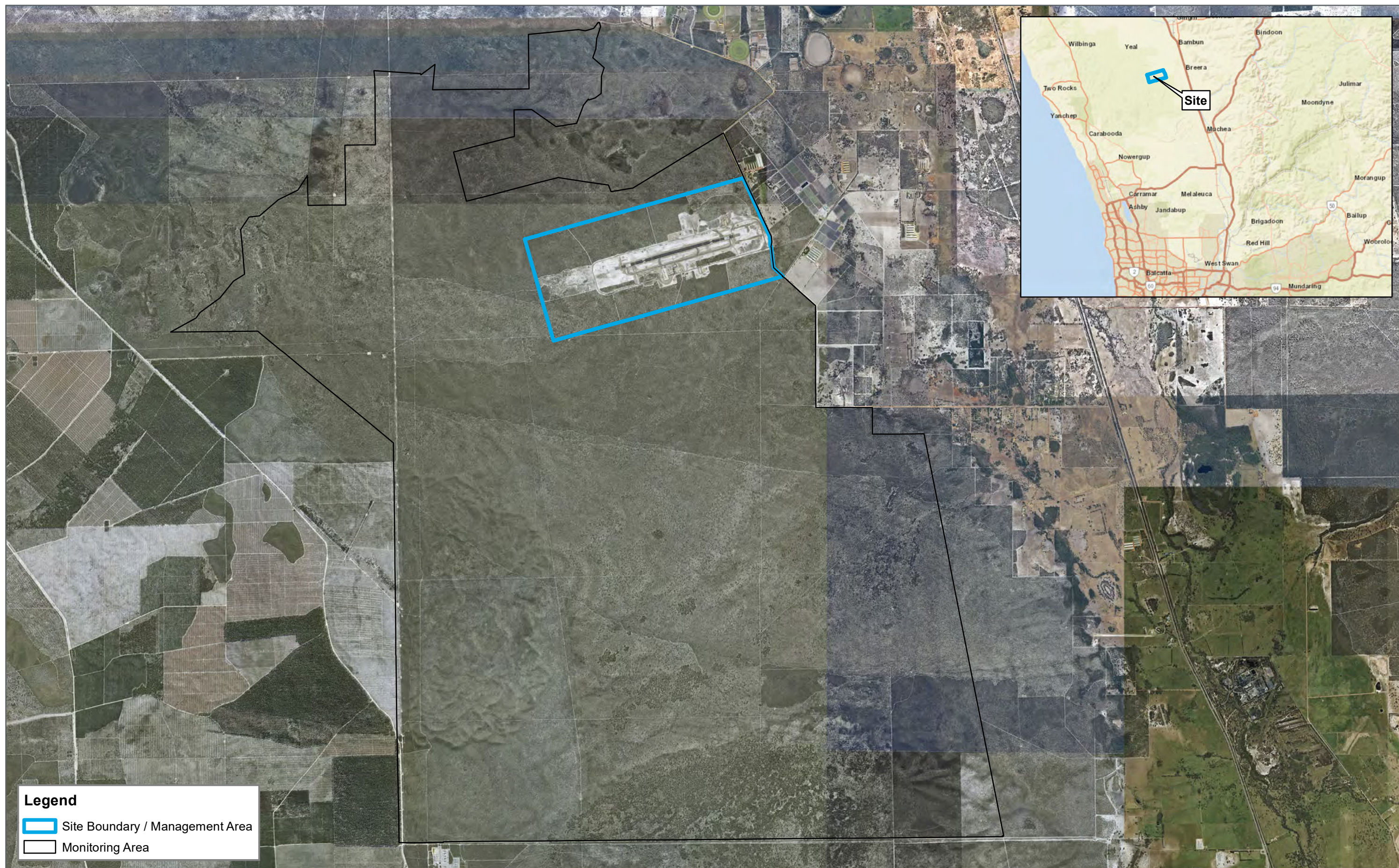
A

FIGURES



now





Legend

 Site Boundary / Management Area

 Monitoring Area

FIGURE 1
1:60,000 Scale at A3

Metres

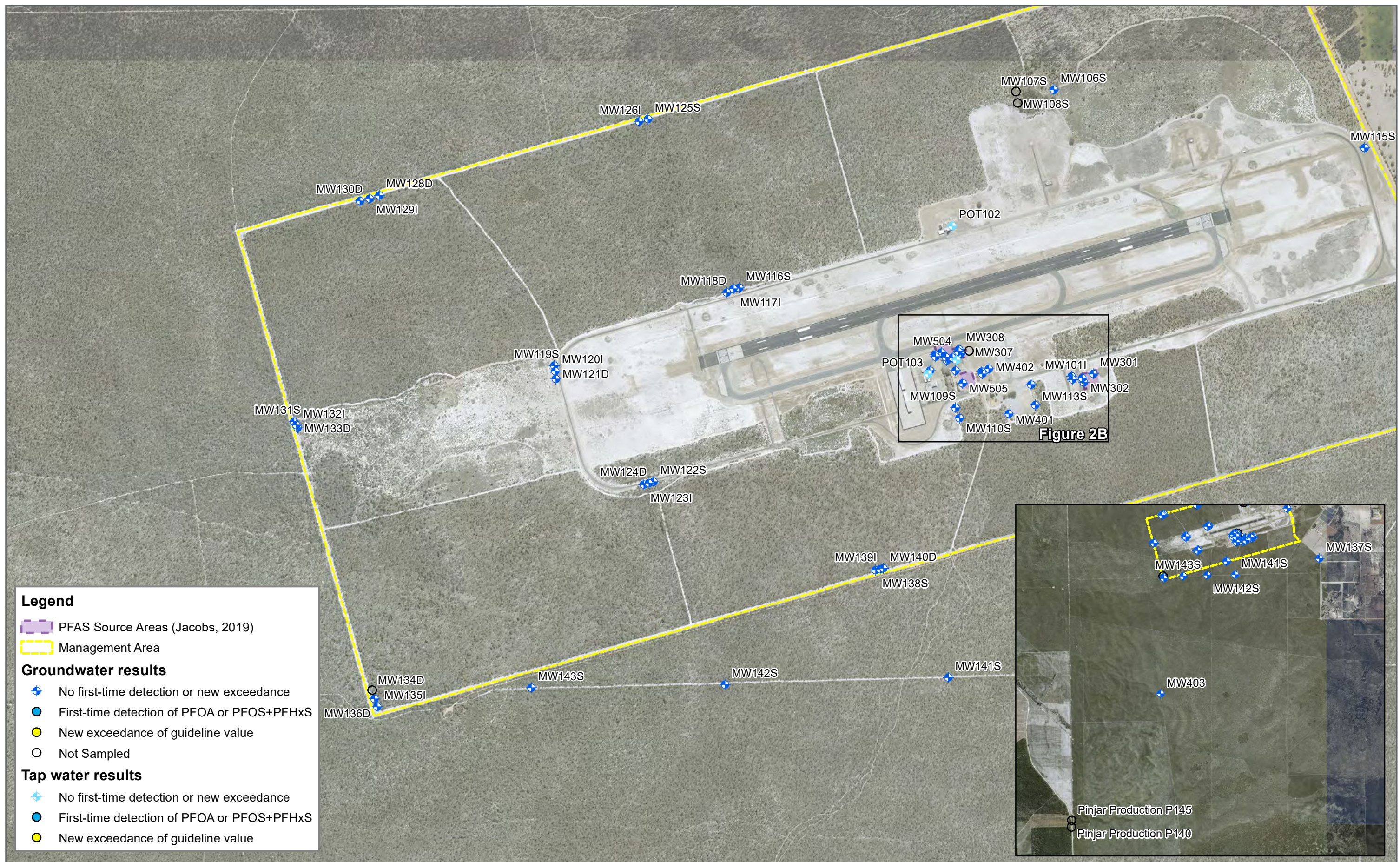
0 1,000 2,000

Site Location

POST-WINTER 2022 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-01 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-001_RegionalLocation 02.mxd
Aerial Imagery Supplied by Aerometrex



Monitoring Locations & Results

POST-WINTER 2022 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-01 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-002A_Sep22PFASResults 01.mxd
Aerial Imagery Supplied by Aerometrex



FIGURE 2B
1:1,750 Scale at A3

Metres
0 50 100

Monitoring Locations & Results

POST-WINTER 2022 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-01 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-002B_Sep22PFASResults 01.mxd
Aerial Imagery Supplied by Aerometrex

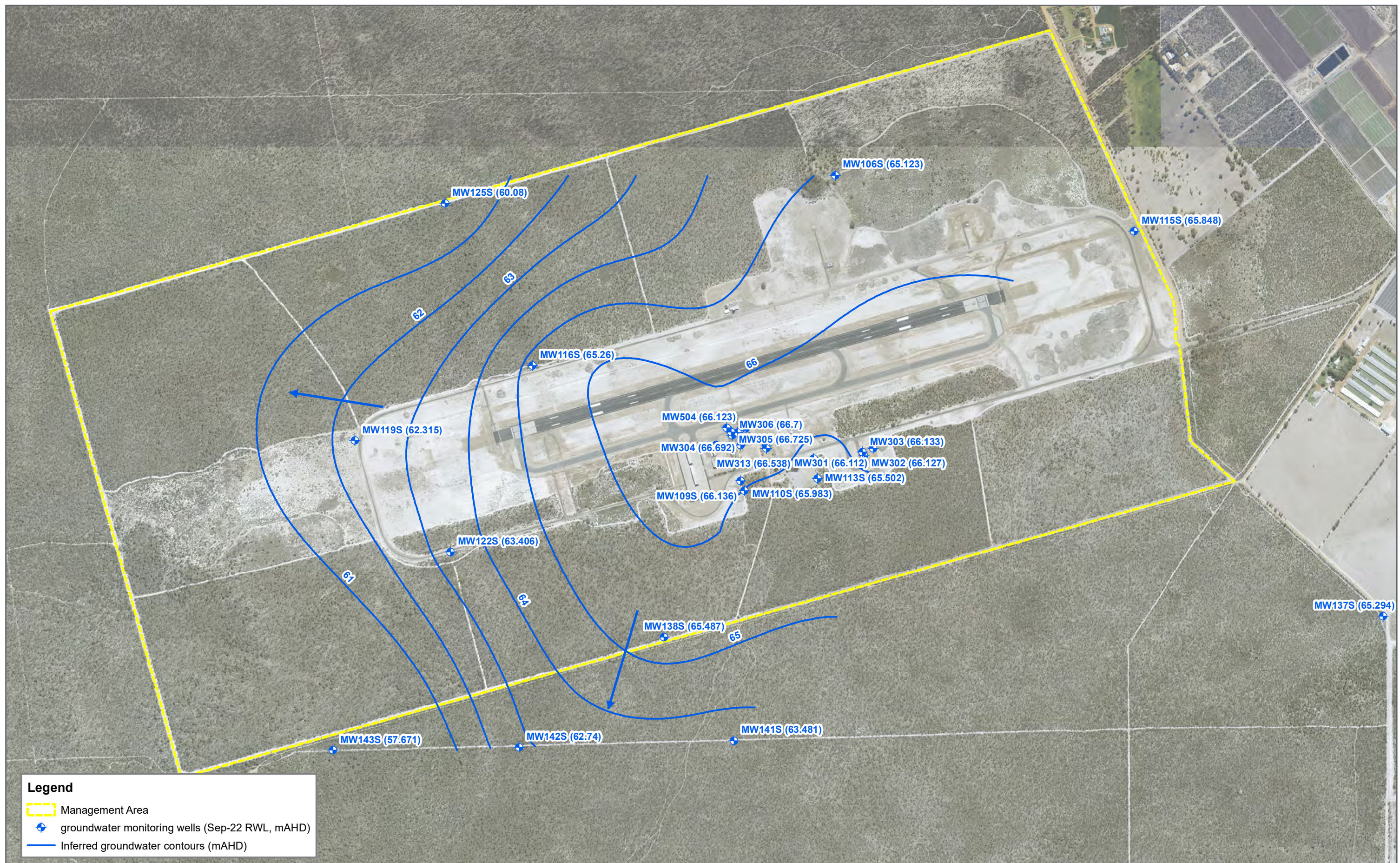


FIGURE 3
1:13,000 Scale at A3

Metres
0 200 400

Inferred Groundwater Contours (Shallow Aquifer)

POST-WINTER 2022 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-01 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-003_Sep22ShallowGWContours 01.mxd
Aerial Imagery Supplied by Aerometrex

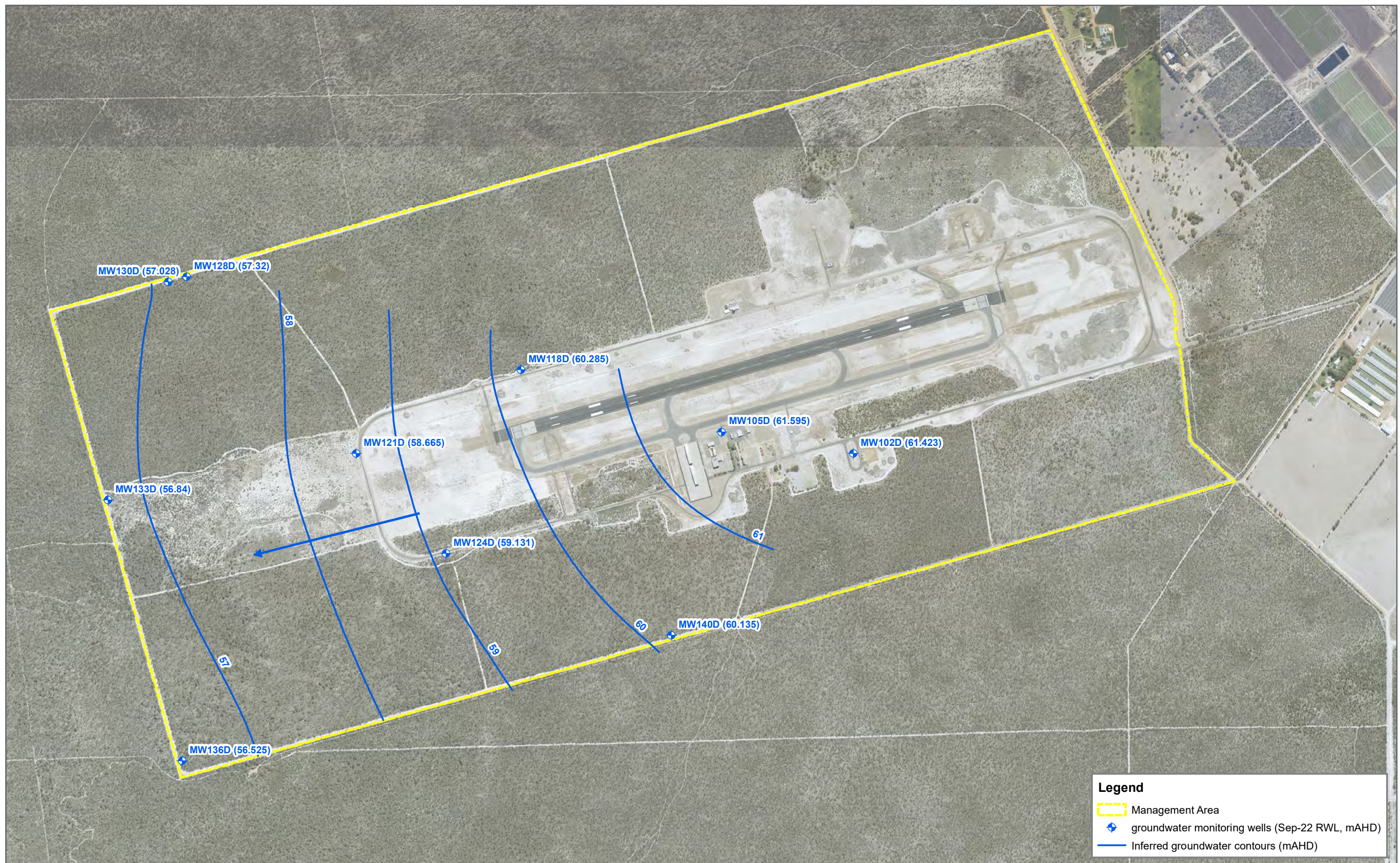


FIGURE 4
1:13,000 Scale at A3

Metres
0 200 400

Inferred Groundwater Contours (Deep Aquifer)

POST-WINTER 2022 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-01 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-004_Sep22DeepGWContours 01.mxd
Aerial Imagery Supplied by Aerometrex

APPENDIX

B

DATA ASSESSMENT TABLES



now



	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids								PFAS - (n:2) Fluorotelomer Sulfonic Acids							
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic 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)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	
LOR - Limit of Reporting	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	0.01	0.05	0.01	0.01
PFAS NEMP 2020 Drinking Water											0.56											
PFAS NEMP 2020 Recreational Water											10											

Location Code	Date	Field ID	Sample Type	Lab Report No.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</
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		PFAS - Perfluoroalkyl Sulfonamides							PFAS		
		Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (ETFOSE)	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR - Limit of Reporting		0.02	0.05	0.02	0.05	0.05	0.02	0.05	0.01	0.01	0.01
PFAS NEMP 2020 Drinking Water									0.07		
PFAS NEMP 2020 Recreational Water									2		

Location Code	Date	Field ID	Sample Type	Lab Report No.									
MW101I	28/09/2022	0958_MW101I_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.46	0.50
MW101I	28/09/2022	0958_QC103_220928	Field Duplicate	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.70	0.80
MW101I	28/09/2022	0958_QC203_220928	Interlab Duplicate	927653	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.46	0.54
MW102D	28/09/2022	0958_MW102D_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.05	0.05
MW102D	28/09/2022	0958_QC105_220928	Field Duplicate	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.04	0.04
MW102D	28/09/2022	0958_QC205_220928	Interlab Duplicate	927653	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.02	<0.05
MW104I	28/09/2022	0958_MW104I_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	3.73	4.82
MW105D	28/09/2022	0958_MW105D_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW106S	28/09/2022	0958_MW106S_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW109S	28/09/2022	0958_MW109S_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.27	0.27
MW110S	28/09/2022	0958_MW110S_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09
MW111S	28/09/2022	0958_MW111S_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2.76	2.98
MW112S	28/09/2022	0958_MW112S_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02
MW113S	28/09/2022	0958_MW113S_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW114S	28/09/2022	0958_MW114S_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.55	1.73
MW115S	28/09/2022	0958_MW115S_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.30	0.30
MW116S	28/09/2022	0958_MW116S_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.12	0.12
MW117I	28/09/2022	0958_MW117I_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02
MW118D	28/09/2022	0958_MW118D_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW119S	29/09/2022	0958_MW119S_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09
MW120I	29/09/2022	0958_MW120I_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.01	0.01
MW121D	29/09/2022	0958_MW121D_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW122S	28/09/2022	0958_MW122S_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.13	0.13
MW123I	28/09/2022	0958_MW123I_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.12	0.12
MW124D	28/09/2022	0958_MW124D_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW125S	29/09/2022	0958_MW125S_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW126I	29/09/2022	0958_MW126I_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW128D	29/09/2022	0958_MW128D_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW129S	29/09/2022	0958_MW129I_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW130D	29/09/2022	0958_MW130D_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW131D	29/09/2022	0958_MW131D_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW132I	29/09/2022	0958_MW132I_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.04	0.04
MW133D	29/09/2022	0958_MW133D_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02
MW135I	29/09/2022	0958_MW135I_220929	Normal	EP2212667	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW136D	29/09/2022	0958_MW136D_220929	Normal	EP2212667	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02
MW137S	28/09/2022	0958_MW137S_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW137S	28/09/2022	0958_QC101_220928	Field Duplicate	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW137S	28/09/2022	0958_QC201_220928	Interlab Duplicate	927653	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01
MW138S	28/09/2022	0958_MW138S_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.10	0.10
MW139I	28/09/2022	0958_MW139I_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW140D	28/09/2022	0958_MW140D_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW141S	29/09/2022	0958_MW141S_220929	Normal	EP2212667	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.35	0.43
MW142S	29/09/2022	0958_MW142S_220929	Normal	EP2212667	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW143S	29/09/2022	0958_MW143S_220929	Normal	EP2212667	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02
MW301	28/09/2022	0958_MW301_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	104	115
MW302	28/09/2022	0958_MW302_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	4.94	5.41
MW302	28/09/2022	0958_QC106_220928	Field Duplicate	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	5.17	5.64
MW302	28/09/2022	0958_QC206_220928	Interlab Duplicate	927653	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	3.1	3.4
MW303	28/09/2022	0958_MW303_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	25.7	28.0
MW304	28/09/2022	0958_MW304_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	7.48	10.5
MW305	28/09/2022	0958_MW305_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	4.22	5.26
MW306	28/09/2022	0958_MW306_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	5.94	7.41
MW308	28/09/2022	0958_MW308_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	75.7	79.3
MW309	28/09/2022	0958_MW309_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	127	131
MW310	28/09/2022	0958_MW310_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	139	152
MW310	28/09/2022	0958_QC107_220928	Field Duplicate	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	119	131
MW310	28/09/2022	0958_QC207_220928	Interlab Duplicate	927653	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	98	106.72
MW312	28/09/2022	0958_MW312_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2.45	2.68
MW313	28/09/2022	0958_MW313_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.18	1.23
MW313	28/09/2022	0958_QC104_220928	Field Duplicate	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.50	1.58
MW313	28/09/2022	0958_QC204_220928	Interlab Duplicate	927653	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.82	0.87
MW401	28/09/2022	0958_MW401_220928	Normal	EP2212584	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW402	28/09/2022	0958_MW402_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.85	2.21
MW403	6/10/2022	0958_MW403_221006	Normal	EP2213053	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW504	28/09/2022	0958_MW504_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	23.6	25.6
MW505	28/09/2022	0958_MW505_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.05	1.18
POT102	28/09/2022	0958_POT102_220928	Normal	EP2212566	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.42	0.59
POT103	29/09/2022	0958_POT103_220929	Normal	EP2212637	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.52	0

Table B2 - Rinsate and Blanks Analytical Results

				PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids										PFAS - (n:2) Fluorotelomer Sulfonic Acids					
				Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR - Limit of Reporting				0.02	0.02	0.01	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05
Date	Field ID	Sample Type	Lab Report No.																						
28/09/2022	0958_QC301_220928	Rinsate	EP2212566	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
28/09/2022	0958_QC302_220928	Rinsate	EP2212566	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
28/09/2022	0958_QC401_220928	Field Blank	EP2212566	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
28/09/2022	0958_QC402_220928	Field Blank	EP2212566	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
29/09/2022	0958_QC301_220929	Rinsate	EP2212637	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
29/09/2022	0958_QC302_220929	Rinsate	EP2212637	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
29/09/2022	0958_QC401_220929	Field Blank	EP2212637	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
29/09/2022	0958_QC402_220929	Field Blank	EP2212637	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
6/10/2022	0958_QC301_221006	Rinsate	EP2213053	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05
6/10/2022	0958_QC401_221006	Field Blank	EP2213053	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05

Table B2 - Rinsate and Blanks Analytical Results

				PFA		PFAS - Perfluoroalkyl Sulfonamides							PFAS		
				Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR - Limit of Reporting				0.02	0.02	0.02	0.05	0.02	0.05	0.05	0.02	0.05	0.01	0.01	0.01

Date	Field ID	Sample Type	Lab Report No.													
28/09/2022	0958_QC301_220928	Rinsate	EP2212566	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
28/09/2022	0958_QC302_220928	Rinsate	EP2212566	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
28/09/2022	0958_QC401_220928	Field Blank	EP2212566	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
28/09/2022	0958_QC402_220928	Field Blank	EP2212566	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
29/09/2022	0958_QC301_220929	Rinsate	EP2212637	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
29/09/2022	0958_QC302_220929	Rinsate	EP2212637	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
29/09/2022	0958_QC401_220929	Field Blank	EP2212637	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
29/09/2022	0958_QC402_220929	Field Blank	EP2212637	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
6/10/2022	0958_QC301_221006	Rinsate	EP2213053	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	
6/10/2022	0958_QC401_221006	Field Blank	EP2213053	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01	

Table B3 - Relative Percentage Differences

Date	Field ID	Matrix Type	Lab Report Number	28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD
				0958_MW1375_220928	0958_QC101_220928		0958_MW1375_220928	0958_QC201_220928		0958_POT104_220928	0958_QC102_220928		0958_POT104_220928	0958_QC202_220928	
				Water	Water		Water	Water		Water	Water		Water	Water	
				EP2212584	EP2212584		EP2212584	927653		EP2212566	EP2212566		EP2212566	927653	
	Unit	LOR													
PFAS - Perfluoroalkyl Sulfonic Acids															
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01						<0.01						<0.01	
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.02	0.02	0	0.02	0.02	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.03	0.03	0	0.03	0.02	40
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.01	0	0.36	0.37	3	0.36	0.18	67
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.02	0.02	0	0.02	0.02	0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.01	0	0.20	0.19	5	0.20	0.16	22
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01						<0.01						<0.01	
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
PFAS - Perfluoroalkyl Carboxylic Acids															
Perfluorobutanoic acid (PFBA)	µg/L	0.05		<0.1	<0.1	0	<0.1	<0.05	0	<0.1	<0.1	0	<0.1	<0.05	0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.02	<0.02	0	0.02	<0.01	67
Perfluorohexanoic acid (PFHxA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.12	0.11	9	0.12	0.07	53
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorooctanoic acid (PFOA)	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.01	0	0.02	0.02	0	0.02	0.02	0
Perfluorononanoic acid (PFNA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorodecanoic acid (PFDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorotridecanoic acid (PFTriDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
PFAS - (n:2) Fluorotelomer Sulfonic Acids															
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
PFAS - Perfluoroalkyl Sulfonamides															
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
PFAS															
Sum of PFHxS and PFOS	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.01	0	0.56	0.56	0	0.56	0.34	49
Sum of PFAS (WA DER List)	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.05	0	0.74	0.71	4	0.74	0.45	49
Sum of PFAS	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.1	0	0.79	0.76	4	0.79	0.49	47

*RPDs have only been considered where a concentration is greater than 1 times the LOR.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each LOR multiplier range are: No Limit (1 - 10 x LOR); 50 (10 - 20 x LOR); 20 (> 20 x LOR))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Table B3 - Relative Percentage Differences

Date	Field ID	Matrix Type	Lab Report Number	28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD
				0958_MW1011_220928	0958_QC103_220928		0958_MW1011_220928	0958_QC203_220928		0958_MW313_220928	0958_QC104_220928		0958_MW313_220928	0958_QC204_220928		0958_MW102D_220928	0958_QC105_220928	
				Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
				EP2212584	EP2212584		EP2212584	927653		EP2212566	EP2212566		EP2212566	927653		EP2212584	EP2212584	
	Unit	LOR																
PFAS - Perfluoroalkyl Sulfonic Acids																		
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01					<0.01						<0.01					
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	<0.02	0.04	67	<0.02	0.04	67	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	0.06	0.06	0	0.06	0.04	40	<0.02	0.03	40	<0.02	0.02	0	<0.02	<0.02	0	
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.30	0.46	42	0.30	0.28	7	0.90	1.13	23	0.90	0.53	52	0.02	0.02	0	
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	0.02	0.02	0	0.02	0.02	0	<0.02	<0.02	0	<0.02	0.01	0	<0.02	<0.02	0	
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.16	0.24	40	0.16	0.18	12	0.28	0.37	28	0.28	0.29	4	0.03	0.02	40	
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01					<0.01						<0.01					
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
PFAS - Perfluoroalkyl Carboxylic Acids																		
Perfluorobutanoic acid (PFBA)	µg/L	0.05	<0.1	<0.1	0	<0.1	<0.05	0	<0.1	<0.1	0	<0.1	<0.05	0	<0.1	<0.1	0	
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	0.02	0.04	67	0.02	0.03	40	0.04	0.06	40	0.04	0.04	0	<0.02	<0.02	0	
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.02	0.02	0	0.02	0.01	67	0.01	0.02	67	0.01	0.01	0	<0.01	<0.01	0	
Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
Perfluorodecanoic acid (PFDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
Perfluorotridecanoic acid (PFTriDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	
PFAS - (n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	
PFAS - Perfluoroalkyl Sulfonamides																		
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	
PFAS																		
Sum of PFHxS and PFOS	µg/L	0.01	0.46	0.70	41	0.46	0.46	0	1.18	1.50	24	1.18	0.82	36	0.05	0.04	22	
Sum of PFAS (WA DER List)	µg/L	0.01	0.50	0.80	46	0.50	0.54	8	1.23	1.58	25	1.23	0.87	34	0.05	0.04	22	
Sum of PFAS	µg/L	0.01	0.58	0.88	41	0.58	0.6	3	1.23	1.61	27	1.23	0.9	31	0.05	0.04	22	

Table B3 - Relative Percentage Differences

Date			28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD	28/09/2022		RPD
Field ID	Matrix Type	0958_MW102D_220928		0958_QC205_220928		0958_MW302_220928			0958_QC206_220928			0958_MW310_220928			0958_QC107_220928					
		Water		Water		Water			Water			Water			Water					
		Lab Report Number		EP2212584		EP2212584			EP2212584			EP2212566			EP2212566					
	Unit	LOR																		
PFAS - Perfluoroalkyl Sulfonic Acids																				
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01		<0.01						<0.01								0.44		
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	<0.02	<0.01	0	0.07	0.06	15	0.07	0.05	33	1.40	1.46	4	1.40	1.3	7			
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	<0.02	<0.01	0	0.14	0.14	0	0.14	0.10	33	3.77	3.15	18	3.77	2.0	61			
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.02	<0.01	67	2.39	2.37	1	2.39	1.1	74	27.4	25.3	8	27.4	16	53			
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	<0.02	<0.01	0	0.24	0.26	8	0.24	0.16	40	4.22	4.06	4	4.22	2.1	67			
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.03	0.02	40	2.55	2.80	9	2.55	2.0	24	112	93.7	18	112	82	31			
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01		<0.01						<0.01						0.36				
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0			
PFAS - Perfluoroalkyl Carboxylic Acids																				
Perfluorobutanoic acid (PFBA)	µg/L	0.05	<0.1	<0.05	0	<0.1	<0.1	0	<0.1	<0.05	0	0.3	0.3	0	0.3	0.29	3			
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	<0.02	<0.01	0	0.04	0.05	22	0.04	0.03	29	0.63	0.61	3	0.63	0.48	27			
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	<0.02	<0.01	0	0.21	0.21	0	0.21	0.12	55	5.60	5.49	2	5.60	3.9	36			
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	<0.02	<0.01	0	0.03	0.03	0	0.03	0.02	40	0.66	0.65	2	0.66	0.35	61			
Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01	<0.01	0	0.12	0.12	0	0.12	0.08	40	3.57	3.36	6	3.57	2.4	39			
Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	0.02	0.02	0	0.02	0.02	0			
Perfluorodecanoic acid (PFDA)	µg/L	0.01	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0			
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0			
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0			
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0			
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0			
PFAS - (n:2) Fluorotelomer Sulfonic Acids																				
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0			
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0			
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0			
PFAS - Perfluoroalkyl Sulfonamides																				
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0			
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0			
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0			
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0			
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0			
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0			
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0			
PFAS																				
Sum of PFHxS and PFOS	µg/L	0.01	0.05	0.02	86	4.94	5.17	5	4.94	3.1	46	139	119	16	139	98	35			
Sum of PFAS (WA DER List)	µg/L	0.01	0.05	<0.05	0	5.41	5.64	4	5.41	3.4	46	152	131	15	152	106.72	35			
Sum of PFAS	µg/L	0.01	0.05	<0.1	0	5.79	6.04	4	5.79	3.66	45	160	138	15	160	111.64	36			

APPENDIX

C

LABORATORY CERTIFICATES OF ANALYSIS



now





CHAIN OF CUSTODY

ALS COC#: 42992

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWAHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWAHAUS0002

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 comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW115S		28/09/2022 09:44 AM	Water	ALS: 5 Non ALS: 0	No	X			extra bottles for lab qc
002	0958_POT104		28/09/2022 10:10 AM	Water	ALS: 2 Non ALS: 0	No	X			
003	0958_QC102		28/09/2022 10:10 AM	Water	ALS: 2 Non ALS: 0	No	X			
004	0958_MW114S		28/09/2022 10:23 AM	Water	ALS: 2 Non ALS: 0	No	X			
005	0958_MW402		28/09/2022 10:39 AM	Water	ALS: 4 Non ALS: 0	No	X			extra PFAS bottles for lab QC
006	0958_MW313		28/09/2022 10:51 AM	Water	ALS: 2 Non ALS: 0	No	X			
007	0958_QC104		28/09/2022 10:55 AM	Water	ALS: 2 Non ALS: 0	No	X			
008	0958_MW312		28/09/2022 11:05 AM	Water	ALS: 2 Non ALS: 0	No	X			
009	0958_MW505		28/09/2022 11:24 AM	Water	ALS: 2 Non ALS: 0	No	X			

**CHAIN OF CUSTODY**

COC#: 42992

ALS Laboratory, EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PASOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWAUS0002

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 comments:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_MW111S		28/09/2022 11:49 AM	Water	ALS: 2 Non ALS: 0	No	X			
011	0958_MW310		28/09/2022 12:04 PM	Water	ALS: 2 Non ALS: 0	No	X			
012	0958_QC107		28/09/2022 12:05 PM	Water	ALS: 2 Non ALS: 0	No	X			
013	0958_MW309		28/09/2022 12:12 PM	Water	ALS: 5 Non ALS: 0	No	X			extra bottles for lab QC
014	0958_MW308		28/09/2022 12:21 PM	Water	ALS: 2 Non ALS: 0	No	X			
015	0958_MW305		28/09/2022 12:33 PM	Water	ALS: 2 Non ALS: 0	No	X			
016	0958_MW306		28/09/2022 12:43 PM	Water	ALS: 2 Non ALS: 0	No	X			
017	0958_MW304		28/09/2022 12:53 PM	Water	ALS: 2 Non ALS: 0	No	X			
018	0958_MW504		28/09/2022 01:07 PM	Water	ALS: 2 Non ALS: 0	No	X			



CHAIN OF CUSTODY

(ALS) COC#: 42992

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWAHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWAHAUS0002

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 comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0958_MW104I		28/09/2022 01:19 PM	Water	ALS: 4 Non ALS: 0	No	X			extra PFAS bottles for lab QC
020	0958_MW105D		28/09/2022 01:44 PM	Water	ALS: 2 Non ALS: 0	No	X			
021	0958_MW106S		28/09/2022 02:12 PM	Water	ALS: 2 Non ALS: 0	No	X			
022	0958_POT102		28/09/2022 02:22 PM	Water	ALS: 2 Non ALS: 0	No	X			
023	0958_MW116S		28/09/2022 02:34 PM	Water	ALS: 2 Non ALS: 0	No	X			
024	0958_MW117I		28/09/2022 02:48 PM	Water	ALS: 2 Non ALS: 0	No	X			
025	0958_MW118D		28/09/2022 03:02 PM	Water	ALS: 2 Non ALS: 0	No	X			
026	0958_QC301		28/09/2022 03:09 PM	Water	ALS: 2 Non ALS: 0	No		X		
027	0958_QC302		28/09/2022 03:09 PM	Water	ALS: 2 Non ALS: 0	No		X		



CHAIN OF CUSTODY

COC#: 42992

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

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 comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
028	0958_QC401		28/09/2022 03:10 PM	Water	ALS: 2 Non ALS: 0	No		X		
029	0958_QC402		28/09/2022 03:10 PM	Water	ALS: 2 Non ALS: 0	No		X		



CHAIN OF CUSTODY

COC#: 42992

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

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 comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW115S	HDPE (no PTFE)	20 mL	00350821000420	Grey	No	
001	0958_MW115S	HDPE (no PTFE)	20 mL	00350621000437	Grey	No	
001	0958_MW115S	HDPE (no PTFE)	20 mL	00350821013449	Grey	No	
001	0958_MW115S	Clear Plastic Bottle - Natural	500 mL	00070821026291	Green	No	
001	0958_MW115S	HDPE (no PTFE)	20 mL	00350821000422	Grey	No	
002	0958_POT104	HDPE (no PTFE)	20 mL	00350821000318	Grey	No	
002	0958_POT104	HDPE (no PTFE)	20 mL	00350821000346	Grey	No	
003	0958_QC102	HDPE (no PTFE)	20 mL	00350821013483	Grey	No	
003	0958_QC102	HDPE (no PTFE)	20 mL	00350821013478	Grey	No	
004	0958_MW114S	HDPE (no PTFE)	20 mL	00350821000326	Grey	No	
004	0958_MW114S	HDPE (no PTFE)	20 mL	00350821000282	Grey	No	
005	0958_MW402	HDPE (no PTFE)	20 mL	00350621000521	Grey	No	
005	0958_MW402	HDPE (no PTFE)	20 mL	00350821000448	Grey	No	
005	0958_MW402	HDPE (no PTFE)	20 mL	00350821000269	Grey	No	
005	0958_MW402	HDPE (no PTFE)	20 mL	00350621000579	Grey	No	
006	0958_MW313	HDPE (no PTFE)	20 mL	00350821000472	Grey	No	
006	0958_MW313	HDPE (no PTFE)	20 mL	00350821000374	Grey	No	
007	0958_QC104	HDPE (no PTFE)	20 mL	00350621000591	Grey	No	
007	0958_QC104	HDPE (no PTFE)	20 mL	00350621000439	Grey	No	
008	0958_MW312	HDPE (no PTFE)	20 mL	00350821000313	Grey	No	
008	0958_MW312	HDPE (no PTFE)	20 mL	00350821000250	Grey	No	
009	0958_MW505	HDPE (no PTFE)	20 mL	00350821000353	Grey	No	
009	0958_MW505	HDPE (no PTFE)	20 mL	00350821000400	Grey	No	
010	0958_MW111S	HDPE (no PTFE)	20 mL	00350821000366	Grey	No	
010	0958_MW111S	HDPE (no PTFE)	20 mL	00350821000236	Grey	No	
011	0958_MW310	HDPE (no PTFE)	20 mL	00350821000466	Grey	No	



CHAIN OF CUSTODY

COC#: 42992

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

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 comments:

011	0958_MW310	HDPE (no PTFE)	20 mL	00350821000245	Grey	No	
012	0958_QC107	HDPE (no PTFE)	20 mL	00350621000472	Grey	No	
012	0958_QC107	HDPE (no PTFE)	20 mL	00350621000490	Grey	No	
013	0958_MW309	HDPE (no PTFE)	20 mL	00350821000394	Grey	No	
013	0958_MW309	HDPE (no PTFE)	20 mL	00350621000545	Grey	No	
013	0958_MW309	HDPE (no PTFE)	20 mL	00350821000195	Grey	No	
013	0958_MW309	HDPE (no PTFE)	20 mL	00350621000479	Grey	No	
013	0958_MW309	Clear Plastic Bottle - Natural	500 mL	00070821026398	Green	No	
014	0958_MW308	HDPE (no PTFE)	20 mL	00350821000468	Grey	No	
014	0958_MW308	HDPE (no PTFE)	20 mL	00350821000368	Grey	No	
015	0958_MW305	HDPE (no PTFE)	20 mL	00350821000262	Grey	No	
015	0958_MW305	HDPE (no PTFE)	20 mL	00350821000489	Grey	No	
016	0958_MW306	HDPE (no PTFE)	20 mL	00350821000286	Grey	No	
016	0958_MW306	HDPE (no PTFE)	20 mL	00350821000187	Grey	No	
017	0958_MW304	HDPE (no PTFE)	20 mL	00350821000443	Grey	No	
017	0958_MW304	HDPE (no PTFE)	20 mL	00350821000455	Grey	No	
018	0958_MW504	HDPE (no PTFE)	20 mL	00350821000465	Grey	No	
018	0958_MW504	HDPE (no PTFE)	20 mL	00350821000378	Grey	No	
019	0958_MW104I	HDPE (no PTFE)	20 mL	00350821000350	Grey	No	
019	0958_MW104I	HDPE (no PTFE)	20 mL	00350821000334	Grey	No	
019	0958_MW104I	HDPE (no PTFE)	20 mL	00350821013500	Grey	No	
019	0958_MW104I	HDPE (no PTFE)	20 mL	00350621000453	Grey	No	
020	0958_MW105D	HDPE (no PTFE)	20 mL	00350821000287	Grey	No	
020	0958_MW105D	HDPE (no PTFE)	20 mL	00350821000345	Grey	No	
021	0958_MW106S	HDPE (no PTFE)	20 mL	00350821000456	Grey	No	
021	0958_MW106S	HDPE (no PTFE)	20 mL	00350821000365	Grey	No	
022	0958_POT102	HDPE (no PTFE)	20 mL	00350821000408	Grey	No	



CHAIN OF CUSTODY

COC#: 42992

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWAHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWAHAUS0002

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 comments:

022	0958_POT102	HDPE (no PTFE)	20 mL	00350821000409	Grey	No	
023	0958_MW116S	HDPE (no PTFE)	20 mL	00350821000204	Grey	No	
023	0958_MW116S	HDPE (no PTFE)	20 mL	00350821000268	Grey	No	
024	0958_MW117I	HDPE (no PTFE)	20 mL	00350821000324	Grey	No	
024	0958_MW117I	HDPE (no PTFE)	20 mL	00350821000414	Grey	No	
025	0958_MW118D	HDPE (no PTFE)	20 mL	00350821000437	Grey	No	
025	0958_MW118D	HDPE (no PTFE)	20 mL	00350821000426	Grey	No	
026	0958_QC301	HDPE (no PTFE)	20 mL	00350621000455	Grey	No	
026	0958_QC301	HDPE (no PTFE)	20 mL	00350621000590	Grey	No	
027	0958_QC302	HDPE (no PTFE)	20 mL	00350621000578	Grey	No	
027	0958_QC302	HDPE (no PTFE)	20 mL	00350621000559	Grey	No	
028	0958_QC401	HDPE (no PTFE)	20 mL	00350621000493	Grey	No	
028	0958_QC401	HDPE (no PTFE)	20 mL	00350621000544	Grey	No	
029	0958_QC402	HDPE (no PTFE)	20 mL	00350621066982	Grey	No	
029	0958_QC402	HDPE (no PTFE)	20 mL	00350621000599	Grey	No	

Total Bottle Count: ALS: 68, Non ALS: 0

**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : EP2212566**

Client : STANTEC AUSTRALIA PTY LTD
Contact : [REDACTED] (STANTEC)
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : [REDACTED]
Address : 26 Rigali Way Wangara Western
Australia Australia 6065

E-mail : [REDACTED]
Telephone : ----
Facsimile : ----

E-mail : [REDACTED]
Telephone : [REDACTED]
Facsimile : [REDACTED]

Project : WA_0958_PFASOMP
Order number : pfas-omp Gingin
C-O-C number : 42992
Site : Gingin GW - MB
Sampler : [REDACTED]

Page : 1 of 3
Quote number : ES2022MWHAUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 28-Sep-2022 18:00
Client Requested Due : 11-Oct-2022
Date :

Issue Date : 30-Sep-2022
Scheduled Reporting Date : **11-Oct-2022**

Delivery Details

Mode of Delivery : Client Drop Off
No. of coolers/boxes : 1
Receipt Detail :

Security Seal : Not Available
Temperature : 1.3 - Ice present
No. of samples received / analysed : 29 / 29

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2212566-001	28-Sep-2022 09:44	0958_MW115S_220928	✓
EP2212566-002	28-Sep-2022 10:10	0958_POT104_220928	✓
EP2212566-003	28-Sep-2022 10:10	0958_QC102_220928	✓
EP2212566-004	28-Sep-2022 10:23	0958_MW114S_220928	✓
EP2212566-005	28-Sep-2022 10:39	0958_MW402_220928	✓
EP2212566-006	28-Sep-2022 10:51	0958_MW313_220928	✓
EP2212566-007	28-Sep-2022 10:55	0958_QC104_220928	✓
EP2212566-008	28-Sep-2022 11:05	0958_MW312_220928	✓
EP2212566-009	28-Sep-2022 11:24	0958_MW505_220928	✓
EP2212566-010	28-Sep-2022 11:49	0958_MW111S_220928	✓
EP2212566-011	28-Sep-2022 12:04	0958_MW310_220928	✓
EP2212566-012	28-Sep-2022 12:05	0958_QC107_220928	✓
EP2212566-013	28-Sep-2022 12:12	0958_MW309_220928	✓
EP2212566-014	28-Sep-2022 12:21	0958_MW308_220928	✓
EP2212566-015	28-Sep-2022 12:33	0958_MW305_220928	✓
EP2212566-016	28-Sep-2022 12:43	0958_MW306_220928	✓
EP2212566-017	28-Sep-2022 12:53	0958_MW304_220928	✓
EP2212566-018	28-Sep-2022 13:07	0958_MW504_220928	✓
EP2212566-019	28-Sep-2022 13:19	0958_MW104I_220928	✓
EP2212566-020	28-Sep-2022 13:44	0958_MW105D_220928	✓
EP2212566-021	28-Sep-2022 14:12	0958_MW106S_220928	✓
EP2212566-022	28-Sep-2022 14:22	0958_POT102_220928	✓
EP2212566-023	28-Sep-2022 14:34	0958_MW116S_220928	✓
EP2212566-024	28-Sep-2022 14:48	0958_MW117I_220928	✓
EP2212566-025	28-Sep-2022 15:02	0958_MW118D_220928	✓
EP2212566-026	28-Sep-2022 15:09	0958_QC301_220928	✓
EP2212566-027	28-Sep-2022 15:09	0958_QC302_220928	✓
EP2212566-028	28-Sep-2022 15:10	0958_QC401_220928	✓
EP2212566-029	28-Sep-2022 15:10	0958_QC402_220928	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

██████████	- A4 - AU Tax Invoice (INV)	Email	████████████████████
DERP LAB REPORTS			
██████████	- EDI Format - ESDAT (ESDAT)	Email	████████████████████
██████████	(STANTEC)		
	- *AU Certificate of Analysis - NATA (COA)	Email	████████████████████
	- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	████████████████████
	- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	████████████████████
	- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	████████████████████
	- Chain of Custody (CoC) (COC)	Email	████████████████████
	- EDI Format - ESDAT (ESDAT)	Email	████████████████████
	- EDI Format - XTab (XTAB)	Email	████████████████████

CERTIFICATE OF ANALYSIS

Work Order : **EP2212566**
Client : **STANTEC AUSTRALIA PTY LTD**
Contact : [REDACTED] (STANTEC)
Address : GROUND FLOOR 226 ADELAIDE TERRACE
 PERTH 6000
Telephone : ----
Project : WA_0958_PFASOMP
Order number : pfas-omp Gingin
C-O-C number : 42992
Sampler : [REDACTED]
Site : Gingin GW - MB
Quote number : SY/139/19 B
No. of samples received : 29
No. of samples analysed : 29

Page : 1 of 17
Laboratory : Environmental Division Perth
Contact : [REDACTED]
Address : 26 Rigali Way Wangara Western Australia Australia 6065
Telephone : [REDACTED]
Date Samples Received : 28-Sep-2022 18:00
Date Analysis Commenced : 04-Oct-2022
Issue Date : 12-Oct-2022 12:42



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
[REDACTED]	Organic Chemist	Sydney Organics, Smithfield, NSW



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.

- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW115S_22092 8	0958_MW114S_22092 8	0958_MW402_220928	0958_MW313_220928	0958_QC104_220928
Sampling date / time				28-Sep-2022 09:44	28-Sep-2022 10:23	28-Sep-2022 10:39	28-Sep-2022 10:51	28-Sep-2022 10:55
Compound	CAS Number	LOR	Unit	EP2212566-001	EP2212566-004	EP2212566-005	EP2212566-006	EP2212566-007
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.05	0.09	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.07	0.11	<0.02	0.03
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.16	0.82	1.21	0.90	1.13
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.07	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.14	0.73	0.64	0.28	0.37
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.02	0.03	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.08	0.16	0.04	0.06
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.03	0.06	0.01	0.02
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW115S_22092 8	0958_MW114S_22092 8	0958_MW402_220928	0958_MW313_220928	0958_QC104_220928
Sampling date / time				28-Sep-2022 09:44	28-Sep-2022 10:23	28-Sep-2022 10:39	28-Sep-2022 10:51	28-Sep-2022 10:55	
Compound	CAS Number	LOR	Unit	EP2212566-001	EP2212566-004	EP2212566-005	EP2212566-006	EP2212566-007	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.30	1.80	2.39	1.23	1.61	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.30	1.55	1.85	1.18	1.50	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.30	1.73	2.21	1.23	1.58	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	92.3	99.8	87.9	92.3	93.6	
13C8-PFOA	----	0.02	%	93.4	98.4	96.8	98.6	96.8	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW312_220928	0958_MW505_220928	0958_MW111S_220928 8	0958_MW310_220928	0958_QC107_220928
Sampling date / time				28-Sep-2022 11:05	28-Sep-2022 11:24	28-Sep-2022 11:49	28-Sep-2022 12:04	28-Sep-2022 12:05
Compound	CAS Number	LOR	Unit	EP2212566-008	EP2212566-009	EP2212566-010	EP2212566-011	EP2212566-012
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.05	0.03	0.04	1.40	1.46
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.07	0.03	0.07	3.77	3.15
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	1.37	0.73	1.90	27.4	25.3
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	0.05	0.05	4.22	4.06
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.08	0.32	0.86	112	93.7
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	0.3	0.3
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.02	<0.02	<0.02	0.63	0.61
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.13	0.07	0.09	5.60	5.49
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.02	0.66	0.65
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	0.03	0.07	3.57	3.36
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	0.02	0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW312_220928	0958_MW505_220928	0958_MW111S_220928 8	0958_MW310_220928	0958_QC107_220928
Sampling date / time				28-Sep-2022 11:05	28-Sep-2022 11:24	28-Sep-2022 11:49	28-Sep-2022 12:04	28-Sep-2022 12:05
Compound	CAS Number	LOR	Unit	EP2212566-008	EP2212566-009	EP2212566-010	EP2212566-011	EP2212566-012
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	2.77	1.26	3.10	160	138
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	2.45	1.05	2.76	139	119
Sum of PFAS (WA DER List)	----	0.01	µg/L	2.68	1.18	2.98	152	131
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	93.9	91.7	91.8	72.2	73.0
13C8-PFOA	----	0.02	%	98.2	93.9	97.7	98.1	96.3



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW309_220928	0958_MW308_220928	0958_MW305_220928	0958_MW306_220928	0958_MW304_220928
Sampling date / time				28-Sep-2022 12:12	28-Sep-2022 12:21	28-Sep-2022 12:33	28-Sep-2022 12:43	28-Sep-2022 12:53
Compound	CAS Number	LOR	Unit	EP2212566-013	EP2212566-014	EP2212566-015	EP2212566-016	EP2212566-017
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.57	0.36	0.42	0.45	0.77
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	1.15	0.84	0.32	0.74	0.80
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	9.24	8.08	2.01	3.50	5.48
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	2.18	0.96	0.09	0.11	0.27
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	118	67.6	2.21	2.44	2.00
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.07	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.1	0.1	<0.1	<0.1	0.2
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.26	0.28	0.12	0.12	0.30
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.62	2.00	0.38	0.69	1.39
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.32	0.27	0.04	0.10	0.13
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.82	0.62	0.08	0.11	0.23
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW309_220928	0958_MW308_220928	0958_MW305_220928	0958_MW306_220928	0958_MW304_220928
Sampling date / time				28-Sep-2022 12:12	28-Sep-2022 12:21	28-Sep-2022 12:33	28-Sep-2022 12:43	28-Sep-2022 12:53
Compound	CAS Number	LOR	Unit	EP2212566-013	EP2212566-014	EP2212566-015	EP2212566-016	EP2212566-017
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	134	81.2	5.67	8.26	11.6
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	127	75.7	4.22	5.94	7.48
Sum of PFAS (WA DER List)	----	0.01	µg/L	131	79.3	5.26	7.41	10.5
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	77.5	90.1	90.8	95.4	91.2
13C8-PFOA	----	0.02	%	98.9	94.3	96.5	94.7	93.1



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW504_220928	0958_MW104I_220928	0958_MW105D_220928	0958_MW106S_220928	0958_MW116S_220928
				8	8	8	8	8
Sampling date / time				28-Sep-2022 13:07	28-Sep-2022 13:19	28-Sep-2022 13:44	28-Sep-2022 14:12	28-Sep-2022 14:34
Compound	CAS Number	LOR	Unit	EP2212566-018	EP2212566-019	EP2212566-020	EP2212566-021	EP2212566-023
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.18	0.26	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.53	0.32	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	10.8	2.83	<0.01	<0.01	0.10
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	1.13	0.12	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	12.8	0.90	<0.01	<0.01	0.02
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.14	0.11	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.81	0.54	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.09	0.07	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.74	0.11	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW504_220928	0958_MW104I_220928	0958_MW105D_220928	0958_MW106S_220928	0958_MW116S_220928
				8	8	8	8	8
Sampling date / time				28-Sep-2022 13:07	28-Sep-2022 13:19	28-Sep-2022 13:44	28-Sep-2022 14:12	28-Sep-2022 14:34
Compound	CAS Number	LOR	Unit	EP2212566-018	EP2212566-019	EP2212566-020	EP2212566-021	EP2212566-023
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	27.2	5.26	<0.01	<0.01	0.12
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	23.6	3.73	<0.01	<0.01	0.12
Sum of PFAS (WA DER List)	----	0.01	µg/L	25.6	4.82	<0.01	<0.01	0.12
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	93.4	90.0	105	98.2	100
13C8-PFOA	----	0.02	%	98.2	100	103	98.6	104



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW117I_22092 8	0958_MW118D_22092 8	----	----	----
Sampling date / time				28-Sep-2022 14:48	28-Sep-2022 15:02	----	----	----
Compound	CAS Number	LOR	Unit	EP2212566-024	EP2212566-025	-----	-----	-----
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW117I_22092 8	0958_MW118D_22092 8	----	----	----
Sampling date / time				28-Sep-2022 14:48	28-Sep-2022 15:02	----	----	----
Compound	CAS Number	LOR	Unit	EP2212566-024	EP2212566-025	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.02	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.02	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	103	104	----	----	----
13C8-PFOA	----	0.02	%	104	102	----	----	----



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

				0958_POT104_22092 8	0958_QC102_220928	0958_POT102_22092 8	----	----
Sampling date / time				28-Sep-2022 10:10	28-Sep-2022 10:10	28-Sep-2022 14:22	----	----
Compound	CAS Number	LOR	Unit	EP2212566-002	EP2212566-003	EP2212566-022	-----	-----
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.02	0.02	0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.03	0.03	0.03	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.36	0.37	0.24	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	0.02	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.20	0.19	0.18	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.02	<0.02	0.02	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.12	0.11	0.10	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	0.02	0.03	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

				0958_POT104_22092 8	0958_QC102_220928	0958_POT102_22092 8	----	----
Sampling date / time				28-Sep-2022 10:10	28-Sep-2022 10:10	28-Sep-2022 14:22	----	----
Compound	CAS Number	LOR	Unit	EP2212566-002	EP2212566-003	EP2212566-022	-----	-----
				Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<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	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.79	0.76	0.62	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.56	0.56	0.42	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.74	0.71	0.59	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	99.1	97.5	98.9	----	----
13C8-PFOA	----	0.02	%	94.0	94.1	101	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0958_QC301_220928	0958_QC302_220928	0958_QC401_220928	0958_QC402_220928	----
Sampling date / time				28-Sep-2022 15:09	28-Sep-2022 15:09	28-Sep-2022 15:10	28-Sep-2022 15:10	----	
Compound	CAS Number	LOR	Unit	EP2212566-026	EP2212566-027	EP2212566-028	EP2212566-029	-----	
				Result	Result	Result	Result	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
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	----	
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	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
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									
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	----	



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_220928	0958_QC302_220928	0958_QC401_220928	0958_QC402_220928	----
Sampling date / time				28-Sep-2022 15:09	28-Sep-2022 15:09	28-Sep-2022 15:10	28-Sep-2022 15:10	----
Compound	CAS Number	LOR	Unit	EP2212566-026	EP2212566-027	EP2212566-028	EP2212566-029	-----
				Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
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	%	99.9	105	100	106	----
13C8-PFOA	----	0.02	%	99.8	102	101	101	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Sub-Matrix: POTABLE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Sub-Matrix: RINSATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP231A: Perfluoroalkyl Sulfonic Acids

(WATER) EP231B: Perfluoroalkyl Carboxylic Acids

(WATER) EP231C: Perfluoroalkyl Sulfonamides

(WATER) EP231D: (n:2) Fluorotelomer Sulfonic Acids

(WATER) EP231P: PFAS Sums

(WATER) EP231S: PFAS Surrogate

QUALITY CONTROL REPORT

Work Order	: EP2212566	Page	: 1 of 11
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara Western Australia Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 28-Sep-2022
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 04-Oct-2022
C-O-C number	: 42992	Issue Date	: 12-Oct-2022
Sampler	: [REDACTED]		
Site	: Gingin GW - MB		
Quote number	: SY/139/19 B		
No. of samples received	: 29		
No. of samples analysed	: 29		



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
[REDACTED]	Organic Chemist	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4628199)									
EP2212566-001	0958_MW115S_220928	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.16	0.17	7.2	0% - 50%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.14	0.14	0.0	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2212566-019	0958_MW104I_220928	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	2.83	3.18	11.8	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.90	1.05	15.7	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.26	0.28	7.5	0% - 50%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.32	0.35	9.5	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.12	0.14	16.2	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	20.9	23.5	11.9	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	51.5	54.0	4.7	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.93	1.96	1.7	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	2.59	2.74	5.5	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	1.14	1.19	4.2	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.09	0.10	0.0	No Limit
EP2212667-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit



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: 4628200) - continued									
EP2212667-005	Anonymous	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628199)									
EP2212566-001	0958_MW115S_220928	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2212566-019	0958_MW104I_220928	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.11	0.12	0.0	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.11	0.13	13.7	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.54	0.60	10.3	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.07	0.08	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	1.25	1.30	4.2	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	1.48	1.52	2.4	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	6.52	6.76	3.7	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.56	0.57	2.0	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	1.1	1.1	0.0	0% - 50%
EP2212667-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit



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 (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628200) - continued									
EP2212667-005	Anonymous	EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4628199)									
EP2212566-001	0958_MW115S_220928	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212566-019	0958_MW104I_220928	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: **WATER**

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: 4628200) - continued									
EP2212403-003	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212667-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628199)							
EP2212566-001	0958_MW115S_220928	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212566-019	0958_MW104I_220928	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2212566
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628200) - continued									
EP2212403-003	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	0.09	0.11	21.6	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212667-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4628199)									
EP2212566-001	0958_MW115S_220928	EP231X: Sum of PFAS	----	0.01	µg/L	0.30	0.31	3.3	0% - 20%
EP2212566-019	0958_MW104I_220928	EP231X: Sum of PFAS	----	0.01	µg/L	5.26	5.93	12.0	0% - 20%
EP231P: PFAS Sums (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	89.2	94.9	6.2	0% - 20%
EP2212667-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.02	0.02	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				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4628199)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	85.6	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	107	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	117	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	91.6	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	84.0	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4628200)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	83.4	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	96.0	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	91.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	95.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	93.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	88.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628199)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	102	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	96.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	102	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	99.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	104	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	99.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	92.8	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	94.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	95.0	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	87.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	95.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628200)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	93.4	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	96.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	96.4	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	100	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	97.8	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	99.0	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: 4628200) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	110	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	89.6	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628199)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	105	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	120	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	100	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	101	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	99.3	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	101	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	98.8	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628200)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	96.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	110	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	106	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	95.8	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	101	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628199)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	96.6	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	101	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	111	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	88.6	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628200)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	93.4	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	87.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	102	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	90.0	71.4	144



Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 4628199)							
EP2212566-005	0958_MW402_220928	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	84.6	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	108	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	# Not Determined	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	95.6	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	92.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	95.8	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4628200)							
EP2212667-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	81.2	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	98.2	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	91.0	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	93.4	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	87.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	86.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628199)							
EP2212566-005	0958_MW402_220928	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	95.9	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	96.2	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	101	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.4	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	96.8	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	102	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	91.4	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	100	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	97.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	95.4	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	97.9	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628200)							
EP2212667-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	90.9	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	99.0	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	98.2	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	94.6	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	100	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	97.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	94.2	71.0	129



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
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628200) - continued							
EP2212667-002	Anonymous	EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	98.0	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	107	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	110	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	93.8	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628199)							
EP2212566-005	0958_MW402_220928	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	105	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	109	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	100	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	109	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	102	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	105	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	107	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628200)							
EP2212667-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	92.6	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	107	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.6	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	95.2	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	99.0	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	96.4	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	95.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628199)							
EP2212566-005	0958_MW402_220928	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	93.2	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	113	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	93.0	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	80.8	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628200)							
EP2212667-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	96.4	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	103	64.0	140



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628200) - continued							
EP2212667-002	Anonymous	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	109	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	79.0	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2212566	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 28-Sep-2022
Site	: Gingin GW - MB	Issue Date	: 12-Oct-2022
Sampler	: [REDACTED]	No. of samples received	: 29
Order number	: pfas-omp Gingin	No. of samples analysed	: 29

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2212566--005	0958_MW402_220928	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

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

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

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

Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)		28-Sep-2022	11-Oct-2022	27-Mar-2023	✓	11-Oct-2022	27-Mar-2023	✓
0958_MW115S_220928, 0958_POT104_220928,								
0958_QC102_220928, 0958_MW114S_220928,								
0958_MW402_220928, 0958_MW313_220928,								
0958_QC104_220928, 0958_MW312_220928,								
0958_MW505_220928, 0958_MW111S_220928,								
0958_MW310_220928, 0958_QC107_220928,								
0958_MW309_220928, 0958_MW308_220928,								
0958_MW305_220928, 0958_MW306_220928,								
0958_MW304_220928, 0958_MW504_220928,								
0958_MW104I_220928, 0958_MW105D_220928,								
0958_MW106S_220928, 0958_POT102_220928,								
0958_MW116S_220928, 0958_MW117I_220928,								
0958_MW118D_220928, 0958_QC301_220928,								
0958_QC302_220928, 0958_QC401_220928,								
0958_QC402_220928								

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



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
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)		28-Sep-2022	11-Oct-2022	27-Mar-2023	✔	11-Oct-2022	27-Mar-2023	✔
0958_MW115S_220928,	0958_POT104_220928,							
0958_QC102_220928,	0958_MW114S_220928,							
0958_MW402_220928,	0958_MW313_220928,							
0958_QC104_220928,	0958_MW312_220928,							
0958_MW505_220928,	0958_MW111S_220928,							
0958_MW310_220928,	0958_QC107_220928,							
0958_MW309_220928,	0958_MW308_220928,							
0958_MW305_220928,	0958_MW306_220928,							
0958_MW304_220928,	0958_MW504_220928,							
0958_MW104I_220928,	0958_MW105D_220928,							
0958_MW106S_220928,	0958_POT102_220928,							
0958_MW116S_220928,	0958_MW117I_220928,							
0958_MW118D_220928,	0958_QC301_220928,							
0958_QC302_220928,	0958_QC401_220928,							
0958_QC402_220928								
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)		28-Sep-2022	11-Oct-2022	27-Mar-2023	✔	11-Oct-2022	27-Mar-2023	✔
0958_MW115S_220928,	0958_POT104_220928,							
0958_QC102_220928,	0958_MW114S_220928,							
0958_MW402_220928,	0958_MW313_220928,							
0958_QC104_220928,	0958_MW312_220928,							
0958_MW505_220928,	0958_MW111S_220928,							
0958_MW310_220928,	0958_QC107_220928,							
0958_MW309_220928,	0958_MW308_220928,							
0958_MW305_220928,	0958_MW306_220928,							
0958_MW304_220928,	0958_MW504_220928,							
0958_MW104I_220928,	0958_MW105D_220928,							
0958_MW106S_220928,	0958_POT102_220928,							
0958_MW116S_220928,	0958_MW117I_220928,							
0958_MW118D_220928,	0958_QC301_220928,							
0958_QC302_220928,	0958_QC401_220928,							
0958_QC402_220928								



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	39	10.26	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA 0958 PFASOMP

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

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 comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW137S	HDPE (no PTFE)	20 mL	00350821013496	Grey	No	
001	0958_MW137S	HDPE (no PTFE)	20 mL	00350821013441	Grey	No	
001	0958_MW137S	HDPE (no PTFE)	20 mL	00350621000131	Grey	No	
001	0958_MW137S	HDPE (no PTFE)	20 mL	00350621000148	Grey	No	
002	0958_QC101	HDPE (no PTFE)	20 mL	00350621036116	Grey	No	
002	0958_QC101	HDPE (no PTFE)	20 mL	00350621000352	Grey	No	
003	0958_MW101I	HDPE (no PTFE)	20 mL	00350621000418	Grey	No	
003	0958_MW101I	HDPE (no PTFE)	20 mL	00350821013539	Grey	No	
003	0958_MW101I	HDPE (no PTFE)	20 mL	00350621000536	Grey	No	
003	0958_MW101I	HDPE (no PTFE)	20 mL	00350821013485	Grey	No	
004	0958_QC103	HDPE (no PTFE)	20 mL	00350621000191	Grey	No	
004	0958_QC103	HDPE (no PTFE)	20 mL	00350621000195	Grey	No	
005	0958_MW102D	HDPE (no PTFE)	20 mL	00350621000272	Grey	No	
005	0958_MW102D	HDPE (no PTFE)	20 mL	00350621000601	Grey	No	
005	0958_MW102D	HDPE (no PTFE)	20 mL	00350821013569	Grey	No	
005	0958_MW102D	HDPE (no PTFE)	20 mL	00350621000571	Grey	No	
006	0958_QC105	HDPE (no PTFE)	20 mL	00350621000205	Grey	No	
006	0958_QC105	HDPE (no PTFE)	20 mL	00350621000378	Grey	No	
007	0958_MW302	HDPE (no PTFE)	20 mL	00350621000385	Grey	No	
007	0958_MW302	HDPE (no PTFE)	20 mL	00350821013474	Grey	No	
007	0958_MW302	HDPE (no PTFE)	20 mL	00350621000483	Grey	No	
007	0958_MW302	HDPE (no PTFE)	20 mL	00350621000373	Grey	No	
008	0958_QC106	HDPE (no PTFE)	20 mL	00350621000197	Grey	No	
008	0958_QC106	HDPE (no PTFE)	20 mL	00350621000396	Grey	No	
009	0958_MW303	HDPE (no PTFE)	20 mL	00350621000580	Grey	No	
009	0958_MW303	HDPE (no PTFE)	20 mL	00350821013527	Grey	No	

**CHAIN OF CUSTODY**

COC#: 42982

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER: [REDACTED]

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

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 comments:

009	0958_MW303	HDPE (no PTFE)	20 mL	00350821013390	Grey	No	
009	0958_MW303	HDPE (no PTFE)	20 mL	00350621000501	Grey	No	
010	0958_MW301	HDPE (no PTFE)	20 mL	00350621000541	Grey	No	
010	0958_MW301	HDPE (no PTFE)	20 mL	00350821013427	Grey	No	
010	0958_MW301	HDPE (no PTFE)	20 mL	00350821013428	Grey	No	
010	0958_MW301	HDPE (no PTFE)	20 mL	00350621000410	Grey	No	
011	0958_MW112S	HDPE (no PTFE)	20 mL	00350821013463	Grey	No	
011	0958_MW112S	HDPE (no PTFE)	20 mL	00350621000369	Grey	No	
011	0958_MW112S	HDPE (no PTFE)	20 mL	00350621000485	Grey	No	
011	0958_MW112S	HDPE (no PTFE)	20 mL	00350621000566	Grey	No	
012	0958_MW113S	HDPE (no PTFE)	20 mL	00350621000372	Grey	No	
012	0958_MW113S	HDPE (no PTFE)	20 mL	00350621000380	Grey	No	
012	0958_MW113S	HDPE (no PTFE)	20 mL	00350621000539	Grey	No	
012	0958_MW113S	HDPE (no PTFE)	20 mL	00350621000408	Grey	No	
013	0958_MW109S	HDPE (no PTFE)	20 mL	00350621000589	Grey	No	
013	0958_MW109S	HDPE (no PTFE)	20 mL	00350621000570	Grey	No	
013	0958_MW109S	HDPE (no PTFE)	20 mL	00350821013562	Grey	No	
013	0958_MW109S	HDPE (no PTFE)	20 mL	00350621000588	Grey	No	
014	0958_MW110S	HDPE (no PTFE)	20 mL	00350621000542	Grey	No	
014	0958_MW110S	HDPE (no PTFE)	20 mL	00350621000468	Grey	No	
014	0958_MW110S	HDPE (no PTFE)	20 mL	00350821013580	Grey	No	
014	0958_MW110S	HDPE (no PTFE)	20 mL	00350821013564	Grey	No	
015	0958_MW401	HDPE (no PTFE)	20 mL	00350621000333	Grey	No	
015	0958_MW401	HDPE (no PTFE)	20 mL	00350821013421	Grey	No	
015	0958_MW401	HDPE (no PTFE)	20 mL	00350621000182	Grey	No	
015	0958_MW401	HDPE (no PTFE)	20 mL	00350821013467	Grey	No	
016	0958_MW138S	HDPE (no PTFE)	20 mL	00350821013462	Grey	No	



ALS Laboratory: EP Perth

EMAIL INVOICES TO:

DATE TIME:

Biohazard info:

/ ES2022MWH AUS0002

•C

Other comments:

Total Bottle Count: ALS: 76, Non ALS: 0.



ALS Laboratory: EP Perth

EMAIL INVOICES TO:

RECEIVED BY:

DATE TIME:

Biohazard info:

•C

Other comments:

/ ES2022MWH AUS0002

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW137S		28/09/2022 09:23 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
002	0958_QC101		28/09/2022 09:24 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_MW101I		28/09/2022 10:42 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
004	0958_QC103		28/09/2022 10:43 AM	Water	ALS: 2 Non ALS: 0	No	X		
005	0958_MW102D		28/09/2022 10:58 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
006	0958_QC105		28/09/2022 10:59 AM	Water	ALS: 2 Non ALS: 0	No	X		
007	0958_MW302		28/09/2022 11:17 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
008	0958_QC106		28/09/2022 11:18 AM	Water	ALS: 2 Non ALS: 0	No	X		
009	0958_MW303		28/09/2022 11:32 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS



ALS Laboratory: EP Perth

EMAIL INVOICES TO:

DATE TIME:

Biohazard info:

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Other comments:

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_MW301		28/09/2022 11:40 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
011	0958_MW112S		28/09/2022 11:56 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
012	0958_MW113S		28/09/2022 12:05 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
013	0958_MW109S		28/09/2022 12:15 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
014	0958_MW110S		28/09/2022 12:35 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
015	0958_MW401		28/09/2022 01:05 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
016	0958_MW138S		28/09/2022 01:23 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
017	0958_MW139I		28/09/2022 01:30 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
018	0958_MW140D		28/09/2022 01:34 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS



RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Yes No N/A

CONTACT PH:

SAMPLER MOBILE:

Random Sample Temperature on Receipt:

C

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

Other comments:

EMAIL INVOICES TO:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0985_MW122S		28/09/2022 02:32 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
020	0985_MW123I		28/09/2022 02:33 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
021	0985_MW124D		28/09/2022 02:34 PM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS

**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : EP2212584****Amendment : 1**

Client : STANTEC AUSTRALIA PTY LTD
Contact : [REDACTED] (STANTEC)
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : [REDACTED]
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail : [REDACTED]
Telephone : ---
Facsimile : ---

E-mail : [REDACTED]
Telephone : [REDACTED]
Facsimile : [REDACTED]

Project : WA_0958_PFASOMP
Order number : pfas-omp Gingen
C-O-C number : 42982
Site : Gingen GW - CG
Sampler : [REDACTED] [REDACTED]

Page : 1 of 3
Quote number : ES2022MWHAUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 28-Sep-2022 18:00
Client Requested Due Date : 11-Oct-2022

Issue Date : 12-Oct-2022
Scheduled Reporting Date : **11-Oct-2022**

Delivery Details

Mode of Delivery : Client Drop Off
No. of coolers/boxes : 1
Receipt Detail :

Security Seal : Not Available
Temperature : 1.3 - Ice present
No. of samples received / analysed : 21 / 21

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2212584-001	28-Sep-2022 09:23	0958_MW137S_220928	✓
EP2212584-002	28-Sep-2022 09:24	0958_QC101_220928	✓
EP2212584-003	28-Sep-2022 10:42	0958_MW101I_220928	✓
EP2212584-004	28-Sep-2022 10:43	0958_QC103_220928	✓
EP2212584-005	28-Sep-2022 10:58	0958_MW102D_220928	✓
EP2212584-006	28-Sep-2022 10:59	0958_QC105_220928	✓
EP2212584-007	28-Sep-2022 11:17	0958_MW302_220928	✓
EP2212584-008	28-Sep-2022 11:18	0958_QC106_220928	✓
EP2212584-009	28-Sep-2022 11:32	0958_MW303_220928	✓
EP2212584-010	28-Sep-2022 11:40	0958_MW301_220928	✓
EP2212584-011	28-Sep-2022 11:56	0958_MW112S_220928	✓
EP2212584-012	28-Sep-2022 12:05	0958_MW113S_220928	✓
EP2212584-013	28-Sep-2022 12:15	0958_MW109S_220928	✓
EP2212584-014	28-Sep-2022 12:35	0958_MW110S_220928	✓
EP2212584-015	28-Sep-2022 13:05	0958_MW401_220928	✓
EP2212584-016	28-Sep-2022 13:23	0958_MW138S_220928	✓
EP2212584-017	28-Sep-2022 13:30	0958_MW139I_220928	✓
EP2212584-018	28-Sep-2022 13:34	0958_MW140D_220928	✓
EP2212584-019	28-Sep-2022 14:32	0958_MW122S_220928	✓
EP2212584-020	28-Sep-2022 14:33	0958_MW123I_220928	✓
EP2212584-021	28-Sep-2022 14:34	0958_MW124D_220928	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

██████████	- A4 - AU Tax Invoice (INV)	Email	████████████████████
DERP LAB REPORTS			
	- EDI Format - ESDAT (ESDAT)	Email	████████████████████
██████████	(STANTEC)		
	- *AU Certificate of Analysis - NATA (COA)	Email	████████████████████
	- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	████████████████████
	- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	████████████████████
	- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	████████████████████
	- Chain of Custody (CoC) (COC)	Email	████████████████████
	- EDI Format - ESDAT (ESDAT)	Email	████████████████████
	- EDI Format - XTab (XTAB)	Email	████████████████████

CERTIFICATE OF ANALYSIS

Work Order : EP2212584 Amendment : 1 Client : STANTEC AUSTRALIA PTY LTD Contact : [REDACTED] (STANTEC) Address : GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000 Telephone : ---- Project : WA_0958_PFASOMP Order number : pfas-omp Gingin C-O-C number : 42982 Sampler : [REDACTED] Site : Gingin GW - CG Quote number : SY/139/19 B No. of samples received : 21 No. of samples analysed : 21	Page : 1 of 13 Laboratory : Environmental Division Perth Contact : [REDACTED] Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : [REDACTED] Date Samples Received : 28-Sep-2022 18:00 Date Analysis Commenced : 04-Oct-2022 Issue Date : 12-Oct-2022 15:23
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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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
[REDACTED]	Organic Chemist	Sydney Organics, Smithfield, NSW



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.

- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- Amendment (12/10/2022): This report has been amended as a result of misinterpretation of sample identification numbers (IDs) for sample 14. All analysis results are as per the previous report.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW137S_22092 8	0958_QC101_220928	0958_MW101I_22092 8	0958_QC103_220928	0958_MW102D_22092 8
Sampling date / time				28-Sep-2022 09:23	28-Sep-2022 09:24	28-Sep-2022 10:42	28-Sep-2022 10:43	28-Sep-2022 10:58	
Compound	CAS Number	LOR	Unit	EP2212584-001	EP2212584-002	EP2212584-003	EP2212584-004	EP2212584-005	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	0.04	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.06	0.06	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.30	0.46	0.02	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.02	0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.16	0.24	0.03	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.02	0.04	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.02	0.02	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW137S_22092 8	0958_QC101_220928	0958_MW101I_22092 8	0958_QC103_220928	0958_MW102D_22092 8
Sampling date / time				28-Sep-2022 09:23	28-Sep-2022 09:24	28-Sep-2022 10:42	28-Sep-2022 10:43	28-Sep-2022 10:58
Compound	CAS Number	LOR	Unit	EP2212584-001	EP2212584-002	EP2212584-003	EP2212584-004	EP2212584-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.58	0.88	0.05
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.46	0.70	0.05
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.50	0.80	0.05
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	88.6	95.6	63.7	92.2	95.6
13C8-PFOA	----	0.02	%	89.1	88.6	98.5	88.6	92.4



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_QC105_220928	0958_MW302_220928	0958_QC106_220928	0958_MW303_220928	0958_MW301_220928
Sampling date / time				28-Sep-2022 10:59	28-Sep-2022 11:17	28-Sep-2022 11:18	28-Sep-2022 11:32	28-Sep-2022 11:40	
Compound	CAS Number	LOR	Unit	EP2212584-006	EP2212584-007	EP2212584-008	EP2212584-009	EP2212584-010	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.07	0.06	0.22	0.80	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.14	0.14	0.54	2.91	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	2.39	2.37	5.93	24.6	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.24	0.26	1.09	4.17	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.02	2.55	2.80	19.8	79.6	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	0.06	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	0.2	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.04	0.05	0.16	0.49	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.21	0.21	0.86	4.36	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.03	0.03	0.14	0.90	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.12	0.12	0.87	3.93	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_QC105_220928	0958_MW302_220928	0958_QC106_220928	0958_MW303_220928	0958_MW301_220928
Sampling date / time				28-Sep-2022 10:59	28-Sep-2022 11:17	28-Sep-2022 11:18	28-Sep-2022 11:32	28-Sep-2022 11:40
Compound	CAS Number	LOR	Unit	EP2212584-006	EP2212584-007	EP2212584-008	EP2212584-009	EP2212584-010
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.04	5.79	6.04	29.6	122
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.04	4.94	5.17	25.7	104
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.04	5.41	5.64	28.0	115
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	94.8	89.3	98.3	99.7	95.0
13C8-PFOA	----	0.02	%	97.3	94.7	96.1	97.3	95.1



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW112S_22092 8	0958_MW113S_22092 8	0958_MW109S_22092 8	0958_MW110S_22092 8	0958_MW401_220928
Sampling date / time				28-Sep-2022 11:56	28-Sep-2022 12:05	28-Sep-2022 12:15	28-Sep-2022 12:35	28-Sep-2022 13:05
Compound	CAS Number	LOR	Unit	EP2212584-011	EP2212584-012	EP2212584-013	EP2212584-014	EP2212584-015
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	<0.01	0.06	0.02	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.21	0.07	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW112S_22092 8	0958_MW113S_22092 8	0958_MW109S_22092 8	0958_MW110S_22092 8	0958_MW401_220928
Sampling date / time				28-Sep-2022 11:56	28-Sep-2022 12:05	28-Sep-2022 12:15	28-Sep-2022 12:35	28-Sep-2022 13:05
Compound	CAS Number	LOR	Unit	EP2212584-011	EP2212584-012	EP2212584-013	EP2212584-014	EP2212584-015
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.02	<0.01	0.27	0.09	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	<0.01	0.27	0.09	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.02	<0.01	0.27	0.09	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	92.6	97.7	96.7	99.3	93.7
13C8-PFOA	----	0.02	%	95.1	102	94.2	100	99.0



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW138S_22092 8	0958_MW139I_22092 8	0958_MW140D_22092 8	0958_MW122S_22092 8	0958_MW123I_22092 8
Sampling date / time				28-Sep-2022 13:23	28-Sep-2022 13:30	28-Sep-2022 13:34	28-Sep-2022 14:32	28-Sep-2022 14:33
Compound	CAS Number	LOR	Unit	EP2212584-016	EP2212584-017	EP2212584-018	EP2212584-019	EP2212584-020
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	<0.01	<0.01	0.02	0.06
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.08	<0.01	<0.01	0.11	0.06
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW138S_22092 8	0958_MW139I_22092 8	0958_MW140D_22092 8	0958_MW122S_22092 8	0958_MW123I_22092 8
Sampling date / time				28-Sep-2022 13:23	28-Sep-2022 13:30	28-Sep-2022 13:34	28-Sep-2022 14:32	28-Sep-2022 14:33
Compound	CAS Number	LOR	Unit	EP2212584-016	EP2212584-017	EP2212584-018	EP2212584-019	EP2212584-020
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.10	<0.01	<0.01	0.13	0.12
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.10	<0.01	<0.01	0.13	0.12
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.10	<0.01	<0.01	0.13	0.12
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	89.8	95.8	95.5	99.4	89.2
13C8-PFOA	----	0.02	%	98.7	97.9	97.5	98.1	94.8



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW124D_22092
8

Sampling date / time

28-Sep-2022 14:34

Compound

CAS Number

LOR

Unit

EP2212584-021

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----

EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW124D_22092
8

Sampling date / time

28-Sep-2022 14:34

Compound

CAS Number

LOR

Unit

EP2212584-021

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----

EP231P: PFAS Sums

Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	100	----	----	----	----
13C8-PFOA	----	0.02	%	101	----	----	----	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP231A: Perfluoroalkyl Sulfonic Acids

(WATER) EP231B: Perfluoroalkyl Carboxylic Acids

(WATER) EP231C: Perfluoroalkyl Sulfonamides

(WATER) EP231D: (n:2) Fluorotelomer Sulfonic Acids

(WATER) EP231P: PFAS Sums

(WATER) EP231S: PFAS Surrogate

QUALITY CONTROL REPORT

Work Order	: EP2212584	Page	: 1 of 11
Amendment	: 1		
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 28-Sep-2022
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 04-Oct-2022
C-O-C number	: 42982	Issue Date	: 12-Oct-2022
Sampler	: [REDACTED] [REDACTED]		
Site	: Gingin GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 21		
No. of samples analysed	: 21		



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
[REDACTED]	Organic Chemist	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4628650)									
EP2212584-001	0958_MW137S_220928	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2212584-011	0958_MW112S_220928	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4628651)									
EP2212584-020	0958_MW123I_220928	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.06	0.06	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.06	0.06	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2212405-011	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	21.5	18.4	15.3	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	153	130	16.4	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	2.07	2.34	12.3	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	3.81	4.10	7.4	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	3.46	3.50	1.3	0% - 20%



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4628651) - continued									
EP2212405-011	Anonymous	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.08	<0.02	118	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628650)									
EP2212584-001	0958_MW137S_220928	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2212584-011	0958_MW112S_220928	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628651)									
EP2212584-020	0958_MW123I_220928	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2212405-011	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	2.02	1.98	1.7	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	1.56	1.71	9.1	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	5.75	4.96	14.7	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.76	0.88	15.2	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 (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628651) - continued									
EP2212405-011	Anonymous	EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.03	0.04	35.3	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.8	1.1	27.8	0% - 50%
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4628650)									
EP2212584-001	0958_MW137S_220928	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212584-011	0958_MW112S_220928	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4628651)									
EP2212584-020	0958_MW123I_220928	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: **WATER**

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: 4628651) - continued									
EP2212584-020	0958_MW123I_220928	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212405-011	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628650)							
EP2212584-001	0958_MW137S_220928	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212584-011	0958_MW112S_220928	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628651)									
EP2212584-020	0958_MW123I_220928	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2212584 Amendment 1
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628651) - continued									
EP2212584-020	0958_MW123I_220928	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212405-011	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4628650)									
EP2212584-001	0958_MW137S_220928	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EP2212584-011	0958_MW112S_220928	EP231X: Sum of PFAS	----	0.01	µg/L	0.02	0.02	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4628651)									
EP2212584-020	0958_MW123I_220928	EP231X: Sum of PFAS	----	0.01	µg/L	0.12	0.12	0.0	0% - 50%
EP2212405-011	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	195	169	14.2	0% - 20%



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

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

Sub-Matrix: **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				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4628650)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	72.6	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	92.4	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	90.4	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	92.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	94.6	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	81.8	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4628651)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	80.0	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	103	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	102	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	98.4	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	103	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	74.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628650)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	92.4	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	79.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	80.4	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	82.8	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	91.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	91.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	97.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	92.8	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	88.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	92.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628651)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	108	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	106	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	109	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	105	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	100	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	100	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: 4628651) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	98.2	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.8	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	105	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628650)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	84.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	114	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	97.8	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	86.2	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	80.2	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	91.4	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628651)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	102	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	94.2	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	120	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	114	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	111	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	118	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	105	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628650)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	102	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	118	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	137	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	125	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628651)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	112	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	105	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	67.8	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	73.8	71.4	144



Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 4628650)							
EP2212584-003	0958_MW101I_220928	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	113	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	113	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	110	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	122	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	76.6	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	95.0	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4628651)							
EP2212405-006	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	93.4	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	91.2	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	72.8	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	82.8	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	94.6	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	86.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628650)							
EP2212584-003	0958_MW101I_220928	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	124	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	115	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	72.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	125	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	75.8	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	82.6	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	95.2	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	91.2	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	91.2	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	89.2	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	84.9	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628651)							
EP2212405-006	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	87.8	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	88.2	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	87.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	86.2	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	84.0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	87.2	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	79.6	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	82.0	69.0	133



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
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628651) - continued							
EP2212405-006	Anonymous	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	89.0	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	80.6	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	86.2	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628650)							
EP2212584-003	0958_MW101I_220928	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	77.8	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	77.8	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	80.6	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	87.8	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	90.2	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	107	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	92.8	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628651)							
EP2212405-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	83.6	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	96.6	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	89.0	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	95.3	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	85.1	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	91.4	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	83.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628650)							
EP2212584-003	0958_MW101I_220928	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	113	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	123	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	127	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	116	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628651)							
EP2212405-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	90.4	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	93.0	67.0	138



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628651) - continued							
EP2212405-006	Anonymous	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	74.8	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order : EP2212584

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Amendment : 1

Client : STANTEC AUSTRALIA PTY LTD

Laboratory : Environmental Division Perth

Contact : [REDACTED] (STANTEC)

Telephone : [REDACTED]

Project : WA_0958_PFASOMP

Date Samples Received : 28-Sep-2022

Site : Gingin GW - CG

Issue Date : 12-Oct-2022

Sampler : [REDACTED]

No. of samples received : 21

Order number : pfas-omp Gingin

No. of samples analysed : 21

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



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	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)	28-Sep-2022	11-Oct-2022	27-Mar-2023	✔	11-Oct-2022	27-Mar-2023	✔	
0958_MW137S_220928,								0958_QC101_220928,
0958_MW101I_220928,								0958_QC103_220928,
0958_MW102D_220928,								0958_QC105_220928,
0958_MW302_220928,								0958_QC106_220928,
0958_MW303_220928,								0958_MW301_220928,
0958_MW112S_220928,								0958_MW113S_220928,
0958_MW109S_220928,								0958_MW110S_220928,
0958_MW401_220928,								0958_MW138S_220928,
0958_MW139I_220928,								0958_MW140D_220928,
0958_MW122S_220928,								0958_MW123I_220928,
0958_MW124D_220928								
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)	28-Sep-2022	11-Oct-2022	27-Mar-2023	✔	11-Oct-2022	27-Mar-2023	✔	
0958_MW137S_220928,								0958_QC101_220928,
0958_MW101I_220928,								0958_QC103_220928,
0958_MW102D_220928,								0958_QC105_220928,
0958_MW302_220928,								0958_QC106_220928,
0958_MW303_220928,								0958_MW301_220928,
0958_MW112S_220928,								0958_MW113S_220928,
0958_MW109S_220928,								0958_MW110S_220928,
0958_MW401_220928,								0958_MW138S_220928,
0958_MW139I_220928,								0958_MW140D_220928,
0958_MW122S_220928,								0958_MW123I_220928,
0958_MW124D_220928								

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW137S_220928, 0958_MW101I_220928, 0958_MW102D_220928, 0958_MW302_220928, 0958_MW303_220928, 0958_MW112S_220928, 0958_MW109S_220928, 0958_MW401_220928, 0958_MW139I_220928, 0958_MW122S_220928, 0958_MW124D_220928	0958_QC101_220928, 0958_QC103_220928, 0958_QC105_220928, 0958_QC106_220928, 0958_MW301_220928, 0958_MW113S_220928, 0958_MW110S_220928, 0958_MW138S_220928, 0958_MW140D_220928, 0958_MW123I_220928,	28-Sep-2022	11-Oct-2022	27-Mar-2023	✓	11-Oct-2022	27-Mar-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW137S_220928, 0958_MW101I_220928, 0958_MW102D_220928, 0958_MW302_220928, 0958_MW303_220928, 0958_MW112S_220928, 0958_MW109S_220928, 0958_MW401_220928, 0958_MW139I_220928, 0958_MW122S_220928, 0958_MW124D_220928	0958_QC101_220928, 0958_QC103_220928, 0958_QC105_220928, 0958_QC106_220928, 0958_MW301_220928, 0958_MW113S_220928, 0958_MW110S_220928, 0958_MW138S_220928, 0958_MW140D_220928, 0958_MW123I_220928,	28-Sep-2022	11-Oct-2022	27-Mar-2023	✓	11-Oct-2022	27-Mar-2023	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW137S_220928, 0958_MW101I_220928, 0958_MW102D_220928, 0958_MW302_220928, 0958_MW303_220928, 0958_MW112S_220928, 0958_MW109S_220928, 0958_MW401_220928, 0958_MW139I_220928, 0958_MW122S_220928, 0958_MW124D_220928	0958_QC101_220928, 0958_QC103_220928, 0958_QC105_220928, 0958_QC106_220928, 0958_MW301_220928, 0958_MW113S_220928, 0958_MW110S_220928, 0958_MW138S_220928, 0958_MW140D_220928, 0958_MW123I_220928,	28-Sep-2022	11-Oct-2022	27-Mar-2023	✓	11-Oct-2022	27-Mar-2023	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	38	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	38	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
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



CHAIN OF CUSTODY

COC#: 43046

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY139/19 B

/ ES2022MWHAUS0002

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 comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_POT103		29/09/2022 08:12 AM	Water	ALS: 4 Non ALS: 0	No	X			extra PFAS bottles for lab QC
002	0958_MW121D		29/09/2022 08:33 AM	Water	ALS: 2 Non ALS: 0	No	X			
003	0958_MW120I		29/09/2022 08:50 AM	Water	ALS: 4 Non ALS: 0	No	X			extra PFAS bottles for lab QC
004	0958_MW119S		29/09/2022 09:02 AM	Water	ALS: 2 Non ALS: 0	No	X			
005	0958_MW133D		29/09/2022 10:02 AM	Water	ALS: 2 Non ALS: 0	No	X			
006	0958_MW131D		29/09/2022 10:06 AM	Water	ALS: 2 Non ALS: 0	No	X			
007	0958_MW132I		29/09/2022 10:10 AM	Water	ALS: 2 Non ALS: 0	No	X			
008	0958_MW130D		29/09/2022 11:52 AM	Water	ALS: 2 Non ALS: 0	No	X			
009	0958_MW129I		29/09/2022 11:55 AM	Water	ALS: 2 Non ALS: 0	No	X			

**CHAIN OF CUSTODY**

(ALS) COC#: 43046

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

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 comments:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_MW128D		29/09/2022 11:58 AM	Water	ALS: 2 Non ALS: 0	No	X			
011	0958_MW125S		29/09/2022 12:01 PM	Water	ALS: 2 Non ALS: 0	No	X			
012	0958_MW126I		29/09/2022 12:04 PM	Water	ALS: 2 Non ALS: 0	No	X			
013	0958_QC301		29/09/2022 12:19 PM	Water	ALS: 2 Non ALS: 0	No		X		
014	0958_QC302		29/09/2022 12:19 PM	Water	ALS: 2 Non ALS: 0	No		X		
015	0958_QC401		29/09/2022 12:20 PM	Water	ALS: 2 Non ALS: 0	No		X		
016	0958_QC402		29/09/2022 12:21 PM	Water	ALS: 2 Non ALS: 0	No		X		



ALS Laboratory: EP Perth

EMAIL INVOICES TO:

012	0958_MW126I	HDPE (no PTFE)	20 mL	00350821000196	Grey	No	
012	0958_MW126I	HDPE (no PTFE)	20 mL	00350821000279	Grey	No	
013	0958_QC301	HDPE (no PTFE)	20 mL	00350621000471	Grey	No	
013	0958_QC301	HDPE (no PTFE)	20 mL	00350621000607	Grey	No	
014	0958_QC302	HDPE (no PTFE)	20 mL	00350621000572	Grey	No	
014	0958_QC302	HDPE (no PTFE)	20 mL	00350621000462	Grey	No	
015	0958_QC401	HDPE (no PTFE)	20 mL	00350621000476	Grey	No	
015	0958_QC401	HDPE (no PTFE)	20 mL	00350621000551	Grey	No	
016	0958_QC402	HDPE (no PTFE)	20 mL	00350621000504	Grey	No	
016	0958_QC402	HDPE (no PTFE)	20 mL	00350621067102	Grey	No	

Total Bottle Count: ALS: 36, Non ALS: 0

**CHAIN OF CUSTODY**

COC#: 43046

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

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 comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_POT103	HDPE (no PTFE)	20 mL	00350621000615	Grey	No	
001	0958_POT103	HDPE (no PTFE)	20 mL	00350821000375	Grey	No	
001	0958_POT103	HDPE (no PTFE)	20 mL	00350621000515	Grey	No	
001	0958_POT103	HDPE (no PTFE)	20 mL	00350821000273	Grey	No	
002	0958_MW121D	HDPE (no PTFE)	20 mL	00350821000381	Grey	No	
002	0958_MW121D	HDPE (no PTFE)	20 mL	00350821000312	Grey	No	
003	0958_MW120I	HDPE (no PTFE)	20 mL	00350621000594	Grey	No	
003	0958_MW120I	HDPE (no PTFE)	20 mL	00350821000457	Grey	No	
003	0958_MW120I	HDPE (no PTFE)	20 mL	00350621000562	Grey	No	
003	0958_MW120I	HDPE (no PTFE)	20 mL	00350821000417	Grey	No	
004	0958_MW119S	HDPE (no PTFE)	20 mL	00350821000339	Grey	No	
004	0958_MW119S	HDPE (no PTFE)	20 mL	00350821000264	Grey	No	
005	0958_MW133D	HDPE (no PTFE)	20 mL	00350821000176	Grey	No	
005	0958_MW133D	HDPE (no PTFE)	20 mL	00350821000314	Grey	No	
006	0958_MW131D	HDPE (no PTFE)	20 mL	00350821000343	Grey	No	
006	0958_MW131D	HDPE (no PTFE)	20 mL	00350821000354	Grey	No	
007	0958_MW132I	HDPE (no PTFE)	20 mL	00350821000444	Grey	No	
007	0958_MW132I	HDPE (no PTFE)	20 mL	00350821000234	Grey	No	
008	0958_MW130D	HDPE (no PTFE)	20 mL	00350821000461	Grey	No	
008	0958_MW130D	HDPE (no PTFE)	20 mL	00350821000328	Grey	No	
009	0958_MW129I	HDPE (no PTFE)	20 mL	00350821000344	Grey	No	
009	0958_MW129I	HDPE (no PTFE)	20 mL	00350821000342	Grey	No	
010	0958_MW128D	HDPE (no PTFE)	20 mL	00350821000219	Grey	No	
010	0958_MW128D	HDPE (no PTFE)	20 mL	00350821000272	Grey	No	
011	0958_MW125S	HDPE (no PTFE)	20 mL	00350821000332	Grey	No	
011	0958_MW125S	HDPE (no PTFE)	20 mL	00350821000217	Grey	No	

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2212637

<p>Client : STANTEC AUSTRALIA PTY LTD</p> <p>Contact : [REDACTED] (STANTEC)</p> <p>Address : GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000</p> <p>E-mail : [REDACTED]</p> <p>Telephone : ----</p> <p>Facsimile : ----</p> <p>Project : WA_0958_PFASOMP</p> <p>Order number : pfas-omp Gingin</p> <p>C-O-C number : 43046</p> <p>Site : Gingin GW - MB</p> <p>Sampler : [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : [REDACTED]</p> <p>Address : 26 Rigali Way Wangara Western Australia Australia 6065</p> <p>E-mail : [REDACTED]</p> <p>Telephone : [REDACTED]</p> <p>Facsimile : [REDACTED]</p> <p>Page : 1 of 2</p> <p>Quote number : ES2022MWWHAUS0002 (SY/139/19 B)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

<p>Date Samples Received : 29-Sep-2022 14:00</p> <p>Client Requested Due Date : 11-Oct-2022</p>	<p>Issue Date : 30-Sep-2022</p> <p>Scheduled Reporting Date : 11-Oct-2022</p>
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Delivery Details

<p>Mode of Delivery : Client Drop Off</p> <p>No. of coolers/boxes : 1</p> <p>Receipt Detail :</p>	<p>Security Seal : Not Available</p> <p>Temperature : 13.4 - Ice present</p> <p>No. of samples received / analysed : 16 / 16</p>
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General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2212637-001	29-Sep-2022 08:12	0958_POT103_220929	✓
EP2212637-002	29-Sep-2022 08:33	0958_MW121D_220929	✓
EP2212637-003	29-Sep-2022 08:50	0958_MW120I_220929	✓
EP2212637-004	29-Sep-2022 09:02	0958_MW119S_220929	✓
EP2212637-005	29-Sep-2022 10:02	0958_MW133D_220929	✓
EP2212637-006	29-Sep-2022 10:06	0958_MW131D_220929	✓
EP2212637-007	29-Sep-2022 10:10	0958_MW132I_220929	✓
EP2212637-008	29-Sep-2022 11:52	0958_MW130D_220929	✓
EP2212637-009	29-Sep-2022 11:55	0958_MW129I_220929	✓
EP2212637-010	29-Sep-2022 11:58	0958_MW128D_220929	✓
EP2212637-011	29-Sep-2022 12:01	0958_MW125S_220929	✓
EP2212637-012	29-Sep-2022 12:04	0958_MW126I_220929	✓
EP2212637-013	29-Sep-2022 12:19	0958_QC301_220929	✓
EP2212637-014	29-Sep-2022 12:19	0958_QC302_220929	✓
EP2212637-015	29-Sep-2022 12:20	0958_QC401_220929	✓
EP2212637-016	29-Sep-2022 12:21	0958_QC402_220929	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

██████████	- A4 - AU Tax Invoice (INV)	Email	██████████
DERP LAB REPORTS			
██████████	- EDI Format - ESDAT (ESDAT)	Email	██████████
██████████	(STANTEC)		
██████████	- *AU Certificate of Analysis - NATA (COA)	Email	██████████
██████████	- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	██████████
██████████	- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	██████████
██████████	- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	██████████
██████████	- Chain of Custody (CoC) (COC)	Email	██████████
██████████	- EDI Format - ESDAT (ESDAT)	Email	██████████
██████████	- EDI Format - XTab (XTAB)	Email	██████████

CERTIFICATE OF ANALYSIS

Work Order : **EP2212637**
Client : **STANTEC AUSTRALIA PTY LTD**
Contact : [REDACTED] (STANTEC)
Address : GROUND FLOOR 226 ADELAIDE TERRACE
 PERTH 6000
Telephone : ----
Project : WA_0958_PFASOMP
Order number : pfas-omp Gingin
C-O-C number : 43046
Sampler : [REDACTED]
Site : Gingin GW - MB
Quote number : SY/139/19 B
No. of samples received : 16
No. of samples analysed : 16

Page : 1 of 13
Laboratory : Environmental Division Perth
Contact : [REDACTED]
Address : 26 Rigali Way Wangara Western Australia Australia 6065
Telephone : [REDACTED]
Date Samples Received : 29-Sep-2022 14:00
Date Analysis Commenced : 04-Oct-2022
Issue Date : 12-Oct-2022 09:16



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
[REDACTED]	LCMS Coordinator	Sydney Organics, Smithfield, NSW



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.

- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231X: PFAS results for sample #3 confirmed by instrument QC duplicate.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW121D_22092 9	0958_MW120I_22092 9	0958_MW119S_22092 9	0958_MW133D_22092 9	0958_MW131D_22092 9
Sampling date / time				29-Sep-2022 08:33	29-Sep-2022 08:50	29-Sep-2022 09:02	29-Sep-2022 10:02	29-Sep-2022 10:06
Compound	CAS Number	LOR	Unit	EP2212637-002	EP2212637-003	EP2212637-004	EP2212637-005	EP2212637-006
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.04	0.02	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.01	0.05	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW121D_22092 9	0958_MW120I_22092 9	0958_MW119S_22092 9	0958_MW133D_22092 9	0958_MW131D_22092 9
Sampling date / time				29-Sep-2022 08:33	29-Sep-2022 08:50	29-Sep-2022 09:02	29-Sep-2022 10:02	29-Sep-2022 10:06
Compound	CAS Number	LOR	Unit	EP2212637-002	EP2212637-003	EP2212637-004	EP2212637-005	EP2212637-006
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	0.01	0.09	0.02	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.01	0.09	0.02	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	0.01	0.09	0.02	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	98.6	100	106	99.4	106
13C8-PFOA	----	0.02	%	106	102	107	106	103



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW132I_22092 9	0958_MW130D_22092 9	0958_MW129I_22092 9	0958_MW128D_22092 9	0958_MW125S_22092 9
Sampling date / time				29-Sep-2022 10:10	29-Sep-2022 11:52	29-Sep-2022 11:55	29-Sep-2022 11:58	29-Sep-2022 12:01
Compound	CAS Number	LOR	Unit	EP2212637-007	EP2212637-008	EP2212637-009	EP2212637-010	EP2212637-011
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.04	<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	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW132I_22092 9	0958_MW130D_22092 9	0958_MW129I_22092 9	0958_MW128D_22092 9	0958_MW125S_22092 9
Sampling date / time				29-Sep-2022 10:10	29-Sep-2022 11:52	29-Sep-2022 11:55	29-Sep-2022 11:58	29-Sep-2022 12:01
Compound	CAS Number	LOR	Unit	EP2212637-007	EP2212637-008	EP2212637-009	EP2212637-010	EP2212637-011
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.04	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.04	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.04	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	99.0	102	101	102	99.0
13C8-PFOA	----	0.02	%	104	105	100	101	103



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW126I_22092
9

Sampling date / time

29-Sep-2022 12:04

Compound	CAS Number	LOR	Unit

EP2212637-012

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----

EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW126I_22092
9

Sampling date / time

29-Sep-2022 12:04

Compound

CAS Number

LOR

Unit

EP2212637-012

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----

EP231P: PFAS Sums

Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	103	----	----	----	----
13C8-PFOA	----	0.02	%	103	----	----	----	----



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

0958_POT103_22092
9

Sampling date / time

29-Sep-2022 08:12

Compound

CAS Number

LOR

Unit

EP2212637-001

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.03	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.30	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.03	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.22	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----

EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.03	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.12	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

0958_POT103_22092
9

Sampling date / time

29-Sep-2022 08:12

Compound

CAS Number

LOR

Unit

EP2212637-001

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----

EP231P: PFAS Sums

Sum of PFAS	----	0.01	µg/L	0.80	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.52	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.73	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	110	----	----	----	----
13C8-PFOA	----	0.02	%	115	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0958_QC301_220929	0958_QC302_220929	0958_QC401_220929	0958_QC402_220929	----
Sampling date / time				29-Sep-2022 12:19	29-Sep-2022 12:19	29-Sep-2022 12:20	29-Sep-2022 12:21	----	
Compound	CAS Number	LOR	Unit	EP2212637-013	EP2212637-014	EP2212637-015	EP2212637-016	-----	
				Result	Result	Result	Result	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
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	----	
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	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
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									
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	----	



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_220929	0958_QC302_220929	0958_QC401_220929	0958_QC402_220929	----
Sampling date / time				29-Sep-2022 12:19	29-Sep-2022 12:19	29-Sep-2022 12:20	29-Sep-2022 12:21	----
Compound	CAS Number	LOR	Unit	EP2212637-013	EP2212637-014	EP2212637-015	EP2212637-016	-----
				Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
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	%	101	100	102	98.4	----
13C8-PFOA	----	0.02	%	105	104	106	105	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Sub-Matrix: POTABLE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Sub-Matrix: RINSATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (WATER) EP231B: Perfluoroalkyl Carboxylic Acids
- (WATER) EP231C: Perfluoroalkyl Sulfonamides
- (WATER) EP231D: (n:2) Fluorotelomer Sulfonic Acids
- (WATER) EP231P: PFAS Sums
- (WATER) EP231S: PFAS Surrogate
- (WATER) EP231A: Perfluoroalkyl Sulfonic Acids

QUALITY CONTROL REPORT

Work Order	: EP2212637	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara Western Australia Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 29-Sep-2022
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 04-Oct-2022
C-O-C number	: 43046	Issue Date	: 12-Oct-2022
Sampler	: [REDACTED]		
Site	: Gingin GW - MB		
Quote number	: SY/139/19 B		
No. of samples received	: 16		
No. of samples analysed	: 16		



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
[REDACTED]	LCMS Coordinator	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4628520)									
EP2212637-003	0958_MW120I_220929	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.01	0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628520)									
EP2212637-003	0958_MW120I_220929	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4628520)									
EP2212637-003	0958_MW120I_220929	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit

Page : 3 of 6
 Work Order : EP2212637
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP



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 (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4628520) - continued									
EP2212637-003	0958_MW120I_220929	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628520)									
EP2212637-003	0958_MW120I_220929	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4628520)									
EP2212637-003	0958_MW120I_220929	EP231X: Sum of PFAS	----	0.01	µg/L	0.01	0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

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: 4628520)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	91.8	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	103	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	97.8	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	97.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	101	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	95.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628520)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	110	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	102	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	102	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	99.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	111	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	113	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	96.8	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628520)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	105	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	114	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	96.6	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	107	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	106	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	103	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	111	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628520)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	101	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	106	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	112	67.0	138



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike	Spike Recovery (%)	Acceptable Limits (%)	
					Concentration	LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628520) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	90.2	71.4	144

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 4628520)							
EP2212637-001	0958_POT103_220929	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	103	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	107	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	83.4	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	109	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	98.2	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	112	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628520)							
EP2212637-001	0958_POT103_220929	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	109	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	114	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	112	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	116	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	108	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	108	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	113	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	116	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	124	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	124	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	107	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628520)							
EP2212637-001	0958_POT103_220929	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	119	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	110	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	112	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	113	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	119	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	118	65.0	136



Sub-Matrix: WATER

Laboratory sample IDSample IDMethod: CompoundCAS Number				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
				Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628520) - continued							
EP2212637-001	0958_POT103_220929	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	120	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628520)							
EP2212637-001	0958_POT103_220929	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	113	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	112	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	102	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	82.8	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2212637	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 29-Sep-2022
Site	: Gingin GW - MB	Issue Date	: 12-Oct-2022
Sampler	: [REDACTED]	No. of samples received	: 16
Order number	: pfas-omp Gingin	No. of samples analysed	: 16

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Matrix: WATER

Analysis Holding Time Compliance

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 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.

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)		29-Sep-2022	11-Oct-2022	28-Mar-2023	✓	11-Oct-2022	28-Mar-2023	✓
0958_POT103_220929,	0958_MW121D_220929,							
0958_MW120I_220929,	0958_MW119S_220929,							
0958_MW133D_220929,	0958_MW131D_220929,							
0958_MW132I_220929,	0958_MW130D_220929,							
0958_MW129I_220929,	0958_MW128D_220929,							
0958_MW125S_220929,	0958_MW126I_220929,							
0958_QC301_220929,	0958_QC302_220929,							
0958_QC401_220929,	0958_QC402_220929							
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)		29-Sep-2022	11-Oct-2022	28-Mar-2023	✓	11-Oct-2022	28-Mar-2023	✓
0958_POT103_220929,	0958_MW121D_220929,							
0958_MW120I_220929,	0958_MW119S_220929,							
0958_MW133D_220929,	0958_MW131D_220929,							
0958_MW132I_220929,	0958_MW130D_220929,							
0958_MW129I_220929,	0958_MW128D_220929,							
0958_MW125S_220929,	0958_MW126I_220929,							
0958_QC301_220929,	0958_QC302_220929,							
0958_QC401_220929,	0958_QC402_220929							

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)								
0958_POT103_220929,	0958_MW121D_220929,	29-Sep-2022	11-Oct-2022	28-Mar-2023	✓	11-Oct-2022	28-Mar-2023	✓
0958_MW120I_220929,	0958_MW119S_220929,							
0958_MW133D_220929,	0958_MW131D_220929,							
0958_MW132I_220929,	0958_MW130D_220929,							
0958_MW129I_220929,	0958_MW128D_220929,							
0958_MW125S_220929,	0958_MW126I_220929,							
0958_QC301_220929,	0958_QC302_220929,							
0958_QC401_220929,	0958_QC402_220929							
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
0958_POT103_220929,	0958_MW121D_220929,	29-Sep-2022	11-Oct-2022	28-Mar-2023	✓	11-Oct-2022	28-Mar-2023	✓
0958_MW120I_220929,	0958_MW119S_220929,							
0958_MW133D_220929,	0958_MW131D_220929,							
0958_MW132I_220929,	0958_MW130D_220929,							
0958_MW129I_220929,	0958_MW128D_220929,							
0958_MW125S_220929,	0958_MW126I_220929,							
0958_QC301_220929,	0958_QC302_220929,							
0958_QC401_220929,	0958_QC402_220929							
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)								
0958_POT103_220929,	0958_MW121D_220929,	29-Sep-2022	11-Oct-2022	28-Mar-2023	✓	11-Oct-2022	28-Mar-2023	✓
0958_MW120I_220929,	0958_MW119S_220929,							
0958_MW133D_220929,	0958_MW131D_220929,							
0958_MW132I_220929,	0958_MW130D_220929,							
0958_MW129I_220929,	0958_MW128D_220929,							
0958_MW125S_220929,	0958_MW126I_220929,							
0958_QC301_220929,	0958_QC302_220929,							
0958_QC401_220929,	0958_QC402_220929							



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

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



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

**CHAIN OF CUSTODY**

COC#: 43049

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

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 comments:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW143S		29/09/2022 08:40 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
002	0958_MW142S		29/09/2022 08:42 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
003	0958_MW141S		29/09/2022 08:43 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
004	0958_MW135I		29/09/2022 10:30 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
005	0958_MW136D		29/09/2022 10:31 AM	Water	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS

Environmental Division
PerthWork Order Reference
EP2212667

Telephone : 61-8-9406 1301

Thursday, September 29, 2022

8:54:17 AM

**CHAIN OF CUSTODY**

ALS COC#: 43049

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

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 comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW143S	HDPE (no PTFE)	20 mL	00350621000514	Grey	No	
001	0958_MW143S	HDPE (no PTFE)	20 mL	00350621000498	Grey	No	
001	0958_MW143S	HDPE (no PTFE)	20 mL	00350621000613	Grey	No	
001	0958_MW143S	HDPE (no PTFE)	20 mL	00350621000401	Grey	No	
002	0958_MW142S	HDPE (no PTFE)	20 mL	00350621000389	Grey	No	
002	0958_MW142S	HDPE (no PTFE)	20 mL	00350621000429	Grey	No	
002	0958_MW142S	HDPE (no PTFE)	20 mL	00350621000279	Grey	No	
002	0958_MW142S	HDPE (no PTFE)	20 mL	00350821013567	Grey	No	
003	0958_MW141S	HDPE (no PTFE)	20 mL	00350621000336	Grey	No	
003	0958_MW141S	HDPE (no PTFE)	20 mL	00350621000403	Grey	No	
003	0958_MW141S	HDPE (no PTFE)	20 mL	00350621000466	Grey	No	
003	0958_MW141S	HDPE (no PTFE)	20 mL	00350621000299	Grey	No	
004	0958_MW135I	HDPE (no PTFE)	20 mL	00350621000487	Grey	No	
004	0958_MW135I	HDPE (no PTFE)	20 mL	00350621036192	Grey	No	
004	0958_MW135I	HDPE (no PTFE)	20 mL	00350621000367	Grey	No	
004	0958_MW135I	HDPE (no PTFE)	20 mL	00350621000179	Grey	No	
005	0958_MW136D	HDPE (no PTFE)	20 mL	00350621000238	Grey	No	
005	0958_MW136D	HDPE (no PTFE)	20 mL	00350621000219	Grey	No	
005	0958_MW136D	HDPE (no PTFE)	20 mL	00350621000513	Grey	No	
005	0958_MW136D	HDPE (no PTFE)	20 mL	00350621000276	Grey	No	

Total Bottle Count: ALS: 20, Non ALS: 0

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2212667

<p>Client : STANTEC AUSTRALIA PTY LTD</p> <p>Contact : [REDACTED] (STANTEC)</p> <p>Address : GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000</p> <p>E-mail : [REDACTED]</p> <p>Telephone : ----</p> <p>Facsimile : ----</p> <p>Project : WA_0958_PFASOMP</p> <p>Order number : pfas-omp Gingin</p> <p>C-O-C number : 43049</p> <p>Site : Gingin GW - CG</p> <p>Sampler : [REDACTED] [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : [REDACTED]</p> <p>Address : 26 Rigali Way Wangara Western Australia Australia 6065</p> <p>E-mail : [REDACTED]</p> <p>Telephone : [REDACTED]</p> <p>Facsimile : [REDACTED]</p> <p>Page : 1 of 2</p> <p>Quote number : ES2022MWH AUS0002 (SY/139/19 B)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

Date Samples Received : 29-Sep-2022 13:30	Issue Date : 30-Sep-2022
Client Requested Due : 11-Oct-2022	Scheduled Reporting Date : 11-Oct-2022
Date	

Delivery Details

Mode of Delivery : Client Drop Off	Security Seal : Not Available
No. of coolers/boxes : 1	Temperature : 13.4 - Ice present
Receipt Detail :	No. of samples received / analysed : 5 / 5

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2212667-001	29-Sep-2022 08:40	0958_MW143S_220929	✓
EP2212667-002	29-Sep-2022 08:42	0958_MW142S_220929	✓
EP2212667-003	29-Sep-2022 08:43	0958_MW141S_220929	✓
EP2212667-004	29-Sep-2022 10:30	0958_MW135I_220929	✓
EP2212667-005	29-Sep-2022 10:31	0958_MW136D_220929	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

- A4 - AU Tax Invoice (INV)

Email

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

Email

(STANTEC)

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- Chain of Custody (CoC) (COC)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

Email
Email
Email
Email
Email
Email
Email

CERTIFICATE OF ANALYSIS

Work Order : **EP2212667**
Client : **STANTEC AUSTRALIA PTY LTD**
Contact : [REDACTED] (STANTEC)
Address : GROUND FLOOR 226 ADELAIDE TERRACE
 PERTH 6000
Telephone : ----
Project : WA_0958_PFASOMP
Order number : pfas-omp Gingin
C-O-C number : 43049
Sampler : [REDACTED]
Site : Gingin GW - CG
Quote number : SY/139/19 B
No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 5
Laboratory : Environmental Division Perth
Contact : [REDACTED]
Address : 26 Rigali Way Wangara Western Australia Australia 6065
Telephone : [REDACTED]
Date Samples Received : 29-Sep-2022 13:30
Date Analysis Commenced : 04-Oct-2022
Issue Date : 12-Oct-2022 12:44



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
[REDACTED]	Organic Chemist	Sydney Organics, Smithfield, NSW



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.

- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW143S_22092 9	0958_MW142S_22092 9	0958_MW141S_22092 9	0958_MW135I_22092 9	0958_MW136D_22092 9
Sampling date / time				29-Sep-2022 08:40	29-Sep-2022 08:42	29-Sep-2022 08:43	29-Sep-2022 10:30	29-Sep-2022 10:31
Compound	CAS Number	LOR	Unit	EP2212667-001	EP2212667-002	EP2212667-003	EP2212667-004	EP2212667-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.03	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	<0.01	0.22	<0.01	0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.13	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.05	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW143S_22092 9	0958_MW142S_22092 9	0958_MW141S_22092 9	0958_MW135I_22092 9	0958_MW136D_22092 9
Sampling date / time				29-Sep-2022 08:40	29-Sep-2022 08:42	29-Sep-2022 08:43	29-Sep-2022 10:30	29-Sep-2022 10:31
Compound	CAS Number	LOR	Unit	EP2212667-001	EP2212667-002	EP2212667-003	EP2212667-004	EP2212667-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.02	<0.01	0.46	<0.01	0.02
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	<0.01	0.35	<0.01	0.02
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.02	<0.01	0.43	<0.01	0.02
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	99.3	102	95.5	102	97.7
13C8-PFOA	----	0.02	%	102	101	98.9	98.9	101

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Work Order : EP2212667
Client : STANTEC AUSTRALIA PTY LTD
Project : WA_0958_PFASOMP



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP231A: Perfluoroalkyl Sulfonic Acids

(WATER) EP231B: Perfluoroalkyl Carboxylic Acids

(WATER) EP231C: Perfluoroalkyl Sulfonamides

(WATER) EP231D: (n:2) Fluorotelomer Sulfonic Acids

(WATER) EP231P: PFAS Sums

(WATER) EP231S: PFAS Surrogate

QUALITY CONTROL REPORT

Work Order	: EP2212667	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara Western Australia Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 29-Sep-2022
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 04-Oct-2022
C-O-C number	: 43049	Issue Date	: 12-Oct-2022
Sampler	: [REDACTED] [REDACTED]		
Site	: Gingin GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 5		
No. of samples analysed	: 5		



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
[REDACTED]	Organic Chemist	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	20.9	23.5	11.9	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	51.5	54.0	4.7	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.93	1.96	1.7	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	2.59	2.74	5.5	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	1.14	1.19	4.2	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.09	0.10	0.0	No Limit
EP2212667-005	0958_MW136D_220929	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	1.25	1.30	4.2	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	1.48	1.52	2.4	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	6.52	6.76	3.7	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.56	0.57	2.0	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	1.1	1.1	0.0	0% - 50%



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 (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4628200) - continued									
EP2212667-005	0958_MW136D_220929	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit	
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212667-005	0958_MW136D_220929	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2212667
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4628200) - continued									
EP2212403-003	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	0.09	0.11	21.6	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2212667-005	0958_MW136D_220929	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4628200)									
EP2212403-003	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	89.2	94.9	6.2	0% - 20%
EP2212667-005	0958_MW136D_220929	EP231X: Sum of PFAS	----	0.01	µg/L	0.02	0.02	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				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4628200)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	83.4	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	96.0	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	91.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	95.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	93.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	88.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628200)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	93.4	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	96.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	96.4	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	100	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	97.8	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	99.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	110	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	89.6	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628200)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	96.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	110	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	106	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	95.8	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	101	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628200)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	93.4	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	87.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	102	67.0	138



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628200) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	90.0	71.4	144

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 4628200)							
EP2212667-002	0958_MW142S_220929	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	81.2	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	98.2	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	91.0	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	93.4	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	87.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	86.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4628200)							
EP2212667-002	0958_MW142S_220929	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	90.9	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	99.0	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	98.2	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	94.6	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	100	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	97.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	94.2	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	98.0	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	107	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	110	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	93.8	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628200)							
EP2212667-002	0958_MW142S_220929	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	92.6	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	107	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.6	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	95.2	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	99.0	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	96.4	65.0	136



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4628200) - continued							
EP2212667-002	0958_MW142S_220929	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	95.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4628200)							
EP2212667-002	0958_MW142S_220929	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	96.4	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	103	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	109	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	79.0	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2212667	Page	: 1 of 4
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 29-Sep-2022
Site	: Gingin GW - CG	Issue Date	: 12-Oct-2022
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 5
Order number	: pfas-omp Gingin	No. of samples analysed	: 5

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method	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) 0958_MW143S_220929, 0958_MW141S_220929, 0958_MW136D_220929	0958_MW142S_220929, 0958_MW135I_220929,	29-Sep-2022	11-Oct-2022	28-Mar-2023	✔	11-Oct-2022	28-Mar-2023	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0958_MW143S_220929, 0958_MW141S_220929, 0958_MW136D_220929	0958_MW142S_220929, 0958_MW135I_220929,	29-Sep-2022	11-Oct-2022	28-Mar-2023	✔	11-Oct-2022	28-Mar-2023	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW143S_220929, 0958_MW141S_220929, 0958_MW136D_220929	0958_MW142S_220929, 0958_MW135I_220929,	29-Sep-2022	11-Oct-2022	28-Mar-2023	✔	11-Oct-2022	28-Mar-2023	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW143S_220929, 0958_MW141S_220929, 0958_MW136D_220929	0958_MW142S_220929, 0958_MW135I_220929,	29-Sep-2022	11-Oct-2022	28-Mar-2023	✔	11-Oct-2022	28-Mar-2023	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW143S_220929, 0958_MW141S_220929, 0958_MW136D_220929	0958_MW142S_220929, 0958_MW135I_220929,	29-Sep-2022	11-Oct-2022	28-Mar-2023	✔	11-Oct-2022	28-Mar-2023	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

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



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



CHAIN OF CUSTODY

COC#: 43303

ALS Laboratory: EP Perth

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

CLIENT: MWAHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW

ORDER NO: pfas-omp Gingin

PROJECT MANAGER

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWAHAUS0002

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 comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW403		06/10/2022 08:15 AM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab QC
002	0958_QC301		06/10/2022 08:24 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_QC401		06/10/2022 08:25 AM	Water	ALS: 2 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

COC#: 43303

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

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 comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW403	HDPE (no PTFE)	20 mL	00350621000583	Grey	No	
001	0958_MW403	HDPE (no PTFE)	20 mL	00350621000495	Grey	No	
001	0958_MW403	HDPE (no PTFE)	20 mL	00350621000464	Grey	No	
001	0958_MW403	HDPE (no PTFE)	20 mL	00350621000480	Grey	No	
002	0958_QC301	HDPE (no PTFE)	20 mL	00350621000565	Grey	No	
002	0958_QC301	HDPE (no PTFE)	20 mL	00350621000543	Grey	No	
003	0958_QC401	HDPE (no PTFE)	20 mL	00350621000553	Grey	No	
003	0958_QC401	HDPE (no PTFE)	20 mL	00350621000465	Grey	No	

Total Bottle Count: ALS: 8, Non ALS: 0

**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : EP2213053**

Client : **STANTEC AUSTRALIA PTY LTD**
Contact : [REDACTED] (STANTEC)
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : [REDACTED]
Address : 26 Rigali Way Wangara Western
Australia Australia 6065

E-mail : [REDACTED]
Telephone : ----
Facsimile : ----

E-mail : [REDACTED]
Telephone : [REDACTED]
Facsimile : [REDACTED]

Project : WA_0958_PFASOMP
Order number : pfas-omp Gingin
C-O-C number : 43303
Site : Gingin GW
Sampler : [REDACTED]

Page : 1 of 2
Quote number : ES2022MWH AUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 06-Oct-2022 12:45
Client Requested Due : 19-Oct-2022
Date

Issue Date : 11-Oct-2022
Scheduled Reporting Date : **19-Oct-2022**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 1
Receipt Detail :

Security Seal : Not Available
Temperature : 14.0 - Ice Bricks present
No. of samples received / analysed : 3 / 3

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2213053-001	06-Oct-2022 08:15	0958_MW403_221006	✓
EP2213053-002	06-Oct-2022 08:24	0958_QC301_221006	✓
EP2213053-003	06-Oct-2022 08:25	0958_QC401_221006	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

- A4 - AU Tax Invoice (INV)

Email

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

Email

(STANTEC)

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- Chain of Custody (CoC) (COC)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

Email

Email

Email

Email

Email

Email

Email

CERTIFICATE OF ANALYSIS

Work Order : **EP2213053**
Client : **STANTEC AUSTRALIA PTY LTD**
Contact : [REDACTED] (STANTEC)
Address : GROUND FLOOR 226 ADELAIDE TERRACE
 PERTH 6000
Telephone : ----
Project : WA_0958_PFASOMP
Order number : pfas-omp Gingin
C-O-C number : 43303
Sampler : [REDACTED]
Site : Gingin GW
Quote number : SY/139/19 B
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 7
Laboratory : Environmental Division Perth
Contact : [REDACTED]
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : [REDACTED]
Date Samples Received : 06-Oct-2022 12:45
Date Analysis Commenced : 14-Oct-2022
Issue Date : 19-Oct-2022 09:20



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
[REDACTED]	LCMS Coordinator	Sydney Organics, Smithfield, NSW



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.

- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW403_221006

Sampling date / time				06-Oct-2022 08:15	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2213053-001	-----	-----	-----	-----
Result				----	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW403_221006

Sampling date / time

06-Oct-2022 08:15

Compound

CAS Number

LOR

Unit

EP2213053-001

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----

EP231P: PFAS Sums

Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	103	----	----	----	----
13C8-PFOA	----	0.02	%	98.8	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_221006	0958_QC401_221006	----	----	----
Sampling date / time				06-Oct-2022 08:24	06-Oct-2022 08:25	----	----	----
Compound	CAS Number	LOR	Unit	EP2213053-002	EP2213053-003	-----	-----	-----
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_221006	0958_QC401_221006	----	----	----
Sampling date / time				06-Oct-2022 08:24	06-Oct-2022 08:25	----	----	----
Compound	CAS Number	LOR	Unit	EP2213053-002	EP2213053-003	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	104	97.0	----	----	----
13C8-PFOA	----	0.02	%	97.0	103	----	----	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Sub-Matrix: RINSATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

- (WATER) EP231A: Perfluoroalkyl Sulfonic Acids
- (WATER) EP231B: Perfluoroalkyl Carboxylic Acids
- (WATER) EP231C: Perfluoroalkyl Sulfonamides
- (WATER) EP231D: (n:2) Fluorotelomer Sulfonic Acids
- (WATER) EP231P: PFAS Sums
- (WATER) EP231S: PFAS Surrogate

QUALITY CONTROL REPORT

Work Order	: EP2213053	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 06-Oct-2022
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 14-Oct-2022
C-O-C number	: 43303	Issue Date	: 19-Oct-2022
Sampler	: [REDACTED]		
Site	: Gingin GW		
Quote number	: SY/139/19 B		
No. of samples received	: 3		
No. of samples analysed	: 3		



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
[REDACTED]	LCMS Coordinator	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4643455)									
EP2213053-001	0958_MW403_221006	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2213191-003	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.21	0.20	6.9	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	2.70	2.57	4.9	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.03	0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.03	0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4643455)									
EP2213053-001	0958_MW403_221006	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit



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 (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4643455) - continued									
EP2213191-003	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.06	0.06	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.11	0.09	16.7	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4643455)									
EP2213053-001	0958_MW403_221006	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2213191-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4643455)									
EP2213053-001	0958_MW403_221006	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

Page : 4 of 7
 Work Order : EP2213053
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4643455) - continued									
EP2213053-001	0958_MW403_221006	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2213191-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	0.11	0.14	22.5	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4643455)									
EP2213053-001	0958_MW403_221006	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EP2213191-003	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	3.33	3.18	4.6	0% - 20%



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

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

Sub-Matrix: **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				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4643455)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	79.8	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	92.2	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	89.8	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	96.4	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	84.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	80.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4643455)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	87.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	104	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	96.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	89.0	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	89.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	87.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	106	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	100	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	103	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4643455)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	103	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	92.4	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	90.2	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	94.4	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	103	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	110	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4643455)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	79.0	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	94.4	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	102	67.0	138



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
Method: Compound	CAS Number	LOR	Unit	Result				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4643455) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	83.2	71.4	144

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 4643455)							
EP2213191-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	87.2	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	103	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	74.2	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	102	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	85.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	89.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4643455)							
EP2213191-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	101	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	123	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	121	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	111	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	107	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	107	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	102	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	109	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	118	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	111	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	119	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4643455)							
EP2213191-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	119	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	115	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	117	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	108	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	114	65.0	136



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4643455) - continued							
EP2213191-002	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	118	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4643455)							
EP2213191-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	95.4	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	105	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	122	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	98.8	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2213053	Page	: 1 of 4
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED] (STANTEC)	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 06-Oct-2022
Site	: Gingin GW	Issue Date	: 19-Oct-2022
Sampler	: [REDACTED]	No. of samples received	: 3
Order number	: pfas-omp Gingin	No. of samples analysed	: 3

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



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	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW403_221006, 0958_QC401_221006	0958_QC301_221006,	06-Oct-2022	18-Oct-2022	04-Apr-2023	✔	18-Oct-2022	04-Apr-2023	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0958_MW403_221006, 0958_QC401_221006	0958_QC301_221006,	06-Oct-2022	18-Oct-2022	04-Apr-2023	✔	18-Oct-2022	04-Apr-2023	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW403_221006, 0958_QC401_221006	0958_QC301_221006,	06-Oct-2022	18-Oct-2022	04-Apr-2023	✔	18-Oct-2022	04-Apr-2023	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW403_221006, 0958_QC401_221006	0958_QC301_221006,	06-Oct-2022	18-Oct-2022	04-Apr-2023	✔	18-Oct-2022	04-Apr-2023	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW403_221006, 0958_QC401_221006	0958_QC301_221006,	06-Oct-2022	18-Oct-2022	04-Apr-2023	✔	18-Oct-2022	04-Apr-2023	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

[illegible]

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rourke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Sample Receipt Advice

Company name: Stantec Australia Pty Ltd (WA)
Contact name: [REDACTED]
Project name: WA_0958_PFASOMP
Project ID: Not provided
Turnaround time: 5 Day
Date/Time received: Sep 30, 2022 9:59 AM
Eurofins reference: 927653

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.
- N/A 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:

[REDACTED] on phone : or by email: [REDACTED]

Results will be delivered electronically via email to [REDACTED] - [REDACTED]

Note: A copy of these results will also be delivered to the general Stantec Australia Pty Ltd (WA) email address.



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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rourke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000
Project Name: WA_0958_PFASOMP

Order No.: 304700525
Report #: 927653
Phone: [REDACTED]
Fax: [REDACTED]

Received: Sep 30, 2022 9:59 AM
Due: Oct 7, 2022
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_220928	Sep 28, 2022		Water	L22-Se0064358	X
2	0958_QC202_220928	Sep 28, 2022		Water	L22-Se0064359	X
3	0958_QC203_220928	Sep 28, 2022		Water	L22-Se0064360	X
4	0958_QC204_220928	Sep 28, 2022		Water	L22-Se0064361	X
5	0958_QC205_220928	Sep 28, 2022		Water	L22-Se0064362	X
6	0958_QC206_220928	Sep 28, 2022		Water	L22-Se0064363	X
7	0958_QC207_220928	Sep 28, 2022		Water	L22-Se0064364	X

Test Counts

7

Stantec Australia Pty Limited
6F 226, Adelaide Terrace
Perth
WA 6000



NATA Accredited
Accreditation Number 2377
Site Number 2370

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:

Report 927653-W
Project name WA_0958_PFASOMP
Received Date Sep 30, 2022

Client Sample ID			0958_QC201_2 20928	0958_QC202_2 20928	0958_QC203_2 20928	0958_QC204_2 20928
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L22-Se0064358	L22-Se0064359	L22-Se0064360	L22-Se0064361
Date Sampled			Sep 28, 2022	Sep 28, 2022	Sep 28, 2022	Sep 28, 2022
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	< 0.01	0.07	0.03	0.04
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.02	^{N09} 0.01	^{N09} 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	70	70	74	70
13C5-PFPeA (surr.)	1	%	89	100	84	88
13C5-PFHxA (surr.)	1	%	95	106	102	92
13C4-PFHpA (surr.)	1	%	97	102	108	93
13C8-PFOA (surr.)	1	%	114	123	119	109
13C5-PFNA (surr.)	1	%	115	124	132	119
13C6-PFDA (surr.)	1	%	105	115	109	100
13C2-PFUnDA (surr.)	1	%	94	100	95	95
13C2-PFDoDA (surr.)	1	%	77	84	78	77
13C2-PFTeDA (surr.)	1	%	63	69	63	57
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	98	107	106	96
D3-N-MeFOSA (surr.)	1	%	111	113	100	97
D5-N-EtFOSA (surr.)	1	%	111	131	114	115

Client Sample ID			0958_QC201_2 20928	0958_QC202_2 20928	0958_QC203_2 20928	0958_QC204_2 20928
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L22-Se0064358	L22-Se0064359	L22-Se0064360	L22-Se0064361
Date Sampled			Sep 28, 2022	Sep 28, 2022	Sep 28, 2022	Sep 28, 2022
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
D7-N-MeFOSE (surr.)	1	%	69	71	64	61
D9-N-EtFOSE (surr.)	1	%	63	67	52	55
D5-N-EtFOSAA (surr.)	1	%	114	117	128	118
D3-N-MeFOSAA (surr.)	1	%	87	108	100	101
Perfluoroalkyl sulfonic acids (PFSA's)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	0.02	0.04	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 0.02	^{N09} 0.04	^{N09} 0.02
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.18	^{N09} 0.28	^{N09} 0.53
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 0.02	^{N09} 0.02	^{N09} 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.16	^{N09} 0.18	^{N09} 0.29
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	94	107	100	91
18O2-PFHxS (surr.)	1	%	94	103	95	79
13C8-PFOS (surr.)	1	%	101	103	105	91
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	107	101	150	112
13C2-6:2 FTSA (surr.)	1	%	83	106	102	97
13C2-8:2 FTSA (surr.)	1	%	114	121	136	115
13C2-10:2 FTSA (surr.)	1	%	83	94	87	79
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	0.34	0.46	0.82
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	0.18	0.19	0.3
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	0.36	0.47	0.83
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	0.45	0.54	0.87
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	0.49	0.6	0.9

Client Sample ID			0958_QC205_2 20928	0958_QC206_2 20928	0958_QC207_2 20928
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L22-Se0064362	L22-Se0064363	L22-Se0064364
Date Sampled			Sep 28, 2022	Sep 28, 2022	Sep 28, 2022
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	0.29
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01	0.03	0.48
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	< 0.01	0.12	3.9
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.02	^{N09} 0.35
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.08	^{N09} 2.4
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	0.02

Client Sample ID			0958_QC205_2 20928	0958_QC206_2 20928	0958_QC207_2 20928
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L22-Se0064362	L22-Se0064363	L22-Se0064364
Date Sampled			Sep 28, 2022	Sep 28, 2022	Sep 28, 2022
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	77	76	66
13C5-PFPeA (surr.)	1	%	84	100	72
13C5-PFHxA (surr.)	1	%	107	104	101
13C4-PFHpA (surr.)	1	%	108	101	96
13C8-PFOA (surr.)	1	%	125	113	95
13C5-PFNA (surr.)	1	%	133	131	100
13C6-PFDA (surr.)	1	%	120	106	56
13C2-PFUnDA (surr.)	1	%	104	106	83
13C2-PFDoDA (surr.)	1	%	98	87	93
13C2-PFTeDA (surr.)	1	%	86	76	112
Perfluoroalkyl sulfonamido substances					
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	109	101	88
D3-N-MeFOSA (surr.)	1	%	130	123	100
D5-N-EtFOSA (surr.)	1	%	75	124	113
D7-N-MeFOSE (surr.)	1	%	79	68	60
D9-N-EtFOSE (surr.)	1	%	73	63	57
D5-N-EtFOSAA (surr.)	1	%	94	125	114
D3-N-MeFOSAA (surr.)	1	%	110	105	63
Perfluoroalkyl sulfonic acids (PFSA's)					
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	0.05	1.3
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	0.36
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	0.44
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 0.10	^{N09} 2.0
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 1.1	^{N09} 16
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 0.16	^{N09} 2.1
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.02	2.0	^{N09} 82
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	102	103	61
18O2-PFHxS (surr.)	1	%	100	76	88
13C8-PFOS (surr.)	1	%	105	93	88

Client Sample ID			0958_QC205_2 20928	0958_QC206_2 20928	0958_QC207_2 20928
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L22-Se0064362	L22-Se0064363	L22-Se0064364
Date Sampled			Sep 28, 2022	Sep 28, 2022	Sep 28, 2022
Test/Reference	LOR	Unit			
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	176	118	116
13C2-6:2 FTSA (surr.)	1	%	95	92	71
13C2-8:2 FTSA (surr.)	1	%	78	103	49
13C2-10:2 FTSA (surr.)	1	%	94	88	161
PFASs Summations					
Sum (PFHxS + PFOS)*	0.01	ug/L	0.02	3.1	98
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.02	2.08	84.4
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.02	3.18	100.4
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	3.4	106.72
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	3.66	111.64

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Oct 03, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Oct 03, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAAs)	Melbourne	Oct 03, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Oct 03, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Sep 30, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			



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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rourke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000
Project Name: WA_0958_PFASOMP

Order No.: 304700525
Report #: 927653
Phone: [REDACTED]
Fax: [REDACTED]

Received: Sep 30, 2022 9:59 AM
Due: Oct 7, 2022
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_220928	Sep 28, 2022		Water	L22-Se0064358	X
2	0958_QC202_220928	Sep 28, 2022		Water	L22-Se0064359	X
3	0958_QC203_220928	Sep 28, 2022		Water	L22-Se0064360	X
4	0958_QC204_220928	Sep 28, 2022		Water	L22-Se0064361	X
5	0958_QC205_220928	Sep 28, 2022		Water	L22-Se0064362	X
6	0958_QC206_220928	Sep 28, 2022		Water	L22-Se0064363	X
7	0958_QC207_220928	Sep 28, 2022		Water	L22-Se0064364	X

Test Counts

7

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to '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 prior to sample receipt deadlines as stated on the SRA.

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

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

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
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 a moisture has been determined on a solid sample the result is expressed on a dry 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 is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA's)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	105			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	101			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	100			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	89			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	83			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	88			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	95			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	99			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	93			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	96			50-150	Pass	
LCS - % Recovery							

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	93			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	115			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	108			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	101			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	118			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	107			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)									
Perfluorobutanesulfonic acid (PFBS)			%	95			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	109			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	101			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	92			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	90			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	105			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	100			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	87			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	104			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	105			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	99			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	119			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)	L22-Se0062998	NCP	%	109			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	L22-Se0062998	NCP	%	101			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	L22-Se0062998	NCP	%	102			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	L22-Se0062998	NCP	%	97			50-150	Pass	
Perfluorooctanoic acid (PFOA)	L22-Se0062998	NCP	%	95			50-150	Pass	
Perfluorononanoic acid (PFNA)	L22-Se0062998	NCP	%	97			50-150	Pass	
Perfluorodecanoic acid (PFDA)	L22-Se0062998	NCP	%	102			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	L22-Se0062998	NCP	%	108			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	L22-Se0062998	NCP	%	106			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	L22-Se0062998	NCP	%	107			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L22-Se0062998	NCP	%	108			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	L22-Se0062998	NCP	%	99			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L22-Se0062998	NCP	%	122			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L22-Se0062998	NCP	%	149			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L22-Se0062998	NCP	%	118			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L22-Se0062998	NCP	%	116			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L22-Se0062998	NCP	%	115			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L22-Se0062998	NCP	%	113			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	L22-Se0062998	NCP	%	100			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	L22-Se0062998	NCP	%	111			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	L22-Se0062998	NCP	%	103			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	L22-Se0062998	NCP	%	99			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	L22-Se0062998	NCP	%	99			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	L22-Se0062998	NCP	%	116			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	L22-Se0062998	NCP	%	97			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	L22-Se0062998	NCP	%	101			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L22-Se0062998	NCP	%	105			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	L22-Se0062998	NCP	%	112			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L22-Se0062998	NCP	%	107			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L22-Se0062998	NCP	%	118			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-Oc0000263	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Oc0000263	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

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

	Analytical Services Manager
	Senior Analyst-PFAS
	Senior Analyst-PFAS



Business Unit Manager

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request

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APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES



now



Monitoring																			
Date	Monitoring Location	Sample ID	Screen Interval (m)	TOC (mAHD)	Well Depth (m)	SWL (mbTOC)	RWL (mAHD)	Other Observations	Sampling Method	Temp (°C)	DO (mg/L)	EC (us/Cm)	TDS (mg/L)	pH	Eh (mV)	QC #	Odour	Colour	
28/09/2022	MW101I	0958_MW101I_220928	19.78-22.78	73.5	23.5	11.964	61.536		HydraSleeve		24.1	3.8	122.7	79.95	5.38	-108.9 QC103/203	no	Clear	
28/09/2022	MW102D	0958_MW102D_220928	40.02-43.02	73.41	43.4	11.987	61.423		HydraSleeve		22.7	2.25	217.5	140.4	5.22	-144.4 QC105/205	no	Clear	
28/09/2022	MW104I	0958_MW104I_220928	19.5-22.9	73.74	22.9	12.073	61.667		HydraSleeve		22.5	0.54	117.8	76.7	5.55	54	no	Yellow,Clear	
28/09/2022	MW105D	0958_MW105D_220928	39-42.5	73.79	42.3	12.195	61.595		HydraSleeve		22.4	1.27	192	124.8	5.86	73.1	no	Clear	
28/09/2022	MW106S	0958_MW106S_220928	6.8-10.8	71.54	11	6.417	65.123		HydraSleeve		19.5	2.76	280.3	182.65	3.1	142.1	no	Brown	
28/09/2022	MW107S		5.5-9.5	71.6	9.5			Dry	HydraSleeve										
28/09/2022	MW108S		5.0-9.0	70.9	9			Dry	HydraSleeve										
28/09/2022	MW109S	0958_MW109S_220928	5.8-10.3	73.45	10.3	7.314	66.136		HydraSleeve		22.4	2.23	154.3	100.1	4.01	-95.1	no	Clear	
28/09/2022	MW110S	0958_MW110S_220928	6.5-10.0	73.74	10	7.757	65.983		HydraSleeve		20.8	3.99	140.1	91	4.29	-58.7	no	Clear	
28/09/2022	MW111S	0958_MW111S_220928	6.5-9.5	73.87	9.5	7.881	65.989		HandBailing		21.5	1.26	146.8	95.55	5.46	103.6	no	Brown	
28/09/2022	MW112S	0958_MW112S_220928	7.5-10.5	73.69	10.5	8.083	65.607		HydraSleeve		21	4.67	100.2	65.9	3.8	-37.8	no	Clear	
28/09/2022	MW113S	0958_MW113S_220928	6.5-9.5	73.79	9.6	8.288	65.502		HydraSleeve		21.3	3.74	150.4	100.75	3.79	-26.9	no	Clear	
28/09/2022	MW114S	0958_MW114S_220928	5.0-8.0	73.68	8	6.664	67.016		HydraSleeve		20	4.05	269.5	174.85	5.9	116.8	no	Clear,Yellow	
28/09/2022	MW115S	0958_MW115S_220928	5.0-8.0	70.79	8	4.942	65.848		HydraSleeve		19.5	2.08	209.2	136.5	3.84	76.3	no	Yellow	
28/09/2022	MW116S	0958_MW116S_220928	8.0-11.0	74.43	11	9.17	65.26		HydraSleeve		19.4	4.9	187.2	121.55	3.66	154.9	no	Yellow	
28/09/2022	MW117I	0958_MW117I_220928	21.3-23.3	74.19	23	13.84	60.35		HydraSleeve		19.5	1.19	127	82.55	5.52	98.8	no	Clear	
28/09/2022	MW118D	0958_MW118D_220928	41-43	74.19	43	13.905	60.285		HydraSleeve		19.3	2.44	208.1	135.2	5.43	111.7	no	Clear	
29/09/2022	MW119S	0958_MW119S_220929	10.1-13.1	74.06	13.1	11.745	62.315		HydraSleeve		18.7	2.92	137.2	89.05	3.86	99.3	no	Clear	
								Hydrasleeve didnt fill up during recovery											
29/09/2022	MW120I	0958_MW120I_220929	19.94-22.94	73.84	23.0	15.16	58.68		HandBailing		19.5	2.97	119.8	78	5.25	62.8	no	Clear	
29/09/2022	MW121D	0958_MW121D_220929	39.8-42.8	73.96	42.8	15.295	58.665		HydraSleeve		18.7	0.99	214.9	139.75	5.64	60.9	no	Clear	
28/09/2022	MW122S	0958_MW122S_220928	10.5-13.5	75.84	13.5	12.434	63.406		HydraSleeve		22.5	7.09	73.6	47.45	3.86	-76	no	Clear	
28/09/2022	MW123I	0958_MW123I_220928	20-23	76.03	23	15.505	60.525		HydraSleeve		17.5	5.7	161.3	100.1	5.36	-125.9	no	Clear	
28/09/2022	MW124D	0958_MW124D_220928	39.5-42.5	75.87	42.5	16.739	59.131		HydraSleeve		20.6	3.37	279.7	182	5.89	-123.9	no	Clear	
29/09/2022	MW125S	0958_MW125S_220929	14.25-17.25	74.88	18.0	14.8	60.08		HydraSleeve		21.8	2.2	177.2	115.05	5.69	24.1	no	Cloudy	
29/09/2022	MW126I	0958_MW126I_220929	33.5-36.5	73.5	36.5	13.245	60.255		HydraSleeve		22.5	1.93	194.7	126.75	5.26	52.9	no	Clear	
29/09/2022	MW128D	0958_MW128D_220929	47-50	74.4	50.0	17.08	57.32		HydraSleeve		19.8	1.08	226.2	146.9	5.53	50.8	no	Clear	
29/09/2022	MW129I	0958_MW129I_220929	15.3-18.3	73.51	18.0	16.18	57.33		HydraSleeve		20.4	1.74	191.9	124.8	5.36	53.7	no	Clear	
29/09/2022	MW130D	0958_MW130D_220929	33.5-36.5	72.77	36.5	15.742	57.028		HydraSleeve		21.8	1.4	213.1	138.45	6	80.3	no	Clear	
29/09/2022	MW131D	0958_MW131D_220929	52.5-55.5	76.59	55.5	19.67	56.92		HydraSleeve		20.5	1.68	157.8	102.7	5.65	99.3	no	Clear	
29/09/2022	MW132I	0958_MW132I_220929	18.5-21.5	76.43	21.0	18.755	57.675		HydraSleeve		21.2	2.24	121.6	79.3	5.58	97.4	no	Clear	
29/09/2022	MW133D	0958_MW133D_220929	40.9-43.9	76.49	43.5	19.65	56.84		HandBailing		20.4	1.67	191.2	124.15	5.37	125.2	no	Clear	
								Bore dry at 21.979 - possibly blocked											
29/09/2022	MW134D		53-56	78.48	56				HydraSleeve										
29/09/2022	MW135I	0958_MW135I_220929	21.1-23.6	77.67	24	21.175	56.495		HydraSleeve		21	2.57	237.5	154.05	5.24	-157.4	no	Clear	
29/09/2022	MW136D	0958_MW136D_220929	41-44	78.24	44.9	21.715	56.525		HydraSleeve		20.2	2.81	198.8	128.7	5.46	-194.3	no	Clear	
28/09/2022	MW137S	0958_MW137S_220928	4.7-8.7	73.12	8.7	7.826	65.294		HydraSleeve		21.9	2.07	260.2	167.5	3.77	-79.1 QC101/201	no	Clear	
28/09/2022	MW138S	0958_MW138S_220928	9.0-15.0	74.17	15	8.683	65.487		HydraSleeve		17.5	2.46	242.4	157.3	3.84	-94	no	Clear	
28/09/2022	MW139I	0958_MW139I_220928	27.0-30.0	73.99	30	13.942	60.048		HydraSleeve		20.5	1.93	215	139.75	5.87	-175.2	no	Clear	
28/09/2022	MW140D	0958_MW140D_220928	51.5-54.5	73.9	54	13.765	60.135		HydraSleeve		22.8	2.59	465.1	302.25	6.84	-152	no	Clear	
29/09/2022	MW141S	0958_MW141S_220929	13.5-16.5	74.36	16.5	10.879	63.481		HydraSleeve		19	2.87	281.6	182.66	3.66	-39.5	no	Clear	
29/09/2022	MW142S	0958_MW142S_220929	12.4-15.4	76.34	15.5	13.6	62.74		HydraSleeve		20.2	4.22	311.4	202.8	4.14	-44.3	no	Clear	
29/09/2022	MW143S	0958_MW143S_220929	14-18.5	75.81	18.5	18.139	57.671		HydraSleeve		20.9	4.6	245.7	159.9	4.86	-123.9	no	Clear	
28/09/2022	MW301	0958_MW301_220928	7_10	74.547	10	8.435	66.112		HydraSleeve		21.4	4.04	225.4	146.6	3.41	-20	no	Clear	
28/09/2022	MW302	0958_MW302_220928	7_10	74.712	10	8.585	66.127		HydraSleeve		23.1	4.41	124.7	81.25	3.74	-31.1 QC106/206	no	Clear	
28/09/2022	MW303	0958_MW303_220928	7_10	74.574	10	8.441	66.133		HydraSleeve		22.5	6.75	141.4	91.65	3.62	-15.2	no	Clear	
28/09/2022	MW304	0958_MW304_220928	6.5-9.5	74.094	9.5	7.402	66.692		HydraSleeve		22.5	3.12	365.3	237.25	5	154.2	no	Cloudy	
28/09/2022	MW305	0958_MW305_220928	6.0-9.0	73.885	9	7.16	66.725		HydraSleeve		22.1	1.45	288.3	187.2	4.05	137.3	no	Cloudy	
28/09/2022	MW306																		



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: Stantec

Contact: [REDACTED]

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 20D101039

Cable length: 1m 20A100403

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	170.90 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 57.77
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 3 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µs/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (11H100544)	Check Temp NATA	Room Temp	18.9	-1	°C	NA	17.9	°C
pH (21K)	pH 7.00	375757	7.01	-1.30	mV	6.98	7.01	pH
pH (21K)	pH 4.00	378281	4.00	169.60	mV	3.97	4.00	pH
Conductivity (11H100544)	2764 µs/cm at 25°C	21/1012	2764	GLP	4.90	2742	2764	µs/cm
ORP (200408SIA605101)	Zobell A & B	22/0103	245	245	mV	240.1	241.2	mV
Zero DO (20B140053)	NaSO3 in distilled water	10175	0.0	NA	NA	0.6	0.0	%
100% DO (20B140053)	100% Air Saturation	Air	100.0	5.1	uA	104.9	100.0	%

Calibrated by: [REDACTED]

Calibration Date: 15-Sep-22

Next Due: 14-Mar-23



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: Stantec

Contact: [REDACTED]

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 20D101953

Cable length: 1m 20A100403

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	171.00 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 57.72
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 3 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	{min 4.31 uA - max 8.00 uA} Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature	Check Temp NATA	Room Temp	18.9	-0.1	°C	NA	18.8	°C
pH (21H)	pH 7.00	375757	7.01	-16.60	mV	7.01	7.01	pH
pH (21H)	pH 4.00	378281	4.00	154.40	mV	4.01	4.00	pH
Conductivity (20A100065)	2764 µS/cm at 25°C	21/1012	2764	GLP	5.06	2749	2764	µS/cm
ORP (200324SEN605102)	Zobell A & B	22/0103	243	243	mV	248.4	240.1	mV
Zero DO (20B140284)	NaSO3 in distilled water	10175	0.0	NA	NA	0.3	0.0	%
100% DO (20B140284)	100% Air Saturation	Air	100.0	5.26	uA	107.5	100.0	%

Calibrated by: [REDACTED]

Calibration Date: 15-Sep-22

Next Due: 14-Mar-23

Date of Bump Test	Site ID	Unit Brand/ Model	Ambient Air Oxygen Calibration	Zero Oxygen Solution Calibration	%	Standard Concentrations	Ambient Temperature (°C)	Bump Test Reading	Bump Test Readings within ±5%?	Comment	Test by (Name)	(Signature)
28/9/22	0958	YSI #20 D101039	100% Saturation? ☒ Y	0% Calibration? ☒ Y	N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N	15.0°C	pH 4.00: 3.95 pH 7.00: 7.08 EC: 1557	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	/		
28/9/22	0958	YSI #20 D101953	100% Saturation? ☒ Y	0% Calibration? ☒ Y	N NA	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N	15°C	pH 4.00: 4.05 pH 7.00: 6.96 EC: 1500	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) Y / N	/		
29/9/22	0958	YSI #20 D101039	100% Saturation? ☒ Y	0% Calibration? ☒ Y	N NA	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N	17°C	pH 4.00: 4.08 pH 7.00: 7.17 EC: 1592	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	/		
29/9/22	0958	YSI #20 D101953	100% Saturation? ☒ Y	0% Calibration? ☒ Y	N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N	16°C	pH 4.00: 4.06 pH 7.00: 6.94 Temp: EC: 1558	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	/		
6/10/22	0958	YSI #20 D101039	100% Saturation? ☒ Y	0% Calibration? ☒ Y	N NA	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N	15°C	pH 4.00: 4.08 pH 7.00: 7.02 Temp: EC: 1543	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	/		
		YSI #	100% Saturation? Y	0% Calibration? ☒ Y	N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? Y	0% Calibration? ☒ Y	N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? Y	0% Calibration? ☒ Y	N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			

APPENDIX

E

DATA QUALITY REVIEW



now



Data Quality Review PFAS Ongoing Monitoring Plan Post-winter 2022 Monitoring Event

This appendix reviews the Quality Assurance (QA) and Quality Control (QC) documentation. Quality assurance encompasses the actions, procedures, checks and decisions undertaken to ensure sample integrity and representativeness, and the reliability and accuracy of analysis results. The QA documentation should also include an indication of the Data Quality Objectives sought in relation to each significant action, test or process involved in the assessment.

QC activities measure the effectiveness of the QA procedures by undertaking testing, and then comparing results to previously established objectives. QC work will include the internal laboratory testing as well as results of QC samples submitted such as trip blanks and duplicates. The quality of the information and/or data is deemed satisfactory when the QC results demonstrate that agreed objectives have been met.

QA/QC Aspects	Evidence & Evaluation
QA Documentation	
Project Quality Plan/Work Plan and Data Quality Objectives	<p>The field investigation was carried out between the 28th September and 6th October 2022 and is generally in accordance with the proposed scope of work, as documented in the SAQP (PFAS OMP SAQP Gingin Satellite Airfield, Cardno, April 2022) issued to the client and in general compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i>, NEPM “<i>National Environment Protection (Assessment of Site Contamination) Measure</i>” and PFAS NEMP 2.0.</p> <p>A quality control program was implemented during the Investigation and the quality assurance procedures used have been reiterated in the report (PFAS OMP Post-winter 2022 Factual Report). In addition, a safety, health and environment work method statement (SHEWMS) was also prepared.</p> <p>The Data Quality Objectives were expressed in terms of the purpose of the assessment and the relevant assessment criteria.</p>
Data Representativeness	
Use of Composites	No Composites were used during the investigation
Holding Times	Chain of custody and laboratory reports provide evidence of holding times. Holding times were in compliance with required timeframes.
Verification of field procedures	<p>The methodology conducted during this investigation is documented in the body of the report and was in general conformance with the SAQP.</p> <p>Non-disposable equipment was decontaminated between sample locations.</p>
Laboratory Reports	<p>The following laboratory reports were considered for this data quality review:</p> <ul style="list-style-type: none"> ▪ ALS reports: EP2212566, EP2212584, EP2212637, EP2212667, EP2213053. ▪ Eurofins ARL report: 927653.

QA/QC Aspects

Evidence & Evaluation

Data Precision & Accuracy

QC sample Frequency

QC sample type	SAQP required frequency	Sample Collected
Blind duplicate	1 in 10 primary samples (10%)	6 for 54 groundwater samples (11.1%) 1 in 3 tap water samples (33%)
Interlab duplicate	1 in 10 primary samples (10%)	6 for 54 groundwater samples (11.1%) 1 in 3 tap water samples (33%)
Rinsate	1 per day/equipment	5 for 3 days (1-2 staff) (100%)
Field Blank	1 per day/field staff	5 for 3 days (1-2 staff) (100%)

The required QC frequency was achieved for all media sampled.

RPD Acceptance criteria

Magnitude of Results	Acceptable RPD range
< 10 x LOR	No limits
10 – 20 LOR	0% - 50%
> 20 x LOR	0% - 20%

QC Testing – Blind Duplicates (Primary Lab)

Groundwater

- Primary Groundwater Samples Analysed: 54
- Blind Duplicate Samples Analysed: 6

All RPDs were within acceptance criteria with the following exceptions:

- QC103 – PFHxS (42%), PFOS (40%)
- QC104 – PFHxS (23%), PFOS (28%)

These minor RPD exceedances are likely due to the low concentrations of analyte under review and are not considered to have impacted the reliability of the dataset.

Tap water

- Primary tap water Samples Analysed: 3
- Blind Duplicate Samples Analysed: 1

All RPDs were within acceptance criteria.

QC Testing – Interlab Duplicates (Secondary Lab)

Groundwater

- Primary Groundwater Samples Analysed: 54
- Interlab Duplicate Samples Analysed: 6

All RPDs were within acceptance criteria with the following exceptions:

- QC204 – PFHxS (52%)
- QC206 – PFHxS (74%), PFOS (24%), PFHxA (55%)
- QC207 – PFPeS (61%), PFHxS (53%), PFHpS (67%), PFOS (31%), PFPeA (27%), PFHxA (36%), PFHpA (61%), PFOA (39%)

Tap water

- Primary tap water Samples Analysed: 3
- Interlab Duplicate Samples Analysed: 1

All RPDs were within acceptance criteria with the following exception:

- QC202: PFHxS – 67%.

These exceedances are likely due the difference of methodologies between the primary and secondary laboratories and the low concentrations of analytes under review. The primary samples reported higher concentrations therefore the results reported on are considered conservative. This is not considered to have impacted the reliability of the dataset.

QA/QC Aspects	Evidence & Evaluation
Field Blanks	Field Blanks were collected at a rate of one per fieldwork team per day. All field blank samples tested reported analytes below the laboratory limit of reporting.
Laboratory Internal QC	<p>Evidence of the laboratories internal QC testing is present and complete in the reports. ALS (Primary) performed internal QC with adequate testing and satisfactory results for method blank, matrix spikes, laboratory control samples and laboratory duplicates.</p> <p>All Method Blank results were within acceptable range.</p> <p>All Matrix Spikes reported recoveries within the acceptance range of 70% to 130% with the exception of the following:</p> <ul style="list-style-type: none"> ▪ EP2212566: <ul style="list-style-type: none"> - Sample ID MW402: PFHxS matrix spike recovery not determined due to the background concentrations exceeding 4x spike level. <p>The following quality control samples frequency outliers was reported:</p> <ul style="list-style-type: none"> ▪ EP2212637: <ul style="list-style-type: none"> - Laboratory Duplicates: PFAS by LCMSMS, expected frequency of 10% not achieved. <p>The above exceptions is not considered to affect the reliability of the dataset.</p>
Laboratory Method Detection Limit	Laboratory reports indicate the method detection limits were generally lower than the respective assessment criteria.
NATA endorsement of laboratory reports	<p>Laboratory reports were stamped with the NATA endorsement stamp and signature.</p> <p>ALS Accreditation No. 825</p> <p>Eurofins ARL Accreditation No. 1261</p>
Calibration of Field Equipment	<p>All equipment used during the investigation was calibrated by the supplier prior to use and daily readings of reference solutions (bump tests) were completed.</p> <p>The equipment calibration certificates, and daily field bump test records are provided in Appendix D.</p>
Decontamination and Equipment Blanks	Rinsate blanks were collected at a rate of one per day per sampler when reusable equipment was used. All rinsate samples tested reported analytes concentrations below the laboratory LORs.
Data Comparability	
Standard Procedures	Fieldwork procedures are detailed in the SAQP and reports and are comparable for each phase of Investigation.
Qualified Personnel	Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.
Sample Integrity	Field Chain of Custody/Laboratory request forms can be found in Appendix C.
Data Completeness	
Completeness of test program	The scope of work undertaken was generally consistent with the SAQP.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection process and therefore, the data set used as the basis for groundwater and tap water investigation is considered valid and complete.

PFAS OMP Quarterly Monitoring Event Factual Report

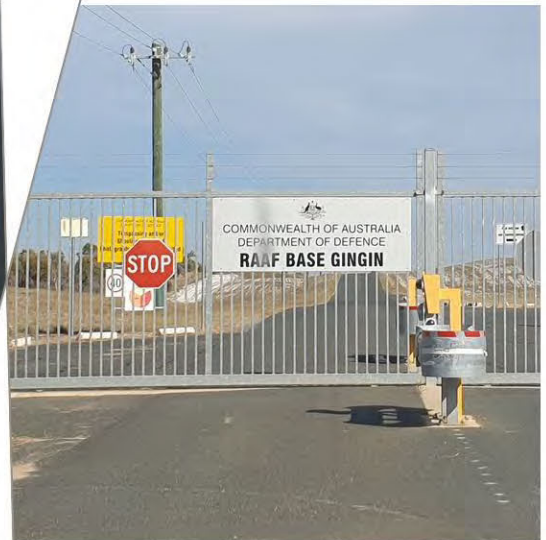
January 2023

Gingin Satellite Airfield

304700525

Prepared for
Department of Defence

15 February 2023



 **Cardno**

now

 **Stantec**

Contact Information

Stantec Australia Pty Ltd

Cardno, now Stantec
ABN 77 009 119 000

11 Harvest Terrace
West Perth WA 6005
Australia

www.cardno.com

Phone +61 8 9273 3888

Fax +61 8 9486 8664

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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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Technical Terms & Abbreviations

AFFF	Aqueous Film-Forming Foam
AHD	Australian Height Datum
AS	Australian Standard
BGL	Below Ground Level
COC	Chain of Custody
CSM	Conceptual Site Model
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
DWER	Department of Water and Environmental Regulation
EC	Electrical Conductivity
EPA	Environment Protection Authority
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
HEPA	Heads of Environmental Protection Authority
LOR	Limit of Reporting
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEMP	National Environmental Management Plan
NEPM	National Environmental Protection Measure
ORP	Oxidation Reduction Potential
PSI	Preliminary Site Investigation
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan
SWL	Standing Water Level
TOC	Top of Casing

Chemical Names

DO	Dissolved Oxygen
PFAS	Per- and Poly-fluoroalkyl Substances
PFHxS	Per-fluoro-hexane Sulphonate
PFOA	Per-fluoro-octanoic Acid
PFOS	Per-fluoro-octane Sulfonate
TDS	Total Dissolved Solids (salinity of water)

Units

ha	Hectares
mAHD	Metres relative to the AHD
mBGL	Metres Below Ground Level
mbTOC	Metres below Top of Casing
mg/L	Milligram per Litre
mV	millivolt
μ S/cm	Micro Siemens per Centimetre (Electrical Conductivity – Water)
μ g/L	Micrograms per Litre

Site Specific

AIR	Annual Interpretive Report
OMP	Ongoing Monitoring Plan
PMAP	PFAS Management Area Plan
RAAF	Royal Australian Air Force

1 Introduction

1.1 Background

Cardno, now Stantec (“Cardno”) was engaged by the Australian Department of Defence (“the Client”) to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) at Royal Australian Air Force (RAAF) Gingin Satellite Airfield (“the site”). The site is located in Yeal, Western Australia and is displayed in Figure 1 of Appendix A.

The OMP was carried out in accordance with the scope and limitations presented in Cardno’s Sampling and Analysis Quality Plan (SAQP):

- > Cardno, January 2023, Reference: DEF19009, ‘PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Gingin Satellite Airfield’ Rev 7.

The SAQP was reviewed prior to the sampling event and no changes relevant to the quarterly monitoring event were required.

For the purposes of this report:

- > The Management Area was defined as Gingin Satellite Airfield (Figure 1, Appendix A).
- > The Monitoring Area was defined as comprising the site, plus the parcel of Crown Land that represents the Yeal Swamp Nature Reserve – an area that surrounds much of the southern, western and northern extent of the Base. The lateral extents of the Monitoring Area are aligned with the boundary of the adjoining Crown Lands property (Figure 1, Appendix A).

1.2 Purpose & Objectives

The objective of the OMP is to assess the changes in the nature and extent of PFAS within the environment, specifically where there is an identified potentially elevated risk to a receptor or a potential future risk to a receptor associated with Defence’s historical use of legacy Aqueous Film Forming Foam (AFFF).

The purpose of this PFAS OMP Factual Report is to provide an up-to-date status of the condition of the site as it is currently understood in relation to the most recent monitoring event.

The objectives of the report are:

- > To provide a succinct summary of the January 2023 monitoring event and provision of analytical results with supporting tables and figures.
- > To provide confirmation of the current understanding of risk.
- > To provide supporting data for the assessment of management actions, where relevant.

1.3 Relevant Guidelines

This assessment has been undertaken in general accordance with applicable industry standards for a site investigation for the purpose, objectives and scope identified in this report. These standards are set out in:

- > National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended 2013) (ASC NEPM).
- > Heads of Environmental Protection Authority’s Australia and New Zealand (HEPA), January 2020, *PFAS National Environmental Management Plan* (NEMP) 2.0.
- > Standards Australia 1998. AS/NZ 5667:1998 *Water quality – sampling*.
- > Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

- > Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*¹.
- > Department of Defence, Department of Energy, 2018, *Quality System Manual Schedule B15*.
- > U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process* (EPA QA/G-4).
- > USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8).
- > National Health and Medical Research Council (NHMRC), August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.

2 Scope of Work

Cardno carried out the tasks detailed in the following sections in order to satisfy the purpose and objectives of this assessment.

2.1 Groundwater Monitoring

Sampling of selected groundwater bores was performed in general accordance with the SAQP (Cardno, 2023), applying methods set out in section 3.1 of this report. The groundwater bores monitored as part of the OMP quarterly monitoring event are presented in Table 2-1, and are shown on Figure 2, Appendix A.

Table 2-1 Groundwater Monitoring Locations

Monitoring Area	Location ID
On-site Abstraction wells	MW401; MW402
Off-site wells - South	MW141S, MW142S; MW143S; MW403
Off-site Abstraction wells ⁽¹⁾	Pinjar Production P140, Pinjar Production P145.

Note: (1) These are Water Corporation production wells being sampled by the Water Corporation.

2.2 Tap water Monitoring

Water samples were collected from the tap water monitoring locations listed in Table 2-2 in accordance with the SAQP (Cardno, 2023) and sampling methodology detailed in section 3.2. The tap water monitoring locations are shown on Figure 2, Appendix A.

Table 2-2 Tap water Monitoring Locations

Monitoring Area	Location ID
On-site	POT102; POT103; POT104.

2.3 Data Management

All the data included in the report has been collected, uploaded and reviewed according to the data management requirements of the *Defence Contamination Management Manual* (DCMM Annex L), including:

- > The sample naming convention detailed in the DCMM Annex L was used in the field;
- > All field data collected was uploaded to the ESdat database;
- > Laboratory data was uploaded and approved; and
- > QA/QC data was reconciled.

¹ It is noted that the site is located on Commonwealth Land and is regulated under the Commonwealth environmental legislation, the State based DWER guidelines are relevant for the sampling of off-site private properties and waterways.

2.4 Deviations from the OMP SAQP

The following deviation from the SAQP were reported:

- > Groundwater monitoring well MW143S was not sampled as this monitoring location was found dry. This has a moderate impact on the OMP as no data was collected for this offsite groundwater monitoring location.

3 Methodology

3.1 Groundwater Sampling Methodology

Groundwater monitoring was undertaken by no purge HydraSleeve® method as detailed in Table 3-1.

Table 3-1 Groundwater Sampling Method

Activity	Details
Well Gauging	Standing Water Level (SWL) was gauged in each well prior to sampling using an interface probe. All wells were measured against a surveyed mark at the top of the well casing.
Groundwater Field Parameters	<p>Groundwater field parameters were recorded prior to deployment of HydraSleeves® or pre-sample collection. The following field parameters were recorded using a water quality meter:</p> <ul style="list-style-type: none"> ▪ pH. ▪ electrical conductivity (EC). ▪ oxidation reduction potential (ORP). ▪ Dissolved oxygen (DO). ▪ Temperature. <p>Once field parameters have stabilised (as indicated by at least three consecutive measurements falling within +/- 10% of each other) measurement were recorded on field data records.</p> <p>All field instruments (e.g. water quality meter) were calibrated by the equipment supplier to optimise the accuracy of the measurements taken. Calibration certificates are provided in Appendix D.</p>
Deployment of HydraSleeve®	HydraSleeve® were deployed with top weight sample collection to begin at the lowest point.
Retrieval of HydraSleeve® (Sample Collection)	<p>HydraSleeve® sampling devices were left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment. Samples were collected via continuous pull method at a rate allowing the water to pass through the check valve into the sample sleeve.</p> <p>Samples were discharged immediately (minimise changes in chemistry) via discharge tube.</p> <p>Following sampling, HydraSleeve® were deployed in preparation for the next OMP monitoring event using the same string for consistency between event (same depth of sampling i.e. within screen).</p>
Decontamination procedure	<p>Dedicated HydraSleeve® were used at each groundwater bore thus removing the need for decontamination.</p> <p>All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.</p>
Sample identification, preservation transport and holding times	<p>Each sample bottle was pre-labelled by the laboratory with a unique barcode.</p> <p>Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under Chain of Custody (CoC) documentation.</p> <p>Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).</p>

Activity	Details
Laboratory Testing	<p>Groundwater samples were submitted for the following analysis:</p> <ul style="list-style-type: none"> Full PFAS analytical suite (refer to the SAQP for full list of analytes). <p>The primary laboratory was ALS Global Laboratories (Perth), and the secondary laboratory (quality control) was Eurofins ARL (Perth). Both laboratories are NATA-accredited for the parameters tested. Copies of the NATA stamped laboratory reports and Chain of Custody documentation are included in Appendix C.</p>

3.2 Tap water Sampling Methodology

Water samples from abstraction wells and taps were collected via the 'first flush' sampling method. The primary objective of the 'first flush' sampling method is to collect water representative of the user, who may not purge the water line.

Field parameters (pH, temperature, EC, ORP and DO) were recorded post sampling collection via flow cell, and samples were analysed for the same analytical suite as the groundwater samples.

3.3 Quality Control / Quality Assurance

A critical aspect of site assessments is the demonstration of the quality of the data used as the basis for the assessment. This is achieved through a Data Validation process which includes a review of the following data quality indicators, as described in the SAQP:

- > QA documentation.
- > Bias.
- > Data Representativeness.
- > Data Precision & Accuracy.
- > Laboratory Performance.
- > Data Comparability.
- > Data Set Completeness.

A detailed review of these aspects has been undertaken, the results of which are presented in Appendix E. The review indicates no significant systematic errors in the data collection process for groundwater and tap water and therefore, the data set used as the basis for this assessment is considered valid and complete.

3.4 Assessment Criteria

3.4.1 Groundwater and Tap water

The adopted assessment criteria for groundwater and tap water are detailed in Table 3-2.

Table 3-2 Criteria for Groundwater and Tap water

Exposure Scenario	Adopted Assessment Criteria		
	PFHxS / PFOS µg/L	PFOA	Guidance
Human Health - Drinking Water Quality Guideline	0.07	0.56	HEPA 2020
Human Health – Recreational Use Guideline	2.0	10	HEPA 2020

4 Field Observations and Results

4.1 General Site Observations

No weather event or site activities that could have impacted the sampling or results were observed during the Q1 2023 monitoring event. The maximum temperature recorded on the day of monitoring was 27.3°C.

4.2 Groundwater

4.2.1 Summary of Field Observations

4.2.1.1 Physicochemical parameters

Stabilised physicochemical parameters, water colour and turbidity observations recorded during the groundwater and tap water sampling event are presented in field sampling records, included in Appendix D. No visual or olfactory evidence of contamination was recorded.

Groundwater condition was fresh [total dissolved solids (TDS) ranging from 223 mg/L (MW401) to 600 mg/L (MW402)], and slightly acidic to neutral [pH ranging 6.17 (MW402) to 7.44 (MW401)]. Groundwater temperature was on average 24.5°C, and DO readings mostly indicate aerobic groundwater condition [DO ranging from 1.47 mg/L (MW402) to 4.5 mg/L (MW142S)]. Field parameters were generally consistent with the previous monitoring events.

4.2.1.2 Groundwater gauging

Groundwater elevation was recorded from 52.35 mAHD (MW403) to 63.8 mAHD (MW141S) which is consistent with historical data. Gauging records are presented in Appendix D.

4.2.2 Groundwater Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria. A summary of results exceeding the adopted criteria is presented in Table 4-1. Laboratory results have also been compared to available historical data in order to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 2 in Appendix A presents the groundwater monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-1 Summary of Groundwater Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	0.56 ²	0.07 (MW402)	5	0
Sum of PFOS and PFHxS	MW402, MW141S	0.07 ²	1.59 (MW402)	5	2

Notes:

1. Non-inclusive of quality control samples
2. PFAS NEMP guideline value for human health – drinking water

Findings are summarised as follows:

- > No new exceedances of guideline values or first-time detection of PFOA or Sum of PFOS and PFHxS were reported at any groundwater sampling locations during the January 2023 quarterly monitoring event.
- > Two out of five groundwater samples (MW141S, MW402) reported Sum of PFOS and PFHxS concentrations above the drinking water guideline value. This is consistent with previous monitoring results.
- > The Department of Defence has been advised that the Water Corporation will continue to sample for PFAS at production bores Pinjar bore 140 (Superficial aquifer) and Pinjar bore 145 (Leederville aquifer) on a quarterly basis.

4.3 Tap water

4.3.1 Summary of Field Observations

Stabilised physicochemical parameters and observations recorded during the tap water sampling event are presented in field sampling records, included in Appendix D. No visual or olfactory evidence of contamination was recorded.

Tap water was fresh [TDS ranging from 694 mg/L (POT103) to 741 mg/L (POT102)], and near neutral [pH ranging 6.49 to 6.95]. Tap water temperature was on average 31.6°C. Field parameters were generally consistent with the previous monitoring events.

4.3.2 Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria. A summary of results exceeding the adopted criteria is presented in Table 4-2. Laboratory results have also been compared to available historical data in order to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 2 in Appendix A presents the tap water monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-2 Summary of Tap Water Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	0.56 ²	0.02 (all locations)	3	0
Sum of PFOS and PFHxS	POT102, POT103, POT104	0.07 ²	0.30 (POT103)	3	3

Notes:

1. Non-inclusive of quality control samples
2. PFAS NEMP guideline value for human health – drinking water

Findings are summarised as follows:

- > No first-time detection of PFOA or Sum of PFOS and PFHxS were reported for the tap water locations during the January 2023 quarterly monitoring event.
- > All three tap water samples reported Sum of PFOS and PFHxS concentrations above the drinking water guideline value but below the recreational use value, which is similar to previous monitoring events.
- > All tap water samples reported a detectable concentration of PFOA (i.e. above laboratory LOR) but below the adopted assessment criteria.

4.4 Changes to the Monitoring Network Condition

No change to the monitoring network condition has occurred since the last monitoring event.

5 Summary and Conclusions

Cardno undertook the January 2023 quarterly groundwater and tap water monitoring event at Gingin Satellite Airfield as part of the PFAS OMP. Groundwater sampling and testing was undertaken at three (3) monitoring wells off-site, two on-site abstraction wells and three on-site taps. One groundwater monitoring well couldn't be sampled as this well was found to be dry (MW143S).

The groundwater laboratory results reported the following:

- > Of the five (5) groundwater samples tested, Sum of PFOS and PFHxS (MW402 and MW141S) reported an exceedance of the HEPA (2020) drinking water guideline value.
- > No exceedances of the guideline values for PFOA were reported for the groundwater samples.
- > No first-time detection or new exceedance of guideline values were reported for the quarterly groundwater monitoring locations.

The tap water laboratory results reported the following:

- > All three samples tested reported Sum of PFOS and PFHxS concentrations above the drinking water criteria but below the recreational use criteria, which is similar to the previous monitoring events.
- > All samples reported PFOA concentrations above the laboratory LOR but below the adopted assessment criteria.
- > No first-time detection or new exceedance of guideline values were reported for the tap water monitoring locations.

The next OMP sampling event for Gingin Satellite Airfield will be the biannual monitoring event (post summer 2023), scheduled for April 2023. An Annual Interpretive Report will be prepared for the August 2021 – July 2022 monitoring period.

6 References

General References

1. Australian Standard AS 4482-2005 *Guide to the investigation and sampling of sites with potentially contaminated soils, Part 1 – Non-volatile and semi-volatile compounds*.
2. Australian Standard AS 4482-1999 *Guide to the investigation and sampling of sites with potentially contaminated soils, Part 2 – Volatile substances*.
3. *Australian and New Zealand Guidelines (ANZG) for fresh and marine water quality*, 2018.
4. *Contaminated Sites Act 2003*, Western Australia.
5. Department of Defence, July 2018 amended June 2021, *Contamination Management Manual*, Annex L Guidance on Data Management.
6. Department of the Environment and Energy (2017) in the *National Greenhouse and Energy Reporting Scheme Measurement Technical Guidelines for the Estimation of Emissions by Facilities in Australia*.
7. Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*.
8. Department of Water and Environment Regulation (DWER), 2018, *Perth Groundwater Atlas*, (<https://maps.water.wa.gov.au/#/webmap/gwm>).
9. Environmental Protection Agency (United States EPA), November 2002, Reference: EPA/240/R-02/004, *Guidance on Environmental Data Verification and Data Validation*.
10. The Heads of EPAs Australia and New Zealand (HEPA; 2020) *PFAS National Environmental Management Plan (NEMP) 2.0*, January 2020.
11. National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended), registered May 2013.
12. National Health and Medical Research Council (NHMRC) (2011 – updated 2022) *National Water Quality Management Strategy Australian Drinking Water Guidelines 6*, September 2022.
13. NHMRC, August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.
14. Standards Australia/Standards New Zealand (1998) AS5667.1:1998 *Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*.
15. U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process* (EPA QA/G-4).
16. USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8).

Site Specific References

17. Cardno, January 2023, *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan*. Rev.7.
18. Cardno, April 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2020*.
19. Cardno, December 2020, *PFAS OMP, Quarterly Monitoring Factual Report - August 2020*.
20. Cardno, December 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2020*.
21. Cardno, May 2021, *PFAS OMP Quarterly Monitoring Factual Report - January 2021*.
22. Cardno, April 2021, *PFAS OMP 2020 Annual Interpretive Report, Gingin Satellite Airfield*.
23. Cardno, August 2021, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2021*.
24. Cardno, August 2021, *PFAS OMP Quarterly Monitoring Factual Report – July 2021*.
25. Cardno, November 2021, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2021*.
26. Cardno, April 2022, *PFAS OMP Quarterly Monitoring Factual Report – January 2022*.
27. Cardno, August 2022, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2022*.
28. Cardno, October 2022, *PFAS OMP Quarterly Monitoring Factual Report – July 2022*.
29. Cardno, October 2022, draft *PFAS OMP 2021 Annual Interpretive Report, Gingin Satellite Airfield*.
30. Cardno, December 2022, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2022*.
31. Department of Defence, 2018a, *Gingin Satellite Airfield PFAS Ongoing Monitoring Plan*.
32. Department of Defence, 2018b, *Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan*.
33. Jacobs, 2018a, *Preliminary Conceptual Site Model - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0001).

34. Jacobs, 2018b, *Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0002).
35. Jacobs, 2018c, *Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-003).
36. Jacobs, 2018d, *Tier 2 Human Health Risk Assessment – Offsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0005).
37. Jacobs, 2018e, *Tier 3 Human Health Risk Assessment – Onsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0006).
38. Jacobs, 2019, *PFAS Ongoing Groundwater Monitoring Report* (No. IS219200-0000-NP-RPT-0008).

APPENDIX

A

FIGURES



now





Legend

 Site Boundary / Management Area

 Monitoring Area

FIGURE 1
1:60,000 Scale at A3

Metres

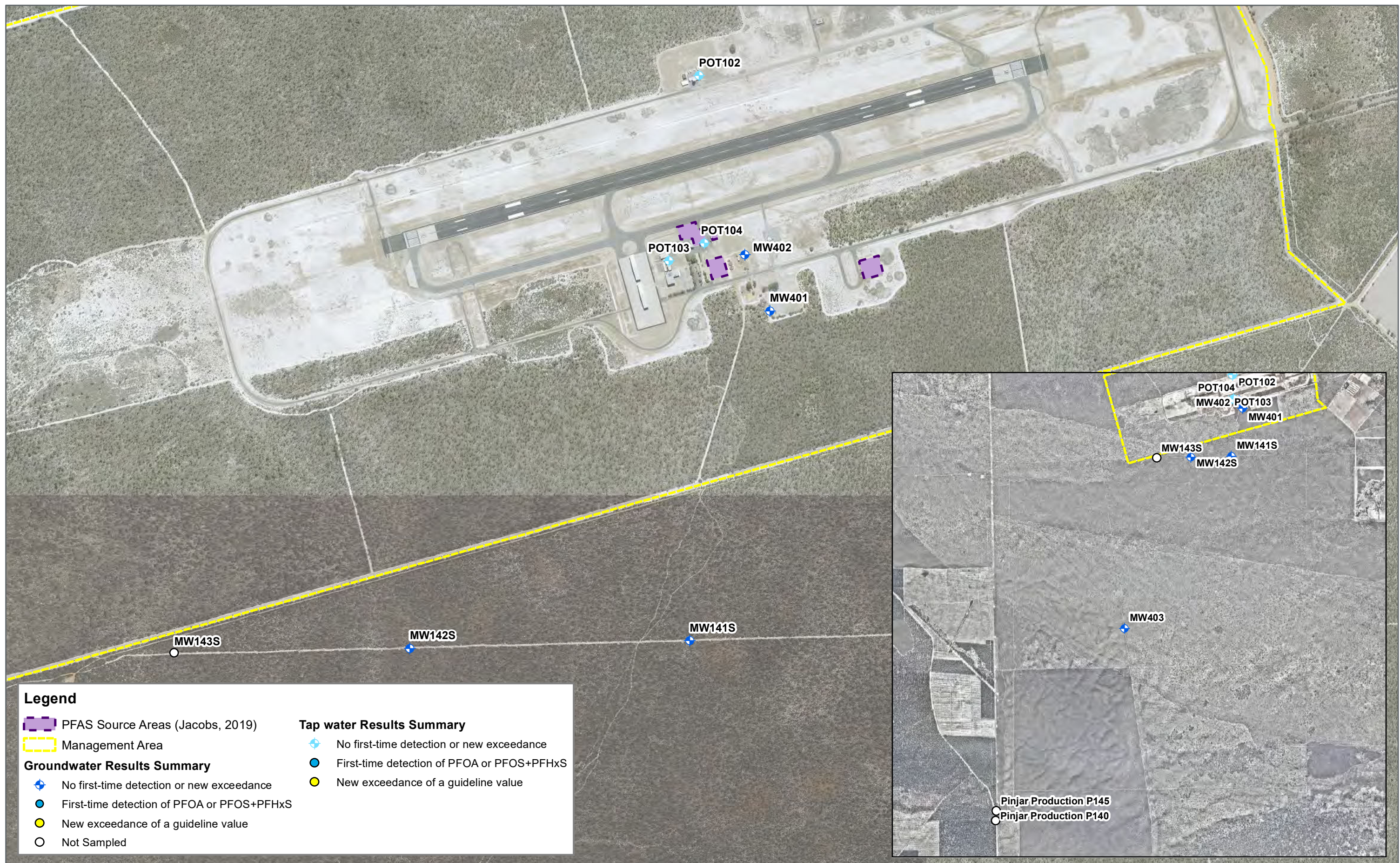
0 1,000 2,000

Site Location

Q1 2023 QUARTERLY SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-02-15 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-001_RegionalLocation 02.mxd
Aerial Imagery Supplied by Nearmap



APPENDIX

B

DATA ASSESSMENT TABLES



now



Table B1 - Analytical Results

	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids										
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)
	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
LOR - Limit of Reporting	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
PFAS NEMP 2020 Drinking Water											0.56						
PFAS NEMP 2020 Recreational Water											10						

Location Code	Date	Field ID	Sample Type	Lab Report No.																	
	11/01/2023	0958_QC301_230111	Rinsate	EP2300271	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
	11/01/2023	0958_QC401_230111	Field Blank	EP2300271	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
MW141S	11/01/2023	0958_MW141S_230111	Normal	EP2300271	0.02	0.02	0.19	<0.02	0.13	<0.02	<0.1	<0.02	0.04	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
MW142S	11/01/2023	0958_MW142S_230111	Normal	EP2300271	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
MW401	11/01/2023	0958_MW401_230111	Normal	EP2300271	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
MW401	11/01/2023	0958_QC102_230111	Field Duplicate	EP2300271	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
MW401	11/01/2023	0958_QC202_230111	Interlab Duplicate	955489	<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
MW402	11/01/2023	0958_MW402_230111	Normal	EP2300271	0.11	0.14	0.99	0.09	0.60	<0.02	<0.1	0.04	0.19	0.03	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
MW403	11/01/2023	0958_MW403_230111	Normal	EP2300271	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
POT102	11/01/2023	0958_POT102_230111	Normal	EP2300271	0.02	0.02	0.16	<0.02	0.11	<0.02	<0.1	0.03	0.15	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
POT103	11/01/2023	0958_POT103_230111	Normal	EP2300271	0.02	0.02	0.18	<0.02	0.12	<0.02	<0.1	0.03	0.15	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
POT103	11/01/2023	0958_QC103_230111	Field Duplicate	EP2300271	0.02	0.03	0.18	<0.02	0.12	<0.02	<0.1	0.03	0.15	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05
POT103	11/01/2023	0958_QC203_231101	Interlab Duplicate	955489	0.02	0.02	0.15	0.01	0.10	<0.01	0.06	0.05	0.14	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
POT104	11/01/2023	0958_POT104_230111	Normal	EP2300271	0.02	0.03	0.17	<0.02	0.12	<0.02	<0.1	0.03	0.16	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05

Environmental Standards

HEPA, January 2020, PFAS NEMP 2020 Drinking Water

HEPA, January 2020, PFAS NEMP 2020 Recreational Water

Notes:

First-time detection of PFOA or PFOS+PFHxS

New Exceedance of guideline value

Table B1 - Analytical Results

	PFAS - (n:2) Fluorotelomer Sulfonic Acids				PFAS - Perfluoroalkyl Sulfonamides							PFAS		
	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	Sum of PFHs and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS
	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
LOR - Limit of Reporting	0.01	0.05	0.01	0.01	0.02	0.05	0.02	0.05	0.05	0.02	0.05	0.01	0.01	0.01
PFAS NEMP 2020 Drinking Water												0.07		
PFAS NEMP 2020 Recreational Water												2		

Location Code	Date	Field ID	Sample Type	Lab Report No.														
	11/01/2023	0958_QC301_230111	Rinsate	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
	11/01/2023	0958_QC401_230111	Field Blank	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW141S	11/01/2023	0958_MW141S_230111	Normal	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.32	0.39	0.41
MW142S	11/01/2023	0958_MW142S_230111	Normal	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW401	11/01/2023	0958_MW401_230111	Normal	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW401	11/01/2023	0958_QC102_230111	Field Duplicate	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW401	11/01/2023	0958_QC202_230111	Interlab Duplicate	955489	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.1
MW402	11/01/2023	0958_MW402_230111	Normal	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.59	2.03	2.26
MW403	11/01/2023	0958_MW403_230111	Normal	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
POT102	11/01/2023	0958_POT102_230111	Normal	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.27	0.49	0.51
POT103	11/01/2023	0958_POT103_230111	Normal	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.30	0.52	0.54
POT103	11/01/2023	0958_QC103_230111	Field Duplicate	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.30	0.52	0.55
POT103	11/01/2023	0958_QC203_231101	Interlab Duplicate	955489	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.25	0.55	0.58
POT104	11/01/2023	0958_POT104_230111	Normal	EP2300271	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.29	0.52	0.55

Environmental Standards

HEPA, January 2020, PFAS NEMP 2020 Drinking Water

HEPA, January 2020, PFAS NEMP 2020 Recreational Water

Notes:

First-time detection of PFOA or PFOS+PFHxS

New Exceedance of guideline value

Lab Report Number	Unit	LOR	Date	11/01/2023	11/01/2023	RPD	11/01/2023	11/01/2023	RPD	11/01/2023	11/01/2023	RPD	11/01/2023	11/01/2023	RPD
			Field ID	0958_MW401_230111	0958_QC102_230111		0958_MW401_230111	0958_QC202_230111		0958_POT103_230111	0958_QC103_230111		0958_POT103_230111	0958_QC203_231101	
			Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water	
			Lab Report Number	EP2300271	EP2300271		EP2300271	955489		EP2300271	EP2300271		EP2300271	955489	
PFAS - Perfluoroalkyl Sulfonic Acids															
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.02	0.02	0	0.02	0.02	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.02	0.03	40	0.02	0.02	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.01	0	0.18	0.18	0	0.18	0.15	18
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	0.01	0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.01	0	0.12	0.12	0	0.12	0.10	18
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
PFAS - Perfluoroalkyl Carboxylic Acids															
Perfluorobutanoic acid (PFBA)	µg/L	0.05		<0.1	<0.1	0	<0.1	<0.05	0	<0.1	<0.1	0	<0.1	0.06	0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.03	0.03	0	0.03	0.05	50
Perfluorohexanoic acid (PFHxA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	0.15	0.15	0	0.15	0.14	7
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	0.01	0
Perfluorooctanoic acid (PFOA)	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.01	0	0.02	0.02	0	0.02	0.02	0
Perfluorononanoic acid (PFNA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorodecanoic acid (PFDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorotridecanoic acid (PFTTrDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
PFAS - (n:2) Fluorotelomer Sulfonic Acids															
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
PFAS - Perfluoroalkyl Sulfonamides															
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
PFAS															
Sum of PFHxS and PFOS	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.01	0	0.30	0.30	0	0.30	0.25	18
Sum of PFAS (WA DER List)	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.05	0	0.52	0.52	0	0.52	0.55	6
Sum of PFAS	µg/L	0.01		<0.01	<0.01	0	<0.01	<0.1	0	0.54	0.55	2	0.54	0.58	7

*RPDs have only been considered where a concentration is greater than 1 times the LOR.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each LOR multiplier range are: No Limit (1 - 10 x LOR); 50 (10 - 20 x LOR); 20 (> 20 x LOR))
***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

APPENDIX

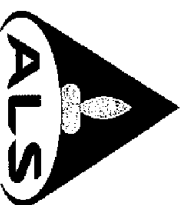
C

LABORATORY CERTIFICATES OF ANALYSIS



now





ALS Use Only

Custody Document for Submissions via ALS Compass App

Project: WA-0958-PEABOTP-23 Client: STANTEC

Project Manager:
Phone:

ALS Compass COC Reference: 46547

Samples: 12

Sampler:
Phone:

Turnaround Requirements: Standard

Urgent

Special Instructions:

--	--	--	--

Custody:

Relinquished by:	Received by:	Relinquished by:	Received by:
<div>Date / Time: <u>11/01/23</u></div>	<div>Date / Time: <u>220pm 11/1</u></div>	<div>Date / Time:</div>	<div>Date / Tin</div>
<div>Environmental Division Perth Work Order Reference EP2300271</div> <div></div> <div>Telephone : +61-8-9406 1301</div>			

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFCASCOMP_23

SITE: Gingin GW - Q1 2023

ORDER NO: pfas-comp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY139/19 B

/ ES2022MWHAUS0002

Yes No N/A
Yes No N/A
C

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MM401		11/01/2023 09:49 AM	WATER	ALS: 4 Non ALS: 0	No	X		Lab QC
002	0958_QC102		11/01/2023 09:50 AM	WATER	ALS: 2 Non ALS: 0	No	X		
003	0958_MM402		11/01/2023 09:58 AM	WATER	ALS: 2 Non ALS: 0	No	X		
004	0958_POT104		11/01/2023 10:07 AM	WATER	ALS: 2 Non ALS: 0	No	X		
005	0958_POT103		11/01/2023 10:19 AM	WATER	ALS: 2 Non ALS: 0	No	X		
006	0958_QC103		11/01/2023 10:20 AM	WATER	ALS: 4 Non ALS: 0	No	X		lab QC
007	0958_POT102		11/01/2023 10:30 AM	WATER	ALS: 2 Non ALS: 0	No	X		
008	0958_MM403		11/01/2023 11:30 AM	WATER	ALS: 2 Non ALS: 0	No	X		
009	0958_MM423		11/01/2023 12:17 PM	WATER	ALS: 2 Non ALS: 0	No	X		

CLIENT: MMHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFA5OMP_23

SITE: Gingin GW - Q1 2023

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

LABORATORY USE ONLY (Circle)

Biohazard Info:

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 comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MMHAUS0002

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFA5 Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_MW141S		11/01/2023 12:33 PM	WATER	ALS: 4 Non ALS: 0	No	X		lab QC
011	0958_QC301		11/01/2023 12:35 PM	WATER	ALS: 2 Non ALS: 0	No	X		
012	0958_QC401		11/01/2023 12:36 PM	WATER	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

(ALS) COC#: 46547

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFA_SOMP_23

SITE: Gingin GW - Q1 2023

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Yes	No	N/A
Yes	No	N/A

Random Sample Temperature on Receipt:

6

Other comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAS0002

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW401	HDPE (no PTFE)	20 mL	00350019041193	Grey	No	
001	0958_MW401	HDPE (no PTFE)	20 mL	00350019041138	Grey	No	
001	0958_MW401	HDPE (no PTFE)	20 mL	00350621000454	Grey	No	
001	0958_MW401	HDPE (no PTFE)	20 mL	00350621000379	Grey	No	
002	0958_QC102	HDPE (no PTFE)	20 mL	00350019041279	Grey	No	
002	0958_QC102	HDPE (no PTFE)	20 mL	00350019041253	Grey	No	
003	0958_MW402	HDPE (no PTFE)	20 mL	00350019041088	Grey	No	
003	0958_MW402	HDPE (no PTFE)	20 mL	00350019041155	Grey	No	
004	0958_POT104	HDPE (no PTFE)	20 mL	00350019041250	Grey	No	
004	0958_POT104	HDPE (no PTFE)	20 mL	00350019041152	Grey	No	
005	0958_POT103	HDPE (no PTFE)	20 mL	00350522042945	Grey	No	
005	0958_POT103	HDPE (no PTFE)	20 mL	00350522042808	Grey	No	
006	0958_QC103	HDPE (no PTFE)	20 mL	00350621016991	Grey	No	
006	0958_QC103	HDPE (no PTFE)	20 mL	00350621016860	Grey	No	
006	0958_QC103	HDPE (no PTFE)	20 mL	00350621016794	Grey	No	
007	0958_POT102	HDPE (no PTFE)	20 mL	00350621016662	Grey	No	
007	0958_POT102	HDPE (no PTFE)	20 mL	00350621016587	Grey	No	
008	0958_MW403	HDPE (no PTFE)	20 mL	00350522043086	Grey	No	
008	0958_MW403	HDPE (no PTFE)	20 mL	00350522042877	Grey	No	
009	0958_MW142S	HDPE (no PTFE)	20 mL	00350522042873	Grey	No	
010	0958_MW141S	HDPE (no PTFE)	20 mL	00350522042867	Grey	No	
010	0958_MW141S	HDPE (no PTFE)	20 mL	00350522062438	Grey	No	
010	0958_MW141S	HDPE (no PTFE)	20 mL	00350621000248	Grey	No	
010	0958_MW141S	HDPE (no PTFE)	20 mL	00350522042695	Grey	No	

CLIENT: MMHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSASOMP_23

SITE: Gingin GW - Q1 2023

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A
Yes No N/A
C

CONTACT PH:

QUOTE NO: SY139/19 B

SAMPLER MOBILE:

/ ES2022MMWHAUS0002

011	0958_QC301	HDPE (no PTFE)	20 mL	00350621016801	Grey	No	
011	0958_QC301	HDPE (no PTFE)	20 mL	00350621016884	Grey	No	
012	0958_QC401	HDPE (no PTFE)	20 mL	00350621016709	Grey	No	
012	0958_QC401	HDPE (no PTFE)	20 mL	00350621016707	Grey	No	

Total Bottle Count: ALS: 30, Non ALS: 0

**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : EP2300271**

Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: [REDACTED]	E-mail	: [REDACTED]
Telephone	: ----	Telephone	: [REDACTED]
Facsimile	: ----	Facsimile	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Page	: 1 of 2
Order number	: pfas-omp Gingin	Quote number	: ES2022MWH AUS0002 (SY/139/19 B)
C-O-C number	: 46547	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Gingin GW - Q1 2023		
Sampler	: [REDACTED] [REDACTED]		

Dates

Date Samples Received	: 11-Jan-2023 14:20	Issue Date	: 13-Jan-2023
Client Requested Due Date	: 24-Jan-2023	Scheduled Reporting Date	: 24-Jan-2023

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 8.2 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 12 / 12

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please see scanned COC for sample discrepancies: extra samples, samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- ### Summary of Sample(s) and Requested Analysis

Laboratory sample ID	Sampling date / time	Sample ID	Water PFAS -
EP2300271-001	11-Jan-2023 09:49	0958_MW401_230111	✓
EP2300271-002	11-Jan-2023 09:50	0958_QC102_230111	✓
EP2300271-003	11-Jan-2023 09:58	0958_MW402_230111	✓
EP2300271-004	11-Jan-2023 10:07	0958_POT104_230111	✓
EP2300271-005	11-Jan-2023 10:19	0958_POT103_230111	✓
EP2300271-006	11-Jan-2023 10:20	0958_QC103_230111	✓
EP2300271-007	11-Jan-2023 10:30	0958_POT102_230111	✓
EP2300271-008	11-Jan-2023 11:30	0958_MW403_230111	✓
EP2300271-009	11-Jan-2023 12:17	0958_MW142S_230111	✓
EP2300271-010	11-Jan-2023 12:33	0958_MW141S_230111	✓
EP2300271-011	11-Jan-2023 12:35	0958_QC301_230111	✓
EP2300271-012	11-Jan-2023 12:36	0958_QC401_230111	✓

Sample(s) have been received within the recommended holding times for the requested analysis.

- A4 - AU Tax Invoice (INV)	Email	
DERP LAB REPORTS		
- EDI Format - ESDAT (ESDAT)	Email	
- *AU Certificate of Analysis - NATA (COA)	Email	
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	
- Chain of Custody (CoC) (COC)	Email	
- EDI Format - ESDAT (ESDAT)	Email	
- EDI Format - XTab (XTAB)	Email	



Environmental

CERTIFICATE OF ANALYSIS

Work Order : **EP2300271**
Client : **STANTEC AUSTRALIA PTY LTD**
Contact : **[REDACTED]**
Address : **GROUND FLOOR 226 ADELAIDE TERRACE
PERTH 6000**
Telephone : **----**
Project : **WA_0958_PFASOMP_23**
Order number : **pfas-omp Gingin**
C-O-C number : **46547**
Sampler : **[REDACTED] [REDACTED]**
Site : **Gingin GW - Q1 2023**
Quote number : **SY/139/19 B**
No. of samples received : **12**
No. of samples analysed : **12**

Page : 1 of 11
Laboratory : Environmental Division Perth
Contact : **[REDACTED]**
Address : **26 Rigali Way Wangara WA Australia 6065**
Telephone : **[REDACTED]**
Date Samples Received : **11-Jan-2023 14:20**
Date Analysis Commenced : **19-Jan-2023**
Issue Date : **24-Jan-2023 15:31**



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 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
[REDACTED]	LCMS Coordinator	Sydney Organics, Smithfield, NSW



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.

- PFAS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW401_230111	0958_QC102_230111	0958_MW402_230111	0958_MW403_230111	0958_MW142S_230111 1
Sampling date / time				11-Jan-2023 09:49	11-Jan-2023 09:50	11-Jan-2023 09:58	11-Jan-2023 11:30	11-Jan-2023 12:17	
Compound	CAS Number	LOR	Unit	EP2300271-001	EP2300271-002	EP2300271-003	EP2300271-008	EP2300271-009	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.11	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.14	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.99	<0.01	<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.09	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.60	<0.01	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.04	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.19	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.03	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.07	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW401_230111	0958_QC102_230111	0958_MW402_230111	0958_MW403_230111	0958_MW142S_230111 1
Sampling date / time					11-Jan-2023 09:49	11-Jan-2023 09:50	11-Jan-2023 09:58	11-Jan-2023 11:30	11-Jan-2023 12:17
Compound	CAS Number	LOR	Unit	EP2300271-001	EP2300271-002	EP2300271-003	EP2300271-008	EP2300271-009	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	2.26	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	1.59	<0.01	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	2.03	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	84.7	94.0	93.3	102	86.6	
13C8-PFOA	----	0.02	%	91.0	101	96.4	108	101	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW141S_23011
1

Sampling date / time

11-Jan-2023 12:33

Compound

CAS Number

LOR

Unit

EP2300271-010

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.19	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.13	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----

EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.04	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW141S_23011
1

Sampling date / time

11-Jan-2023 12:33

Compound

CAS Number

LOR

Unit

EP2300271-010

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----

EP231P: PFAS Sums

Sum of PFAS	----	0.01	µg/L	0.41	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.32	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.39	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	98.7	----	----	----	----
13C8-PFOA	----	0.02	%	105	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0958_QC301_230111	0958_QC401_230111	----	----	----
Sampling date / time					11-Jan-2023 12:35	11-Jan-2023 12:36	----	----	----
Compound	CAS Number	LOR	Unit	EP2300271-011	EP2300271-012	-----	-----	-----	
				Result	Result	----	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	----	----	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----	



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_230111	0958_QC401_230111	----	----	----
Sampling date / time				11-Jan-2023 12:35	11-Jan-2023 12:36	----	----	----
Compound	CAS Number	LOR	Unit	EP2300271-011	EP2300271-012	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	94.5	106	----	----	----
13C8-PFOA	----	0.02	%	116	118	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				0958_POT104_23011 1	0958_POT103_23011 1	0958_QC103_230111	0958_POT102_23011 1	----
Sampling date / time				11-Jan-2023 10:07	11-Jan-2023 10:19	11-Jan-2023 10:20	11-Jan-2023 10:30	----
Compound	CAS Number	LOR	Unit	EP2300271-004	EP2300271-005	EP2300271-006	EP2300271-007	-----
				Result	Result	Result	Result	----
EP231A: Perfluoroalkyl Sulfonic Acids								
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	0.03	0.02	0.03	0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.17	0.18	0.18	0.16	----
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	0.12	0.12	0.12	0.11	----
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	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.03	0.03	0.03	0.03	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.16	0.15	0.15	0.15	----
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	0.02	0.02	0.02	0.02	----
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								
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	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0958_POT104_23011 1	0958_POT103_23011 1	0958_QC103_230111	0958_POT102_23011 1	----
Sampling date / time					11-Jan-2023 10:07	11-Jan-2023 10:19	11-Jan-2023 10:20	11-Jan-2023 10:30	----
Compound	CAS Number	LOR	Unit		EP2300271-004	EP2300271-005	EP2300271-006	EP2300271-007	-----
				Result	Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
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		0.55	0.54	0.55	0.51	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		0.29	0.30	0.30	0.27	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		0.52	0.52	0.52	0.49	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		96.4	101	97.5	101	----
13C8-PFOA	----	0.02	%		107	104	112	107	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Sub-Matrix: RINSATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP231A: Perfluoroalkyl Sulfonic Acids

(WATER) EP231B: Perfluoroalkyl Carboxylic Acids

(WATER) EP231C: Perfluoroalkyl Sulfonamides

(WATER) EP231D: (n:2) Fluorotelomer Sulfonic Acids

(WATER) EP231P: PFAS Sums

(WATER) EP231S: PFAS Surrogate

QUALITY CONTROL REPORT

Work Order	: EP2300271	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Jan-2023
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 19-Jan-2023
C-O-C number	: 46547	Issue Date	: 24-Jan-2023
Sampler	: [REDACTED]		
Site	: Gingin GW - Q1 2023		
Quote number	: SY/139/19 B		
No. of samples received	: 12		
No. of samples analysed	: 12		



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
[REDACTED]	LCMS Coordinator	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4823429)									
EP2300271-001	0958_MW401_230111	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2300271-010	0958_MW141S_230111	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.19	0.18	0.0	0% - 50%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.13	0.12	0.0	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4823429)									
EP2300271-001	0958_MW401_230111	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit



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 (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4823429) - continued									
EP2300271-010	0958_MW141S_230111	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.04	0.03	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit	
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4823429)									
EP2300271-001	0958_MW401_230111	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2300271-010	0958_MW141S_230111	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4823429)									
EP2300271-001	0958_MW401_230111	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2300271
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP_23



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4823429) - continued									
EP2300271-001	0958_MW401_230111	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2300271-010	0958_MW141S_230111	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4823429)									
EP2300271-001	0958_MW401_230111	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EP2300271-010	0958_MW141S_230111	EP231X: Sum of PFAS	----	0.01	µg/L	0.41	0.38	7.6	0% - 20%



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

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

Sub-Matrix: **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				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4823429)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	74.4	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	89.2	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	80.2	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	79.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	77.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	77.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4823429)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	100.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	81.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	84.4	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	76.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	83.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	77.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	77.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	95.6	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	101	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	91.4	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4823429)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	86.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	85.3	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	89.2	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	89.8	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	91.8	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	86.0	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	100	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4823429)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	84.8	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	77.6	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	88.2	67.0	138

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 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP_23



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				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4823429) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	101	71.4	144

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 4823429)							
EP2300271-006	0958_QC103_230111	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	75.0	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	82.6	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	75.2	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	79.2	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	72.0	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	78.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4823429)							
EP2300271-006	0958_QC103_230111	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	96.4	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	73.2	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	80.8	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	74.6	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	83.2	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	77.4	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	74.4	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	92.8	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	91.4	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	79.2	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	92.2	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4823429)							
EP2300271-006	0958_QC103_230111	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	84.8	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	72.8	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	72.3	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	78.1	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	82.9	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	87.4	65.0	136



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4823429) - continued							
EP2300271-006	0958_QC103_230111	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	95.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4823429)							
EP2300271-006	0958_QC103_230111	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	78.2	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	77.4	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	80.8	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	96.4	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2300271	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Jan-2023
Site	: Gingin GW - Q1 2023	Issue Date	: 24-Jan-2023
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 12
Order number	: pfas-omp Gingin	No. of samples analysed	: 12

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



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	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW401_230111, 0958_MW402_230111, 0958_POT103_230111, 0958_POT102_230111,	0958_QC102_230111, 0958_POT104_230111, 0958_QC103_230111, 0958_MW403_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	23-Jan-2023	10-Jul-2023	✔
HDPE (no PTFE) (EP231X) 0958_MW142S_230111, 0958_QC301_230111,	0958_MW141S_230111, 0958_QC401_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	24-Jan-2023	10-Jul-2023	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0958_MW401_230111, 0958_MW402_230111, 0958_POT103_230111, 0958_POT102_230111,	0958_QC102_230111, 0958_POT104_230111, 0958_QC103_230111, 0958_MW403_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	23-Jan-2023	10-Jul-2023	✔
HDPE (no PTFE) (EP231X) 0958_MW142S_230111, 0958_QC301_230111,	0958_MW141S_230111, 0958_QC401_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	24-Jan-2023	10-Jul-2023	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW401_230111, 0958_MW402_230111, 0958_POT103_230111, 0958_POT102_230111,	0958_QC102_230111, 0958_POT104_230111, 0958_QC103_230111, 0958_MW403_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	23-Jan-2023	10-Jul-2023	✔
HDPE (no PTFE) (EP231X) 0958_MW142S_230111, 0958_QC301_230111,	0958_MW141S_230111, 0958_QC401_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	24-Jan-2023	10-Jul-2023	✔

Page : 3 of 5
 Work Order : EP2300271
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP_23



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
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW401_230111, 0958_MW402_230111, 0958_POT103_230111, 0958_POT102_230111,	0958_QC102_230111, 0958_POT104_230111, 0958_QC103_230111, 0958_MW403_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	23-Jan-2023	10-Jul-2023	✔
HDPE (no PTFE) (EP231X) 0958_MW142S_230111, 0958_QC301_230111,	0958_MW141S_230111, 0958_QC401_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	24-Jan-2023	10-Jul-2023	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW401_230111, 0958_MW402_230111, 0958_POT103_230111, 0958_POT102_230111,	0958_QC102_230111, 0958_POT104_230111, 0958_QC103_230111, 0958_MW403_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	23-Jan-2023	10-Jul-2023	✔
HDPE (no PTFE) (EP231X) 0958_MW142S_230111, 0958_QC301_230111,	0958_MW141S_230111, 0958_QC401_230111	11-Jan-2023	19-Jan-2023	10-Jul-2023	✔	24-Jan-2023	10-Jul-2023	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

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



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



mgt

**Sydney**

Unit F3 - 6 Building F, 16 Mars Road, Lane Cove
Phone: +612 9900 8400
Email: enviro.syd@mgtlabmark.com.au

**Brisbane**

Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mgtlabmark.com.au

**Melbourne**

2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS				Page 1 of 1															
Company Name : Stantec Australia				Contact Name [REDACTED]				Purchase Order : 304700525				COC Number : 304700525 -01							
Office Address : 226 Adelaide Tce, Perth, WA 6000				PROJECT Number : WA_0958_PFSOMP_23				Eurofins mgt quote ID :											
Email for COC/SRN/Results [REDACTED]				PROJECT Name : WA_0958_PFSOMP_23				Data output format: PDF; ESDAT											
Special Directions & Comments : Please send ESdat files to [REDACTED] with the project No in the header file Please send invoice to [REDACTED] Eurofins mgt DI water batch number:				Some common holding times (with correct preservation). For further information contact the lab															
				Waters								Soils							
				BTEX, MAH, VOC								BTEX, MAH, VOC							
				TRH, PAH, Phenols, Pesticides								TRH, PAH, Phenols, Pesticides							
				Heavy Metals								Heavy Metals							
Analytes PFAS (28 analytes)				Mercury, CrVI								Mercury, CrVI							
				Microbiological testing								Microbiological testing							
				BOD, Nitrate, Nitrite, Total N								Anions							
				Solids - TSS, TDS etc								SPOCAS, pH Field and FOX, CrS							
				Ferrous iron								ASLP, TCLP							
				Containers:															
				1LP 250P 125P 1LA 40mL vial 125mL A Jar															
				Sample comments:															
				Relinquished By: Stantec				Laboratory Staff [REDACTED]				Turn around time				Method Of Shipment			
Date & Time : 11/01/2023				Date & Time : 13/01/23 13:15				1 DAY ☐ 2 DAY ☐ 3 DAY ☐				☒ Courier ☐ Hand Delivered ☐ Postal				15.3°C			
Signature:				Signature:				STANDARD ☒ Other:				Courier Consignment # :				Report number: 9SS489			

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Sample Receipt Advice

Company name: Stantec Australia Pty Ltd (WA)
Contact name: [REDACTED]
Project name: WA_0958_PFASOMP_23
Project ID: WA_0958_PFASOMP_23
Turnaround time: 5 Day
Date/Time received: Jan 13, 2023 1:15 PM
Eurofins reference: 955489

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.
- N/A 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:

[REDACTED] on phone : or by email: [REDACTED]

Results will be delivered electronically via email to [REDACTED] - [REDACTED]

Note: A copy of these results will also be delivered to the general Stantec Australia Pty Ltd (WA) email address.



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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Tel: +61 2 4968 8448
NATA# 1261 Site# 25079

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: WA_0958_PFASOMP_23
Project ID: WA_0958_PFASOMP_23

Order No.: 304700525
Report #: 955489
Phone: [REDACTED]
Fax: [REDACTED]

Received: Jan 13, 2023 1:15 PM
Due: Jan 20, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC202_230111	Jan 11, 2023		Water	L23-Ja0012466	X
2	0958_QC203_231101	Jan 11, 2023		Water	L23-Ja0012467	X
Test Counts						2

Stantec Australia Pty Limited
6F 226, Adelaide Terrace
Perth
WA 6000



NATA Accredited
Accreditation Number 2377
Site Number 2370

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:

Report **955489-W**
Project name **WA_0958_PFASOMP_23**
Project ID **WA_0958_PFASOMP_23**
Received Date **Jan 13, 2023**

Client Sample ID			0958_QC202_2 30111	0958_QC203_2 31101
Sample Matrix			Water	Water
Eurofins Sample No.			L23-Ja0012466	L23-Ja0012467
Date Sampled			Jan 11, 2023	Jan 11, 2023
Test/Reference	LOR	Unit		
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	0.06
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01	0.05
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	< 0.01	0.14
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.02
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	79	62
13C5-PFPeA (surr.)	1	%	71	54
13C5-PFHxA (surr.)	1	%	106	62
13C4-PFHpA (surr.)	1	%	112	65
13C8-PFOA (surr.)	1	%	125	71
13C5-PFNA (surr.)	1	%	102	59
13C6-PFDA (surr.)	1	%	78	40
13C2-PFUnDA (surr.)	1	%	66	33
13C2-PFDoDA (surr.)	1	%	59	20
13C2-PFTeDA (surr.)	1	%	36	11
Perfluoroalkyl sulfonamido substances				
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	91	15
D3-N-MeFOSA (surr.)	1	%	54	17

Client Sample ID			0958_QC202_2 30111	0958_QC203_2 31101
Sample Matrix			Water	Water
Eurofins Sample No.			L23-Ja0012466	L23-Ja0012467
Date Sampled			Jan 11, 2023	Jan 11, 2023
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonamido substances				
D5-N-EtFOSA (surr.)	1	%	60	21
D7-N-MeFOSE (surr.)	1	%	60	71
D9-N-EtFOSE (surr.)	1	%	58	11
D5-N-EtFOSAA (surr.)	1	%	52	28
D3-N-MeFOSAA (surr.)	1	%	52	32
Perfluoroalkyl sulfonic acids (PFASs)				
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	0.02
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 0.02
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.15
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.10
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	107	62
18O2-PFHxS (surr.)	1	%	100	67
13C8-PFOS (surr.)	1	%	68	54
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	90	46
13C2-6:2 FTSA (surr.)	1	%	58	97
13C2-8:2 FTSA (surr.)	1	%	61	67
13C2-10:2 FTSA (surr.)	1	%	49	33
PFASs Summations				
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	0.25
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	0.12
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	0.27
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	0.55
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	0.58

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Jan 16, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Jan 16, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Jan 16, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Jan 16, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Jan 13, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226,Adelaide Terrace
Perth
WA 6000

Project Name: WA_0958_PFASOMP_23
Project ID: WA_0958_PFASOMP_23

Order No.: 304700525
Report #: 955489
Phone: [REDACTED]
Fax: [REDACTED]

Received: Jan 13, 2023 1:15 PM
Due: Jan 20, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC202_230111	Jan 11, 2023		Water	L23-Ja0012466	X
2	0958_QC203_231101	Jan 11, 2023		Water	L23-Ja0012467	X
Test Counts						2

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to '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 prior to sample receipt deadlines as stated on the SRA.

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

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

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
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 a moisture has been determined on a solid sample the result is expressed on a dry 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 is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA)s							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)s							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	94			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	91			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	72			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	75			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	77			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	72			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	75			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	75			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	75			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	85			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	71			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	68			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	77			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	73			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	83			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	79			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	74			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	100			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)									
Perfluorobutanesulfonic acid (PFBS)			%	92			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	71			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	99			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	92			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	100			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	95			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	98			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	92			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	72			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	77			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	102			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	79			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)									
				Result 1					
Perfluorobutanoic acid (PFBA)	M23-Ja0014474	NCP	%	75			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Ja0014101	NCP	%	89			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Ja0014474	NCP	%	71			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Ja0014474	NCP	%	73			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M23-Ja0014474	NCP	%	72			50-150	Pass	
Perfluorononanoic acid (PFNA)	M23-Ja0014474	NCP	%	70			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M23-Ja0014474	NCP	%	76			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Ja0014474	NCP	%	70			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Ja0014474	NCP	%	80			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-Ja0014474	NCP	%	86			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Ja0014474	NCP	%	71			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	M23-Ja0014474	NCP	%	69			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Ja0014474	NCP	%	73			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Ja0014474	NCP	%	73			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Ja0014474	NCP	%	77			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Ja0014474	NCP	%	74			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Ja0014474	NCP	%	67			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Ja0014474	NCP	%	62			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M23-Ja0014474	NCP	%	63			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Ja0014474	NCP	%	71			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Ja0014474	NCP	%	66			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Ja0014474	NCP	%	61			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Ja0014474	NCP	%	68			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Ja0014474	NCP	%	64			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Ja0014101	NCP	%	66			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Ja0014474	NCP	%	65			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Ja0014474	NCP	%	72			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Ja0014474	NCP	%	75			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Ja0014474	NCP	%	79			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Ja0014474	NCP	%	77			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Ja0014102	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTriDA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M23-Ja0014102	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Ja0014476	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Ja0014476	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Sample Integrity

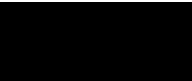
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	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:

 Analytical Services Manager
 Senior Analyst-PFAS



Business Unit Manager

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request

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APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES



now

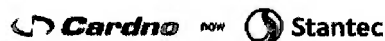


Table D - Groundwater and Tap water field records

Monitoring Date	Monitoring Location	Sample ID	Screen Interval	TOC (mAHD)	Well Depth (m)	SWL (mbTOC)	RWL (mAHD)	Other Observations	Sampling Method	Temp (°C)	DO (mg/L)	EC (us/Cm)	TDS (mg/L)	pH	Eh (mV)	QC Sample #	Odour	Colour
11/01/2023	MW141S	0958_MW141S_230111	13.5-16.5	74.36	16.5	10.565	63.795		HydraSleeve	20.7	1.85	557	392.2	6.39	76.9		no	Cloudy
11/01/2023	MW142S	0958_MW142S_230111	12.4-15.4	76.34	15.5	13.27	63.07		HydraSleeve	20.7	4.5	378.3	270.2	6.5	143.6		no	Yellow
11/01/2023	MW143S		14-18.5	75.81	18.5			Dry										
11/01/2023	MW401	0958_MW401_230111	NA	NA	NA				Bore pump/Tap	30.1	2.35	380.9	223	7.44	-105.2	QC102/202	no	Clear
11/01/2023	MW402	0958_MW402_230111	NA	NA	NA				Bore pump/Tap	30.5	1.47	1016	600	6.17	-166.7		no	Clear
11/01/2023	MW403	0958_MW403_230111	14-26	73.84	26.0	21.49	52.35		HydraSleeve	20.4	1.98	328	233.7	7.09	25		no	Clear

11/01/2023	POT102	0958_POT102_230111							Tap	29.6	4.64	1237	741	6.95	12.2		no	Clear
11/01/2023	POT103	0958_POT103_230111							Tap	36.2	2.53	1295	694	6.75	126.6	QC103/203	no	Clear
11/01/2023	POT104	0958_POT104_230111							Tap	29	5.01	1240	737	6.49	33.8		no	Clear

Date of Bump Test	Site ID	Unit Brand/ Model	Ambient Air Oxygen Calibration	Zero Oxygen Solution Calibration	Standard Concentrations	Ambient Temperature (°C)	Bump Test Reading	Bump Test Readings within ±5%?	Comment	Test by (Name)	(Signature)
11/01/23	0958	YSI # Cardno 4m	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N	25°C	pH 4.00: 4.12 pH 7.00: 7.05 EC: 1,545	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	Nil		
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			



Calibration Report

Multi-Parameter Water Quality Instrument

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 21G105325

Cable length: 4m (21F100778)

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	needs new spare batteries.
	Battery Saver	✓	automatically switches off after 30 mins
Connections	Condition	✓	
Cable	Condition	✓	
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	
pH millivolts for pH7 calibration range 0 mV ± 50 mV		✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	
pH slope		✓	
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	
Conductivity			
Condition		✓	
Temperature		✓	
Conductivity cell constant 5.0 ± 1.0 in GLP file		✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Calibration Point	Units	Instrument Readings				Units
				Before		After		
Temperature	Check Temp NATA		°C	NA				°C
pH 21G	pH 7.00	7.01	mV	6.93		7.04		pH
pH 21G	pH 4.00	4.00	mV	4.12		4.01		pH
Conductivity (21H100008)	276 µS/cm at 25°C	276	5.03	279.3		276.0		µS/cm
ORP (Reference check only) 21O	Zobell A & B	235	mV	240		235		mV
Zero DO (21G100131)	NaSO ₃ in distilled water	0.0	NA	0.0		0.0		%
100% DO (21G100131)	100% Air Saturation	100.0	uA	100		100		%

Calibrated by:

Calibration Date:

7/12/22

APPENDIX

E

DATA QUALITY REVIEW



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Data Quality Review PFAS Ongoing Monitoring Plan Q1 2023 Monitoring Event

This appendix reviews the Quality Assurance (QA) and Quality Control (QC) documentation. Quality assurance encompasses the actions, procedures, checks and decisions undertaken to ensure sample integrity and representativeness, and the reliability and accuracy of analysis results. The QA documentation should also include an indication of the Data Quality Objectives sought in relation to each significant action, test or process involved in the assessment.

QC activities measure the effectiveness of the QA procedures by undertaking testing, and then comparing results to previously established objectives. QC work will include the internal laboratory testing as well as results of QC samples submitted such as trip blanks and duplicates. The quality of the information and/or data is deemed satisfactory when the QC results demonstrate that agreed objectives have been met.

QA/QC Aspects	Evidence & Evaluation
QA Documentation	
Project Quality Plan/Work Plan and Data Quality Objectives	<p>The field investigation was carried out on the 11th January 2023 and is generally in accordance with the proposed scope of work, as documented in the SAQP (PFAS OMP SAQP Gingin Satellite Airfield, Cardno, January 2023) issued to the client and in compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i>, NEPM “National Environment Protection (Assessment of Site Contamination) Measure” and PFAS NEMP 2.0.</p> <p>A quality control program was implemented during the Investigation and the quality assurance procedures used have been reiterated in the report (PFAS OMP January 2023 Factual Report). In addition, a safety, health and environment work method statement (SHEWMS) was also prepared.</p> <p>The Data Quality Objectives were expressed in terms of the purpose of the assessment and the relevant assessment criteria.</p>
Data Representativeness	
Use of Composites	No Composites were used during the investigation
Holding Times	Chain of custody and laboratory reports provide evidence of holding times. Holding times were in compliance with required timeframes.
Verification of field procedures	<p>The methodology conducted during this investigation is documented in the body of the report, and was in general conformance with the SAQP.</p> <p>Non-disposable equipment was decontaminated between sample locations.</p>
Laboratory Reports	<p>The following laboratory reports were considered for this data quality review:</p> <ul style="list-style-type: none"> ▪ ALS report: EP2300271. ▪ Eurofins ARL report: 955489.

QA/QC Aspects

Evidence & Evaluation

Data Precision & Accuracy

QC sample Frequency

QC sample type	SAQP required frequency	Sample Collected
Blind duplicate	1 in 10 primary samples (10%)	1 for 5 groundwater samples (20%) 1 in 3 tap water samples (33%)
Interlab duplicate	1 in 10 primary samples (10%)	1 for 5 groundwater samples (20%) 1 in 3 tap water samples (33%)
Rinsate	1 per day	1 for 1 day (100%)
Field Blank	1 per day	1 for 1 day (100%)

The required QC frequency was achieved for all media sampled.

RPD Acceptance criteria

Magnitude of Results	Acceptable RPD range
< 10 x LOR	No limits
10 – 20 LOR	0% - 50%
> 20 x LOR	0% - 20%

QC Testing – Blind Duplicates (Primary Lab)

- Groundwater**
- Primary Groundwater Samples Analysed: 5
 - Blind Duplicate Samples Analysed: 1
- All RPDs were within acceptance criteria.

Tap water

- Primary tap water Samples Analysed: 3
 - Blind Duplicate Samples Analysed: 1
- All RPDs were within acceptance criteria.

QC Testing – Interlab Duplicates (Secondary Lab)

- Groundwater**
- Primary Groundwater Samples Analysed: 5
 - Interlab Duplicate Samples Analysed: 1
- All RPDs were within acceptance criteria.

Tap water

- Primary tap water Samples Analysed: 3
 - Interlab Duplicate Samples Analysed: 1
- All RPDs were within acceptance criteria.

Field Blanks

Field Blanks were collected at a rate of one per fieldwork team per day. All field blank samples tested reported analytes below the laboratory limit of reporting.

Laboratory Internal QC

Evidence of the laboratories internal QC testing is present and complete in the reports. ALS (Primary) performed internal QC with adequate testing and satisfactory results for method blank, matrix spikes, laboratory control samples and laboratory duplicates.

QA/QC Aspects	Evidence & Evaluation
	<p>All Method Blank results were within acceptable range.</p> <p>All Matrix Spikes reported recoveries within the acceptance range of 70% to 130%.</p> <p>No quality control samples frequency outliers was reported.</p>
Laboratory Method Detection Limit	Laboratory reports indicate the method detection limits were generally lower than the respective assessment criteria.
NATA endorsement of laboratory reports	<p>Laboratory reports were stamped with the NATA endorsement stamp and signature.</p> <p>ALS Accreditation No. 825</p> <p>Eurofins ARL Accreditation No. 1261</p>
Calibration of Field Equipment	<p>All equipment used during the investigation was calibrated prior to use and daily readings of reference solutions (bump tests) were completed.</p> <p>The equipment calibration certificate and daily field bump test records are provided in Appendix D.</p>
Decontamination and Equipment Blanks	Rinsate blanks were collected at a rate of one per day per sampler when reusable equipment was used. All rinsate samples tested reported analytes concentrations below the laboratory LORs.
Data Comparability	
Standard Procedures	Fieldwork procedures are detailed in the SAQP and reports and are comparable for each phase of Investigation.
Qualified Personnel	Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.
Sample Integrity	Field Chain of Custody/Laboratory request forms can be found in Appendix C.
Data Completeness	
Completeness of test program	The scope of work undertaken was generally consistent with the SAQP.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection process and therefore, the data set used as the basis for groundwater and tap water investigation is considered valid and complete.

PFAS OMP Biannual Sampling Event Factual Report

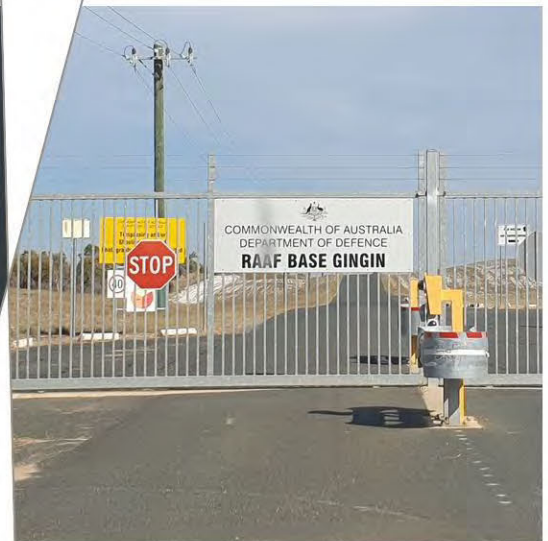
Post-summer 2023

Gingin Satellite Airfield

304700525

Prepared for
Department of Defence

26 May 2023



 **Cardno**

now

 **Stantec**

Contact Information

Stantec Australia Pty Ltd

Cardno, now Stantec
ABN 77 009 119 000

11 Harvest Terrace
West Perth WA 6005
Australia

www.stantec.com

Phone +61 8 9273 3888

Fax +61 8 9486 8664

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0.0	26/04/2023	Internal Draft	■	■
Rev 0	28/04/2023	External Draft	■	■
Rev 1	26/05/2023	Revision 1	■	■

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Chemical Names

DOC	Dissolved Organic Carbon
DO	Dissolved Oxygen
PFAS	Per- and Poly-fluoroalkyl Substances
PFHxS	Perfluorohexane Sulfonate
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
TDS	Total Dissolved Solids (salinity of water)
TSS	Total Suspended Solids

Technical Terms

AFFF	Aqueous Film Forming Foam
AHD	Australian Height Datum
AS	Australian Standard
BGL	Below Ground Level
COC	Chain of Custody
DQI	Data Quality Indicator
DQO	Data Quality Objective
EC	Electrical Conductivity
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
LOR	Limit of Reporting
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan

Units

ha	Hectares
mAHD	Metres relative to the Australian Height Datum
mBGL	Metres Below Ground Level
mbTOC	Metres below Top of Casing
mg/kg	Milligram per Kilogram (approximately equivalent to ppm)
mg/L	Milligram per Litre
µg/L	Micrograms per Litre
ppm	Parts per Million
µS/cm	Micro Siemens per Centimetre (Electrical Conductivity - Water)

Site Specific

FTG	Fire Training Ground
OMP	Ongoing Monitoring Plan
PMAP	PFAS Management Area Plan
RAAF	Royal Australian Airforce

1 Introduction

1.1 Background

Cardno, now Stantec (“Cardno”) was engaged by the Australian Department of Defence (“the Client”) to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) at Royal Australian Air force (RAAF) Gingin Satellite Airfield (“the site”). The site is located in Yeal, Western Australia and is displayed in Figure 1 of Appendix A.

The OMP was carried out in accordance with the scope and limitations presented in Cardno’s Sampling and Analysis Quality Plan (SAQP):

- > Cardno, 23 February 2023, Reference: DEF19009, ‘PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Gingin Satellite Airfield’ Rev8.

The SAQP was reviewed prior to the monitoring event and minor methodology updates (related to the record of field parameters) were made.

For the purposes of this report:

- > Management Area was defined as Gingin Satellite Airfield (Figure 1, Appendix A).
- > Monitoring Area was defined as comprising the site, plus the parcel of Crown Land that represents the Yeal Swamp Nature Reserve – an area that surrounds much of the southern, western, and northern extent of the site. The lateral extents of the Monitoring Area are aligned with the boundary of the adjoining Crown Lands property (Figure 1, Appendix A).

1.2 Purpose & Objectives

The objective of the OMP is to assess the changes in the nature and extent of PFAS within the environment, specifically where there is an identified potentially elevated risk to a receptor or a potential future risk to a receptor associated with Defence’s historical use of legacy Aqueous Film Forming Foam (AFFF).

The purpose of this PFAS OMP Factual Report is to provide an up-to-date status of the condition of the site as it is currently understood in relation to the most recent sampling event.

The objectives of the report are:

- > To provide a succinct summary of the post-summer 2023 sampling event and provision of analytical results with supporting tables and figures.
- > To provide confirmation of the current understanding of risk.
- > To provide supporting data for the assessment of management actions, where relevant.

1.3 Relevant Guidelines

This assessment has been undertaken in general accordance with applicable industry standards for a site investigation for the purpose, objectives and scope identified in this report. These standards are set out in:

- > National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended 2013) (ASC NEPM).
- > Heads of Environmental Protection Authority’s Australia and New Zealand (HEPA), January 2020, *PFAS National Environmental Management Plan (NEMP) 2.0*.
- > Standards Australia 1998. AS/NZ 5667:1998 *Water quality – sampling*.
- > Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

- > Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*¹.
- > Department of Defence, Department of Energy, 2018, *Quality System Manual Schedule B15*.
- > U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process (EPA QA/G-4)*.
- > USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8)*.
- > National Health and Medical Research Council (NHMRC), August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.

¹ It is noted that the site is located on Commonwealth Land and is regulated under the Commonwealth environmental legislation, the State based DWER guidelines are relevant for the sampling of off-Site private properties and waterways.

2 Scope of Work

Cardno carried out the tasks detailed in the following sections in order to satisfy the purpose and objectives of this assessment.

2.1 Groundwater Monitoring

Sampling of selected groundwater bores was generally performed in accordance with the SAQP (Cardno, 2023), applying methods set out in Section 3 of this report. The groundwater bores monitored as part of the OMP biannual monitoring event are presented in Table 2-1, and are shown on Figure 2A and 2B, Appendix A.

Table 2-1 Groundwater Monitoring Locations

Monitoring Area	Location ID	Number of locations
On-Site – Source Areas	Former fuel farm (SA01) - MW112S, MW113S, MW101I, MW102D, MW301, MW302, MW303.	22
	Fire house and Refuelling area (SA02) - MW504, MW104I, MW105D, MW304, MW305, MW306.	
	Powerhouse (SA03) - MW307, MW308, MW309, MW310.	
	Landfills - MW106S, MW107S, MW108S, MW109S, MW110S.	
On-Site – secondary sources	Sewage system and leach field (SA04) : MW114S.	8
	Site Drainage - MW115S.	
	Water Supply Infrastructure –MW505, MW312, MW313, MW111S.	
	Abstraction bore 1 - MW401.	
On-site - other	Abstraction bore 2 –MW402.	24
	Airside perimeter – MW116S, MW117I, MW118D, MW119S, MW120I, MW121D, MW122S, MW123I, MW124D.	
	Site boundary –MW125S, MW126I, MW128S, MW129I, MW130D, MW131D, MW132I, MW133D, MW134D, MW135I, MW136D, MW138S, MW139I, MW140D.	
	Background - MW137S.	
Off-Site	Water Corporation Production bores⁽¹⁾ : Pinjar Production P140, Pinjar Production P145.	6
	Public land⁽²⁾ : MW143S, MW142S, MW141S, MW403.	

Notes: (1) These are Water Corporation production bores being sampled by the Water Corporation.

(2) Yeal Swamp Nature Reserve managed by the Department of Parks and Wildlife (DPaW) / Vacant Crown Land managed by the Department of Planning, Lands and Heritage (DLPH)

2.2 Tap Water Monitoring

Water samples were collected from the tap water monitoring locations listed in Table 2-2 in accordance with the SAQP (Cardno, 2023) and sampling methodology detailed in section 3.2. The tap water monitoring locations are shown on Figure 2A and 2B, Appendix A.

Table 2-2 Tap Water Monitoring Locations

Monitoring Area	Location ID	Number of locations
On-Site	POT102; POT103; POT104.	3

2.3 Data Management

All the data included in this report has been collected, uploaded to the ESdat database and reviewed according to the data management requirements of the *Defence Contamination Management Manual* (DCMM) Annex L, including:

- > All field data collected was uploaded;
- > Laboratory data was uploaded and approved; and
- > QA/QC data was reconciled.

The sample naming convention detailed in the DCMM Annex L was used in the field.

2.4 Deviations from the OMP SAQP

Deviations from the SAQP for the post-summer 2023 monitoring event are presented in Table 2-3 below.

Table 2-3 Deviations from the OMP SAQP

Location	Deviation	Comments
MW107S, MW108S		These wells were found dry. Impact on the OMP program is moderate as these wells are constantly dry and therefore no data is obtained for the landfills in this area.
MW111S	Not sampled	This well was found dry. This location is regularly dry in the post-summer monitoring event. Impact on the OMP is limited, a sample will be collected in the post-winter event.
MW307		This well has been destroyed. Impact on the OMP program is moderate, this location is the only monitoring well up hydraulic gradient of the fire house and refueling source area.
MW114S	No field parameters recorded	Insufficient amount of water left in the HydraSleeve to take field readings. No impact on the OMP, field parameters are not informing any critical OMP decision.

3 Methodology

3.1 Groundwater Sampling Methodology

Groundwater monitoring was undertaken by no purge HydraSleeve® method as detailed in Table 3-1.

Table 3-1 Groundwater Sampling Method

Activity	Details
Well Gauging	Standing Water Level (SWL) was gauged in each well prior to sampling using an interface probe. All wells were measured against a specified mark at the top of the well casing.
Groundwater Field Parameters	<p>Groundwater field parameters were recorded via a water quality meter prior to deployment of HydraSleeves® or pre-sample collection. The following field parameters were recorded:</p> <ul style="list-style-type: none"> pH. electrical conductivity (EC). oxidation reduction potential (ORP). Dissolved oxygen (DO). Temperature. <p>Once field parameters had stabilised (as indicated by at least three consecutive measurements falling within +/- 10% of each other) measurements were recorded on field data records.</p> <p>All field instruments (e.g. water quality meter) were calibrated by the equipment supplier and bump tested on the field daily to optimise the accuracy of the measurements taken. Calibration certificates and bump test records are provided in Appendix D.</p>
Deployment of HydraSleeve®	<p>HydraSleeve® were deployed with top weight sample collection to begin at the lowest point.</p> <p>Following sampling, HydraSleeves® were deployed in preparation for the next OMP monitoring event using the same string for consistency between event (same depth of sampling i.e. within screen depth).</p>
Retrieval of HydraSleeves® (Sample Collection)	<p>HydraSleeve® sampling devices were left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment.</p> <p>Samples were collected via a continuous pull method at a rate allowing the water to pass through the check valve into the sample sleeve.</p> <p>Samples were discharged immediately (minimise changes in chemistry) via discharge tube.</p>
Hand bailing (alternative sampling method)	Disposable HDPE hand bailers, attached to a polypropylene string, were used at wells where the water column wasn't sufficient to fill the HydraSleeve®. Purging of the well was undertaken prior to sampling to ensure that a sample representative of the aquifer is taken (i.e. removal of 3x well volume).
Decontamination procedure	<p>Dedicated HydraSleeves® and single use nitrile gloves were used at each groundwater bore thus removing the need for decontamination.</p> <p>All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.</p>
Sample identification, preservation transport and holding times	<p>Each sample bottle was pre-labelled by the laboratory with a unique barcode.</p> <p>Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under Chain of Custody (CoC) documentation.</p> <p>Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).</p>
Laboratory Testing	<p>Groundwater samples were submitted for the following analysis:</p> <ul style="list-style-type: none"> Full PFAS analytical suite (refer to the SAQP for full list of analytes). <p>The primary laboratory was ALS Global Laboratories (Perth), and the secondary laboratory (quality control) was Eurofins ARL (Perth). Both laboratories are NATA-accredited for the parameters tested. Copies of the NATA stamped laboratory reports and CoC documentation are included in Appendix C.</p>

3.2 Tap water Sampling Methodology

Water samples from abstraction bores and taps were collected via the 'first flush' sampling method. The primary objective of the 'first flush' sampling method is to collect water representative of the user, who may not purge the water line.

Field parameters (pH, temperature, EC, ORP and DO) were recorded post sampling collection, samples were analysed for the full PFAS analytical suite (refer to SAQP for full list of analytes).

3.3 Quality Control / Quality Assurance

A critical aspect of site assessments is the demonstration of the quality of the data used as the basis for the assessment. This is achieved through a Data Validation process which includes a review of the following data quality indicators, as described in the SAQP:

- > QA documentation.
- > Bias.
- > Data Representativeness.
- > Data Precision & Accuracy.
- > Laboratory Performance.
- > Data Comparability.
- > Data Set Completeness.

A detailed review of these aspects has been undertaken, the results of which are presented in Appendix E.

The data quality review indicates no significant systematic errors in the data collection process for groundwater and tap water and therefore, the data set used as the basis for this assessment is considered valid and complete.

3.4 Assessment Criteria

3.4.1 Groundwater and Tap water

The adopted assessment criteria for groundwater and tap water are detailed in Table 3-2.

Table 3-2 Criteria for Groundwater and Tap water

Exposure Scenario	Adopted Assessment Criteria		
	PFHxS / PFOS µg/L	PFOA	Guidance
Human Health - Drinking Water Quality Guideline	0.07	0.56	HEPA 2020
Human Health – Recreational Use Guideline	2.0	10	HEPA 2020

4 Field Observations and Results

4.1 General Site Observations

No significant weather event or site activities that could have impacted the monitoring event or results obtained were noted during the post-summer 2023 monitoring event. No rainfall occurred during the post-summer 2023 monitoring event and the daily maximum temperatures varied between 23.3 and 24.0°C.

4.2 Groundwater

4.2.1 Summary of Field Observations

4.2.1.1 Physicochemical parameters

Stabilised physicochemical parameters, water colour and turbidity observations recorded during the groundwater and tap water sampling event are presented in field sampling records included in Appendix D. Parameters were generally consistent with historical data for the site. Groundwater pH was acidic to slightly acidic, water colour was generally clear and, in some instances, cloudy or brown. DO readings indicate aerobic groundwater conditions and TDS indicate freshwater conditions.

4.2.1.2 Groundwater gauging

Groundwater depth ranged from 52.34 mAHD (MW403) to 66.53 mAHD (MW302) which is consistent with historical data. Gauging records are presented in Appendix D. Inferred groundwater contours and flow direction are presented on Figures 3 and 4, Appendix A. Groundwater is inferred to flow from the site in a south-westerly direction, which is consistent with previous monitoring events.

4.2.2 Groundwater Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria. A summary of results exceeding the adopted criteria is presented in Table 4-1. Laboratory results have also been compared to available historical data in order to identify monitoring locations where a first-time detection of PFOA or PFOS+PFHxS or a new exceedance of a guideline value were reported. Figures 2A & 2B in Appendix A present the groundwater monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-1 Summary of Groundwater Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	MW301, MW309.	0.56 ²	2.64 (MW301)	54	2
Sum of PFOS and PFHxS	MW101I, MW104I, MW109S, MW114S, MW115S, MW119S, MW141S, MW301, MW302, MW303, MW304, MW305, MW306, MW308, MW309, MW310, MW312, MW313, MW402 MW504, MW505.	0.07 ²	70.5 (MW310)	54	21

Notes:

1. Non-inclusive of quality control samples
2. PFAS NEMP guideline value for human health – drinking water

Findings are summarised as follows:

- > No first-time detection or new exceedance of a guideline value was reported for the groundwater monitoring locations during the post-summer 2023 monitoring event.

4.3 Tap water

4.3.1 Summary of Field Observations

Stabilised physiochemical parameters and observations recorded during the tap water sampling event are presented in field sampling records, included in Appendix D. Parameters were generally consistent with the previous monitoring event. Tap water pH was slightly acidic to near neutral, water was observed to be clear and slightly brackish. DO readings indicate aerobic tap water conditions. No visual or olfactory evidence of contamination were recorded.

4.3.2 Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria. A summary of results exceeding the adopted criteria is presented in Table 4-1. Laboratory results have also been compared to available historical data in order to identify monitoring locations where a first-time detection of PFOA or PFOS+PFHxS or a new exceedance of a guideline value were reported. Figures 2A and 2B in Appendix A present the tap water monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-2 Summary of Tap Water Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	0.56 ²	0.03 (POT103)	3	0
Sum of PFOS and PFHxS	POT102, POT103, POT104.	0.07 ²	0.50 (POT104)	3	3

Note:

1. Non-inclusive of quality control samples
2. PFAS NEMP guideline value for human health – drinking water

Findings are summarised as follows:

- > No first-time detection of PFOA or Sum of PFOS and PFHxS, or new exceedance of the guideline value were reported for the tap water locations.
- > All three tap water samples reported Sum of PFOS and PFHxS concentrations above the drinking water guideline value but below the recreational use value, which is consistent with to previous monitoring events.
- > All samples reported a detectable concentration of PFOA (i.e. above laboratory LOR) but below the adopted assessment criteria.

4.4 Changes to the Monitoring Network Condition

The following change to the monitoring network condition was noted during the post-summer 2023 event:

- > Monitoring well MW134D was unblocked with a steel bailer and sampled.

The Department of Defence has been advised that the Water Corporation will continue to sample for PFAS at production bores Pinjar bore 140 (Superficial aquifer) and Pinjar bore 145 (Leederville aquifer) on a quarterly basis.

5 Summary and Conclusions

Cardno undertook the post-summer 2023 groundwater and tap water monitoring event at Gingin Satellite Airfield as part of the PFAS OMP. Groundwater sampling and testing was undertaken at 52 monitoring wells on- and off-site, two abstraction bores and three tap water locations. Four groundwater monitoring wells couldn't be sampled as these wells were found to be dry (MW107S, MW108S, MW111S) or destroyed (MW307).

The groundwater laboratory results reported the following:

- > Of the 54 groundwater samples tested, Sum of PFOS and PFHxS (21 samples) and PFOA (2 samples) reported exceedances of the adopted assessment criteria.
- > No first-time detection of PFOA or Sum of PFOS and PFHxS, or new exceedance of a guideline value was reported for the groundwater monitoring locations during the post-summer 2023 monitoring event.

The tap water laboratory results reported the following:

- > All three samples tested reported Sum of PFOS and PFHxS concentrations above the drinking water criteria but below the recreational use criteria, which is consistent with the previous monitoring events.
- > All samples reported PFOA concentrations above the laboratory LOR but below the adopted assessment criteria.
- > No first-time detection of PFOA or Sum of PFOS and PFHxS, or new exceedance of guideline values were reported for the tap water monitoring locations.

PFAS concentrations at the groundwater and tap water locations sampled during the post-summer 2023 monitoring event were generally of the same order of magnitude as historical events.

It is recommended that MW307 is replaced prior to the next biannual monitoring event.

The next OMP sampling event for Gingin Satellite Airfield is the quarterly monitoring event (Q3 2023), scheduled for July 2023. An annual interpretive report will be prepared for the September 2022 – August 2023 monitoring period.

6 References

General References

1. *Australian and New Zealand Guidelines (ANZG) for fresh and marine water quality*, 2018.
2. *Contaminated Sites Act 2003*, Western Australia.
3. Department of Defence, 2021, *Defence Contamination Management Manual (DCMM) Annex L Data Management*.
4. Department of Defence, May 2021, *PFAS OMP Factual Report Guidance*, Version 0.2.
5. Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*.
6. Environmental Protection Agency (United States EPA), November 2002, Reference: EPA/240/R-02/004, '*Guidance on Environmental Data Verification and Data Validation*'.
7. The Heads of EPAs Australia and New Zealand (HEPA; 2020) *PFAS National Environmental Management Plan (NEMP) 2.0*, January 2020.
8. National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended), registered May 2013.
9. National Health and Medical Research Council (NHMRC) (2011 – updated 2022) *National Water Quality Management Strategy - Australian Drinking Water Guidelines 6*, January 2022
10. NHMRC, August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.
11. Standards Australia/Standards New Zealand (1998) AS5667.1:1998 *Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*.
12. U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process (EPA QA/G-4)*.
USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8)*.
13. Australian Department of Defence, March 2018 amended June 2021, *Defence Contamination Management Manual (DCMM). Annex L, 'Data Management'*.

Site Specific References

14. Cardno, 2023, *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan*, Rev8.
15. Cardno, April 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2020*.
16. Cardno, December 2020, *PFAS OMP, Biannual Monitoring Factual Report - August 2020*.
17. Cardno, December 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2020*.
18. Cardno, March 2021, *PFAS OMP Quarterly Sampling Event Factual Report – January 2021*.
19. Cardno, April 2021, *PFAS OMP – 2020 Annual Interpretive Report*.
20. Cardno, August 2021, *PFAS OMP Biannual Monitoring Factual Report – post-summer 2021*.
21. Cardno, August 2021, *PFAS OMP Quarterly Sampling Event Factual Report – July 2021*.
22. Cardno, November 2021, *PFAS OMP Biannual Monitoring Factual Report – post-winter 2021*.
23. Cardno, January 2022, *PFAS OMP Quarterly Sampling Event Factual Report – January 2022*.
24. Cardno, August 2022, *PFAS OMP Biannual Monitoring Factual Report – post-summer 2022*.
25. Cardno, October 2022, *PFAS OMP Quarterly Sampling Event Factual Report – July 2022*.
26. Cardno, December 2022, *PFAS OMP Biannual Monitoring Factual Report – post-winter 2022*.
27. Cardno, February 2023, *PFAS OMP Quarterly Sampling Event Factual Report – January 2023*.
28. Cardno, May 2022, *PFAS OMP – draft 2021 Annual Interpretive Report*.
29. Department of Defence, 2018a, *Gingin Satellite Airfield PFAS Ongoing Monitoring Plan*.
30. Department of Defence, 2018b, *Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan*.
31. Jacobs, 2018a, *Preliminary Conceptual Site Model - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0001).
32. Jacobs, 2018b, *Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0002).
33. Jacobs, 2018c, *Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-003).

34. Jacobs, 2018d, *Tier 2 Human Health Risk Assessment – Offsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0005).
35. Jacobs, 2018e, *Tier 3 Human Health Risk Assessment – Onsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0006).
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APPENDIX

A

FIGURES



now





Legend

 Site Boundary / Management Area

 Monitoring Area

FIGURE 1
1:60,000 Scale at A3

Metres

0 1,000 2,000

Site Location

POST-SUMMER 2023 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE




Map Produced by Cardno WA
Date: 2023-04-18 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-001_RegionalLocation 02.mxd
Aerial Imagery Supplied by Aerometrex



FIGURE 2B
1:1,750 Scale at A3

Metres
0 50 100

Monitoring Locations & Results

POST-SUMMER 2023 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-05-26 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-002B_Apr23PFASResults 01.mxd
Aerial Imagery Supplied by Aerometrex

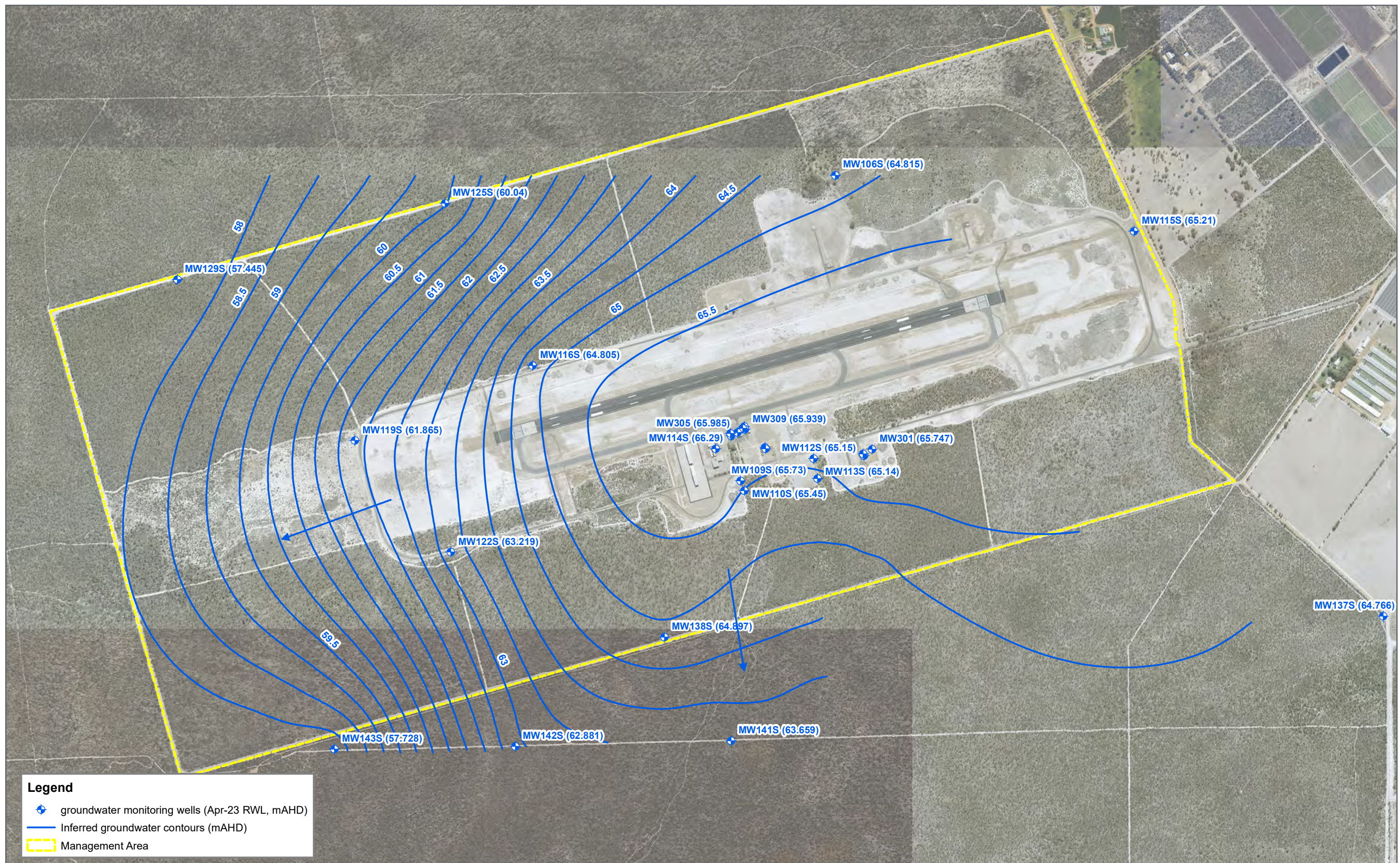


FIGURE 3
1:13,000 Scale at A3

Metres
0 200 400

Inferred Groundwater Contours (Shallow Aquifer)

POST-SUMMER 2023 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-04-18 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-003_Apr23ShallowGWContours 01.mxd
Aerial Imagery Supplied by Aerometrex



FIGURE 4
1:13,000 Scale at A3

Metres

0 200 400

Inferred Groundwater Contours (Deep Aquifer)

POST-SUMMER 2023 SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-04-18 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-004_Apr23DeepGWContours 01.mxd
Aerial Imagery Supplied by Aerometrex

APPENDIX

B

DATA ASSESSMENT TABLES



now



[illegible][illegible]

Notes:

First time detect of PFOA or PFOS+PFHxS

New Exceedance of guideline value

	N-Ethyl perfluorooctane sulfonamidoacetic acid (ETFOsAA)	N-Ethyl perfluorooctane sulfonamidoethanol (ETFOSE)	PFAS		
	µg/L	µg/L	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS
LOR - Limit of Reporting	0.02	0.05	0.01	0.01	0.01
PFAS NEMP 2020 Drinking Water			0.07		
PFAS NEMP 2020 Recreational Water			2		

Location Code	Date	Field ID	Sample Type	Lab Report Number					
MW101I	11 Apr 2023	0958_MW101I_230411	Normal	EP2304516	<0.02	<0.05	0.45	0.52	0.56
MW102D	11 Apr 2023	0958_MW102D_230411	Normal	EP2304516	<0.02	<0.05	<0.01	<0.01	<0.01
MW104I	11 Apr 2023	0958_MW104I_230411	Normal	EP2304516	<0.02	<0.05	3.13	4.23	4.73
MW105D	11 Apr 2023	0958_MW105D_230411	Normal	EP2304516	<0.02	<0.05	<0.01	<0.01	<0.01
MW106S	11 Apr 2023	0958_MW106S_230411	Normal	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW109S	11 Apr 2023	0958_MW109S_230411	Normal	EP2304517	<0.02	<0.05	0.53	0.54	0.56
MW110S	11 Apr 2023	0958_MW110S_230411	Normal	EP2304517	<0.02	<0.05	0.05	0.05	0.05
MW112S	11 Apr 2023	0958_MW112S_230411	Normal	EP2304516	<0.02	<0.05	<0.01	<0.01	<0.01
MW113S	11 Apr 2023	0958_MW113S_230411	Normal	EP2304516	<0.02	<0.05	<0.01	<0.01	<0.01
MW114S	11 Apr 2023	0958_MW114S_230411	Normal	EP2304516	<0.02	<0.05	0.78	0.82	0.84
MW115S	11 Apr 2023	0958_MW115S_230411	Normal	EP2304517	<0.02	<0.05	0.20	0.20	0.20
MW116S	11 Apr 2023	0958_MW116S_230411	Normal	EP2304517	<0.02	<0.05	0.01	0.01	0.01
MW117I	11 Apr 2023	0958_MW117I_230411	Normal	EP2304517	<0.02	<0.05	0.01	0.01	0.01
MW118D	11 Apr 2023	0958_MW118D_230411	Normal	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW119S	11 Apr 2023	0958_MW119S_230411	Normal	EP2304514	<0.02	<0.05	0.09	0.09	0.09
MW120I	11 Apr 2023	0958_MW120I_230411	Normal	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW121D	11 Apr 2023	0958_MW121D_230411	Normal	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW122S	11 Apr 2023	0958_MW122S_230411	Normal	EP2304514	<0.02	<0.05	0.03	0.03	0.03
MW123I	11 Apr 2023	0958_MW123I_230411	Normal	EP2304514	<0.02	<0.05	0.07	0.07	0.07
MW124D	11 Apr 2023	0958_MW124D_230411	Normal	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW125S	11 Apr 2023	0958_MW125S_230411	Normal	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW126I	11 Apr 2023	0958_MW126I_230411	Normal	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW128D	11 Apr 2023	0958_MW128D_230411	Normal	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW128D	11 Apr 2023	0958_QC107_230411	Field Duplicate	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW128D	11 Apr 2023	0958_QC207_230411	Interlab Duplicate	981667	<0.05	<0.05	<0.01	<0.05	<0.1
MW129S	11 Apr 2023	0958_MW129S_230411	Normal	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW130D	11 Apr 2023	0958_MW130D_230411	Normal	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW131D	11 Apr 2023	0958_MW131D_230411	Normal	EP2304517	<0.02	<0.05	<0.01	<0.01	<0.01
MW132I	11 Apr 2023	0958_MW132I_230411	Normal	EP2304517	<0.02	<0.05	0.02	0.02	0.02
MW133D	11 Apr 2023	0958_MW133D_230411	Normal	EP2304517	<0.02	<0.05	0.01	0.01	0.01
MW134D	12 Apr 2023	0958_MW134D_230414	Normal	EP2304599	<0.02	<0.05	<0.01	<0.01	<0.01
MW135I	11 Apr 2023	0958_MW135I_230411	Normal	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW136D	11 Apr 2023	0958_MW136D_230411	Normal	EP2304514	<0.02	<0.05	0.04	0.04	0.04
MW137S	11 Apr 2023	0958_MW137S_230411	Normal	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW138S	11 Apr 2023	0958_MW138S_230411	Normal	EP2304514	<0.02	<0.05	0.01	0.01	0.01
MW139I	11 Apr 2023	0958_MW139I_230411	Normal	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW140D	11 Apr 2023	0958_MW140D_230411	Normal	EP2304514	<0.02	<0.05	<0.01	0.04	0.04
MW141S	11 Apr 2023	0958_MW141S_230411	Normal	EP2304514	<0.02	<0.05	0.10	0.13	0.13
MW141S	11 Apr 2023	0958_QC106_230411	Field Duplicate	EP2304514	<0.02	<0.05	0.10	0.10	0.10
MW141S	11 Apr 2023	0958_QC206_230411	Interlab Duplicate	981667	<0.05	<0.05	0.11	0.12	0.12
MW142S	11 Apr 2023	0958_MW142S_230411	Normal	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW142S	11 Apr 2023	0958_QC104_230411	Field Duplicate	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW142S	11 Apr 2023	0958_QC204_230411	Interlab Duplicate	981667	<0.05	<0.05	<0.01	<0.05	<0.1
MW143S	11 Apr 2023	0958_MW143S_230411	Normal	EP2304514	<0.02	<0.05	0.02	0.02	0.02
MW301	11 Apr 2023	0958_MW301_230411	Normal	EP2304516	<0.02	<0.05	70.5	77.6	81.6
MW302	11 Apr 2023	0958_MW302_230411	Normal	EP2304516	<0.02	<0.05	1.71	2.00	2.22
MW302	11 Apr 2023	0958_QC102_230411	Field Duplicate	EP2304516	<0.02	<0.05	1.62	1.90	2.12
MW302	11 Apr 2023	0958_QC202_230411	Interlab Duplicate	981667	<0.05	<0.05	1.85	2.18	2.41
MW303	11 Apr 2023	0958_MW303_230411	Normal	EP2304516	<0.02	<0.05	14.8	15.7	16.4
MW303	11 Apr 2023	0958_QC103_230411	Field Duplicate	EP2304516	<0.02	<0.05	13.3	14.3	14.9
MW303	11 Apr 2023	0958_QC203_230411	Interlab Duplicate	981667	<0.05	<0.05	11.4	12.47	13.33
MW304	11 Apr 2023	0958_MW304_230411	Normal	EP2304516	<0.02	<0.05	4.95	5.86	6.47
MW305	11 Apr 2023	0958_MW305_230411	Normal	EP2304516	<0.02	<0.05	6.02	7.38	8.14
MW306	11 Apr 2023	0958_MW306_230411	Normal	EP2304516	<0.02	<0.05	4.59	6.44	7.86
MW308	11 Apr 2023	0958_MW308_230411	Normal	EP2304516	<0.02	<0.05	19.8	21.2	21.9
MW309	11 Apr 2023	0958_MW309_230411	Normal	EP2304516	<0.02	<0.05	41.3	50.7	53.5
MW310	11 Apr 2023	0958_MW310_230411	Normal	EP2304516	<0.02	<0.05	12.4	12.8	13.5
MW312	11 Apr 2023	0958_MW312_230411	Normal	EP2304516	<0.02	<0.05	1.21	1.34	1.40
MW313	11 Apr 2023	0958_MW313_230411	Normal	EP2304516	<0.02	<0.05	0.47	0.50	0.50
MW313	11 Apr 2023	0958_QC105_230411	Field Duplicate	EP2304516	<0.02	<0.05	0.39	0.42	0.42
MW313	11 Apr 2023	0958_QC205_230411	Interlab Duplicate	981667	<0.05	<0.05	0.3	0.32	0.33
MW401	11 Apr 2023	0958_MW401_230411	Normal	EP2304516	<0.02	<0.05	<0.01	<0.01	<0.01
MW402	11 Apr 2023	0958_MW402_230411	Normal	EP2304517	<0.02	<0.05	1.57	1.98	2.24
MW403	11 Apr 2023	0958_MW403_230411	Normal	EP2304514	<0.02	<0.05	<0.01	<0.01	<0.01
MW504	11 Apr 2023	0958_MW504_230411	Normal	EP2304516	<0.02	<0.05	16.1	17.1	18.0
MW505	11 Apr 2023	0958_MW505_230411	Normal	EP2304516	<0.02	<0.05	0.30	0.32	0.32
POT102	11 Apr 2023	0958_POT102_230411	Normal	EP2304517	<0.02	<0.05	0.43	0.68	0.73
POT103	11 Apr 2023	0958_POT103_230411	Normal	EP2304517	<0.02	<0.05	0.48	0.76	0.82
POT103	11 Apr 2023	0958_QC101_230411	Field Duplicate	EP2304517	<0.02	<0.05	0.50	0.78	0.85
POT103	11 Apr 2023	0958_QC201_230411	Interlab Duplicate	981667	<0.05	<0.05	0.54	0.88	0.97
POT104	11 Apr 2023	0958_POT104_230411	Normal	EP2304517	<0.02	<0.05	0.50	0.73	0.79

Environmental Standards
HEPA, January 2020, PFAS NEMP 2020 Drinking Water
HEPA, January 2020, PFAS NEMP 2020 Recreational Water

Notes:

First time detect of PFOA or PFOS+PFHxS

New Exceedance of guideline value

	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids											
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluoroheptanoic acid (PFHpA)	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	
LOR - Limit of Reporting	0.02	0.02	0.01	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.05
PFAS NEMP 2020 Drinking Water											0.56							
PFAS NEMP 2020 Recreational Water											10							

Date	Field ID	Sample Type	Lab Report Number																
11 Apr 2023	0958_QC301_230411	Rinsate	EP2304514	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05
11 Apr 2023	0958_QC302_230411	Rinsate	EP2304514	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05
11 Apr 2023	0958_QC303_230411	Rinsate	EP2304514	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05
11 Apr 2023	0958_QC401_230411	Field Blank	EP2304514	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05
11 Apr 2023	0958_QC402_230411	Field Blank	EP2304514	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05
11 Apr 2023	0958_QC403_230411	Field Blank	EP2304514	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05
12 Apr 2023	0958_QC301_230414	Rinsate	EP2304599	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05
12 Apr 2023	0958_QC401_230414	Field Blank	EP2304599	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05

Environmental Standards

HEPA, January 2020, PFAS NEMP 2020 Drinking Water

HEPA, January 2020, PFAS NEMP 2020 Recreational Water

	PFAS - (n:2) Fluorotelomer Sulfonic Acids				PFAS - Perfluoroalkyl Sulfonamides								PFAS		
	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS	
	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	
LOR - Limit of Reporting	0.05	0.05	0.05	0.05	0.02	0.05	0.02	0.05	0.05	0.02	0.05	0.01	0.01	0.01	
PFAS NEMP 2020 Drinking Water												0.07			
PFAS NEMP 2020 Recreational Water												2			

Date	Field ID	Sample Type	Lab Report Number														
11 Apr 2023	0958_QC301_230411	Rinsate	EP2304514	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
11 Apr 2023	0958_QC302_230411	Rinsate	EP2304514	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
11 Apr 2023	0958_QC303_230411	Rinsate	EP2304514	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
11 Apr 2023	0958_QC401_230411	Field Blank	EP2304514	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
11 Apr 2023	0958_QC402_230411	Field Blank	EP2304514	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
11 Apr 2023	0958_QC403_230411	Field Blank	EP2304514	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
12 Apr 2023	0958_QC301_230414	Rinsate	EP2304599	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
12 Apr 2023	0958_QC401_230414	Field Blank	EP2304599	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01

Environmental Standards

HEPA, January 2020, PFAS NEMP 2020 Drinking Water

HEPA, January 2020, PFAS NEMP 2020 Recreational Water

Lab Report Number	Unit	LOR	Date	11 Apr 2023	11 Apr 2023	RPD	Date	11 Apr 2023	11 Apr 2023	RPD	Date	11 Apr 2023	11 Apr 2023	RPD
			Field ID	0958_POT103_230411	0958_QC101_230411		Field ID	0958_POT103_230411	0958_QC201_230411		Field ID	0958_MW302_230411	0958_QC102_230411	
			Matrix Type	Water	Water		Matrix Type	Water	Water		Matrix Type	Water	Water	
				EP2304517	EP2304517			EP2304517	981667			EP2304516	EP2304516	
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01						0.02					<0.01	
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	0.04	0.04	0		0.04	0.04	0		0.04	0.04	0	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	0.04	0.05	22		0.04	0.05	22		0.06	0.06	0	29
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.29	0.30	3		0.29	0.30	3		1.00	0.91	9	15
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	0.02	0.02	0		0.02	0.02	0		0.16	0.16	0	21
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.19	0.20	5		0.19	0.24	23		0.71	0.71	0	33
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01						<0.01						<0.01
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01	<0.02	<0.02	0		<0.02	<0.01	0		<0.02	<0.02	0	0
PFAS - Perfluoroalkyl Carboxylic Acids														
Perfluorobutanoic acid (PFBA)	µg/L	0.05	<0.1	<0.1	0		<0.1	0.06	0		<0.1	<0.1	0	0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	0.04	0.04	0		0.04	0.04	0		0.02	0.02	0	40
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	0.17	0.17	0		0.17	0.16	6		0.09	0.09	0	12
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	<0.02	<0.02	0		<0.02	0.01	0		<0.02	<0.02	0	0
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.03	0.03	0		0.03	0.03	0		0.14	0.13	7	19
Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.02	<0.02	0		<0.02	<0.01	0		<0.02	<0.02	0	0
Perfluorodecanoic acid (PFDA)	µg/L	0.01	<0.02	<0.02	0		<0.02	<0.01	0		<0.02	<0.02	0	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	<0.02	<0.02	0		<0.02	<0.01	0		<0.02	<0.02	0	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01	<0.02	<0.02	0		<0.02	<0.01	0		<0.02	<0.02	0	0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01	<0.02	<0.02	0		<0.02	<0.01	0		<0.02	<0.02	0	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	<0.05	<0.05	0		<0.05	<0.01	0		<0.05	<0.05	0	0
PFAS - (n:2) Fluorotelomer Sulfonic Acids														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01	<0.05	<0.05	0		<0.05	<0.01	0		<0.05	<0.05	0	0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<0.05	<0.05	0		<0.05	<0.05	0		<0.05	<0.05	0	0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01	<0.05	<0.05	0		<0.05	<0.01	0		<0.05	<0.05	0	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01	<0.05	<0.05	0		<0.05	<0.01	0		<0.05	<0.05	0	0
PFAS - Perfluoroalkyl Sulfonamides														
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	0		<0.02	<0.05	0		<0.02	<0.02	0	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0		<0.05	<0.05	0		<0.05	<0.05	0	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	0		<0.02	<0.05	0		<0.02	<0.02	0	0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05	<0.05	0		<0.05	<0.05	0		<0.05	<0.05	0	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0		<0.05	<0.05	0		<0.05	<0.05	0	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	0		<0.02	<0.05	0		<0.02	<0.02	0	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0		<0.05	<0.05	0		<0.05	<0.05	0	0
PFAS														
Sum of PFHxS and PFOS	µg/L	0.01	0.48	0.50	4		0.48	0.54	12		1.71	1.62	5	8
Sum of PFAS (WA DER List)	µg/L	0.01	0.76	0.78	3		0.76	0.88	15		2.00	1.90	5	9
Sum of PFAS	µg/L	0.01	0.82	0.85	4		0.82	0.97	17		2.22	2.12	5	8
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01						0.57						2.02
Sum of PFAS (PFOS + PFOA)	µg/L	0.01						0.27						1.16

*RPDs have only been considered where a concentration is greater than 1 times the LOR.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each LOR multiplier range are: No Limit (1 - 10 x LOR); 50 (10 - 20 x LOR); 20 (> 20 x LOR))
***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

Lab Report Number	Unit	LOR	Date	11 Apr 2023	11 Apr 2023	RPD	11 Apr 2023	11 Apr 2023	RPD	11 Apr 2023	11 Apr 2023	RPD	11 Apr 2023	11 Apr 2023	RPD	11 Apr 2023	11 Apr 2023	RPD
			Field ID	0958_MW303_230411	0958_QC103_230411		0958_MW303_230411	0958_QC203_230411		0958_MW1425_230411	0958_QC104_230411		0958_MW1425_230411	0958_QC204_230411		0958_MW1415_230411	0958_QC106_230411	
			Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
			Lab Report Number	EP2304516	EP2304516		EP2304516	981667		EP2304514	EP2304514		EP2304514	981667		EP2304514	EP2304514	
PFAS - Perfluoroalkyl Sulfonic Acids																		
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01						<0.01						<0.01				
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01		0.12	0.10	18	0.12	0.11	9	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01		0.27	0.25	8	0.27	0.44	48	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01		2.85	2.52	12	2.85	2.3	21	<0.01	<0.01	0	<0.01	<0.01	0	0.06	0.06	0
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01		0.40	0.35	13	0.40	0.42	5	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01		11.9	10.8	10	11.9	9.1	27	<0.01	<0.01	0	<0.01	<0.01	0	0.04	0.04	0
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01						<0.01						<0.01				
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
PFAS - Perfluoroalkyl Carboxylic Acids																		
Perfluorobutanoic acid (PFBA)	µg/L	0.05		<0.1	<0.1	0	<0.1	<0.05	0	<0.1	<0.1	0	<0.1	<0.05	0	<0.1	<0.1	0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01		0.06	0.06	0	0.06	0.06	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01		0.36	0.34	6	0.36	0.32	12	<0.02	<0.02	0	<0.02	<0.01	0	0.02	<0.02	0
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01		0.05	0.05	0	0.05	0.05	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorooctanoic acid (PFOA)	µg/L	0.01		0.40	0.42	5	0.40	0.53	28	<0.01	<0.01	0	<0.01	<0.01	0	0.01	<0.01	0
Perfluorononanoic acid (PFNA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorodecanoic acid (PFDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0
PFAS - (n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0
PFAS - Perfluoroalkyl Sulfonamides																		
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
PFAS																		
Sum of PFHxS and PFOS	µg/L	0.01		14.8	13.3	11	14.8	11.4	26	<0.01	<0.01	0	<0.01	<0.01	0	0.10	0.10	0
Sum of PFAS (WA DER List)	µg/L	0.01		15.7	14.3	9	15.7	12.47	23	<0.01	<0.01	0	<0.01	<0.05	0	0.13	0.10	26
Sum of PFAS	µg/L	0.01		16.4	14.9	10	16.4	13.33	21	<0.01	<0.01	0	<0.01	<0.1	0	0.13	0.10	26
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01						11.93						<0.01				
Sum of PFAS (PFOS + PFOA)	µg/L	0.01						9.63						<0.01				

*RPDs have only been considered where a concentration is greater than 1 times
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs f
***Interlab Duplicates are matched on a per compound basis as methods vary b

Lab Report Number	Unit	LOR	Date	11 Apr 2023		RPD	11 Apr 2023		RPD	11 Apr 2023		RPD	11 Apr 2023		RPD	11 Apr 2023		RPD
			Field ID	0958_MW1415_230411	0958_QC206_230411		0958_MW128D_230411	0958_QC107_230411		0958_MW128D_230411	0958_QC207_230411		0958_MW313_230411	0958_QC105_230411		0958_MW313_230411	0958_QC205_230411	
			Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
				EP2304514	981667		EP2304517	EP2304517		EP2304517	981667		EP2304516	EP2304516		EP2304516	981667	
PFAS - Perfluoroalkyl Sulfonic Acids																		
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01			<0.01						<0.01						<0.01	
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	0		<0.01	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	0		0.01	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01		0.06	0.06	0		<0.01	0		<0.01	0		0.22	0.19	15	0.22	0.14
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	0		<0.01	0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01		0.04	0.05	22		<0.01	0		<0.01	0		0.25	0.20	22	0.25	0.16
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01			<0.01						<0.01						<0.01	
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.01
PFAS - Perfluoroalkyl Carboxylic Acids																		
Perfluorobutanoic acid (PFBA)	µg/L	0.05		<0.1	<0.05	0		<0.1	0		<0.1	0		<0.1	<0.1	0	<0.1	<0.05
Perfluoropentanoic acid (PFPeA)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01		0.02	0.01	67		<0.02	0		<0.02	0		0.03	0.03	0	0.03	0.02
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.01
Perfluorooctanoic acid (PFOA)	µg/L	0.01		0.01	<0.01	0		<0.01	0		<0.01	0		<0.01	<0.01	0	<0.01	<0.01
Perfluorononanoic acid (PFNA)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.01
Perfluorodecanoic acid (PFDA)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.01
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.01
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.01
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01		<0.02	<0.01	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.01
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01		<0.05	<0.01	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.01
PFAS - (n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01		<0.05	<0.01	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.01
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05		<0.05	<0.05	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01		<0.05	<0.01	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.01
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01		<0.05	<0.01	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.01
PFAS - Perfluoroalkyl Sulfonamides																		
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.05	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02		<0.02	<0.05	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.05
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02		<0.02	<0.05	0		<0.02	0		<0.02	0		<0.02	<0.02	0	<0.02	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05	0		<0.05	0		<0.05	0		<0.05	<0.05	0	<0.05	<0.05
PFAS																		
Sum of PFHxS and PFOS	µg/L	0.01		0.10	0.11	10		<0.01	0		<0.01	0		0.47	0.39	19	0.47	0.3
Sum of PFAS (WA DER List)	µg/L	0.01		0.13	0.12	8		<0.01	0		<0.01	0		0.50	0.42	17	0.50	0.32
Sum of PFAS	µg/L	0.01		0.13	0.12	8		<0.01	0		<0.01	0		0.50	0.42	17	0.50	0.33
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01			0.11						<0.01							0.3
Sum of PFAS (PFOS + PFOA)	µg/L	0.01			0.05						<0.01							0.16

*RPDs have only been considered where a concentration is greater than 1 times
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs f
***Interlab Duplicates are matched on a per compound basis as methods vary b

APPENDIX

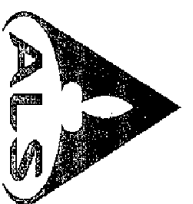
C

LABORATORY CERTIFICATES OF ANALYSIS



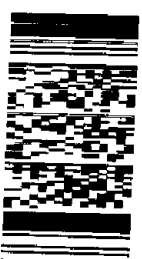
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Environmental Division
Perth

Work Order Reference
EP2304514



Telephone : - 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0958 - PEARSON, 23 Client: Stantec

Project Manager:

Phone:

ALS Compass COC Reference: 50776 50780 # Samples:

Sampler:

Phone:

Turnaround Requirements: Standard

Special Instructions:

Please send small cake to Eurofin (accs)

Custody:

Relinquished by: <u>STANTEC</u>	R 	Relinquished by:	Received by:
Date / Time: <u>11/04/23 4PM</u>	Date / Time: <u>11/4 1650</u>	Date / Time:	Date / Time:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP_23

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

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 comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW137S		11/04/2023 08:46 AM	WATER	ALS: 2 Non ALS: 0	No	X		
002	0958_MW403		11/04/2023 09:27 AM	WATER	ALS: 2 Non ALS: 0	No	X		
003	0958_MW143S		11/04/2023 10:12 AM	WATER	ALS: 2 Non ALS: 0	No	X		
004	0958_MW142S		11/04/2023 10:26 AM	WATER	ALS: 2 Non ALS: 0	No	X		
005	0958_QC104		11/04/2023 10:27 AM	WATER	ALS: 2 Non ALS: 0	No	X		
006	0958_MW141S		11/04/2023 10:48 AM	WATER	ALS: 2 Non ALS: 0	No	X		
007	0958_QC106		11/04/2023 10:49 AM	WATER	ALS: 2 Non ALS: 0	No	X		
008	0958_MW140D		11/04/2023 11:19 AM	WATER	ALS: 2 Non ALS: 0	No	X		
009	0958_MW139I		11/04/2023 11:20 AM	WATER	ALS: 2 Non ALS: 0	No	X		

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSASOMP_23

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:
TURNAROUND REQUIREMENTS : 5 Days		LABORATORY USE ONLY (Circle)	
Biohazard info:		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 comments:	

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_MMW138S		11/04/2023 11:20 AM	WATER	ALS: 2 Non ALS: 0	No	X		
011	0958_MMW136D		11/04/2023 12:16 PM	WATER	ALS: 2 Non ALS: 0	No	X		
012	0958_MMW135I		11/04/2023 12:48 PM	WATER	ALS: 2 Non ALS: 0	No	X		
013	0958_MMW123I		11/04/2023 12:52 PM	WATER	ALS: 2 Non ALS: 0	No	X		
014	0958_MMW124D		11/04/2023 01:19 PM	WATER	ALS: 2 Non ALS: 0	No	X		
015	0958_MMW122S		11/04/2023 01:31 PM	WATER	ALS: 2 Non ALS: 0	No	X		
016	0958_MMW121D		11/04/2023 01:44 PM	WATER	ALS: 2 Non ALS: 0	No	X		
017	0958_MMW120I		11/04/2023 01:45 PM	WATER	ALS: 2 Non ALS: 0	No	X		
018	0958_MMW119S		11/04/2023 01:45 PM	WATER	ALS: 2 Non ALS: 0	No	X		

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP_23

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

LABORATORY USE ONLY (Circle)

Biohazard Info:

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

Yes No N/A

Yes No N/A

C

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0958_QC301		11/04/2023 02:26 PM	WATER	ALS: 2 Non ALS: 0	No	X		
020	0958_QC302		11/04/2023 02:26 PM	WATER	ALS: 2 Non ALS: 0	No	X		
021	0958_QC303		11/04/2023 02:27 PM	WATER	ALS: 2 Non ALS: 0	No	X		
022	0958_QC401		11/04/2023 02:37 PM	WATER	ALS: 2 Non ALS: 0	No	X		
023	0958_QC402		11/04/2023 02:37 PM	WATER	ALS: 2 Non ALS: 0	No	X		
024	0958_QC403		11/04/2023 02:38 PM	WATER	ALS: 2 Non ALS: 0	No	X		

CLIENT: MMHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFA50MP_23

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free Ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A
Yes No N/A
C

CONTACT PH: SAMPLER MOBILE: QUOTE NO: SY/139/19 B / ES2022MMWHAUS0002

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MMV137S	HDPE (no PTFE)	20 mL	00350822075285	Grey	No	
001	0958_MMV137S	HDPE (no PTFE)	20 mL	00350822075261	Grey	No	
002	0958_MMV403	HDPE (no PTFE)	20 mL	00350822075254	Grey	No	
002	0958_MMV403	HDPE (no PTFE)	20 mL	00350822075180	Grey	No	
003	0958_MMV143S	HDPE (no PTFE)	20 mL	00350822081505	Grey	No	
003	0958_MMV143S	HDPE (no PTFE)	20 mL	00350822057628	Grey	No	
004	0958_MMV142S	HDPE (no PTFE)	20 mL	00350822057785	Grey	No	
004	0958_MMV142S	HDPE (no PTFE)	20 mL	00350822081438	Grey	No	
005	0958_QC104	HDPE (no PTFE)	20 mL	00350822057817	Grey	No	
005	0958_QC104	HDPE (no PTFE)	20 mL	00350822057801	Grey	No	
006	0958_MMV141S	HDPE (no PTFE)	20 mL	00350822057605	Grey	No	
006	0958_MMV141S	HDPE (no PTFE)	20 mL	00350854007829	Grey	No	
007	0958_QC106	HDPE (no PTFE)	20 mL	00350822081509	Grey	No	
007	0958_QC106	HDPE (no PTFE)	20 mL	00350822057914	Grey	No	
008	0958_MMV140D	HDPE (no PTFE)	20 mL	00350822075073	Grey	No	
008	0958_MMV140D	HDPE (no PTFE)	20 mL	00350822075112	Grey	No	
009	0958_MMV139I	HDPE (no PTFE)	20 mL	00350822075311	Grey	No	
009	0958_MMV139I	HDPE (no PTFE)	20 mL	00350822075317	Grey	No	
010	0958_MMV138S	HDPE (no PTFE)	20 mL	00350822075174	Grey	No	
010	0958_MMV138S	HDPE (no PTFE)	20 mL	00350822075185	Grey	No	
011	0958_MMV136D	HDPE (no PTFE)	20 mL	00350822075314	Grey	No	
011	0958_MMV136D	HDPE (no PTFE)	20 mL	00350822075307	Grey	No	
012	0958_MMV135I	HDPE (no PTFE)	20 mL	00350822075227	Grey	No	
012	0958_MMV135I	HDPE (no PTFE)	20 mL	00350822075208	Grey	No	
013	0958_MMV123I	HDPE (no PTFE)	20 mL	00350822075122	Grey	No	
013	0958_MMV123I	HDPE (no PTFE)	20 mL	00350822075175	Grey	No	

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFA50MP_23

SITE: Gingin GW - CG

ORDER NO: plas-omp Gingin

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A
Yes No N/A
C

CONTACT PH: [REDACTED] SAMPLER MOBILE: [REDACTED]
QUOTE NO: SY/139/19 B / ES2022MWHAUS0002

014	0958_MMW124D	HDPE (no PTFE)	20 mL	00350822075251	Grey	No	
014	0958_MMW124D	HDPE (no PTFE)	20 mL	00350822075274	Grey	No	
015	0958_MMW122S	HDPE (no PTFE)	20 mL	00350822075362	Grey	No	
015	0958_MMW122S	HDPE (no PTFE)	20 mL	00350822075121	Grey	No	
016	0958_MMW121D	HDPE (no PTFE)	20 mL	00350822075244	Grey	No	
016	0958_MMW121D	HDPE (no PTFE)	20 mL	00350822075247	Grey	No	
017	0958_MMW120I	HDPE (no PTFE)	20 mL	00350822075381	Grey	No	
017	0958_MMW120I	HDPE (no PTFE)	20 mL	00350822075186	Grey	No	
018	0958_MMW119S	HDPE (no PTFE)	20 mL	00350822075338	Grey	No	
019	0958_QC301	HDPE (no PTFE)	20 mL	00350822075329	Grey	No	
019	0958_QC301	HDPE (no PTFE)	20 mL	00350822075232	Grey	No	
020	0958_QC302	HDPE (no PTFE)	20 mL	00350822075289	Grey	No	
020	0958_QC302	HDPE (no PTFE)	20 mL	00350822075355	Grey	No	
021	0958_QC303	HDPE (no PTFE)	20 mL	00350822075216	Grey	No	
021	0958_QC303	HDPE (no PTFE)	20 mL	00350822075171	Grey	No	
022	0958_QC401	HDPE (no PTFE)	20 mL	00350822075273	Grey	No	
022	0958_QC401	HDPE (no PTFE)	20 mL	00350621066542	Grey	No	
023	0958_QC402	HDPE (no PTFE)	20 mL	00350621066573	Grey	No	
023	0958_QC402	HDPE (no PTFE)	20 mL	00350621065817	Grey	No	
024	0958_QC403	HDPE (no PTFE)	20 mL	00350621066286	Grey	No	
024	0958_QC403	HDPE (no PTFE)	20 mL	00350621065567	Grey	No	
024	0958_QC403	HDPE (no PTFE)	20 mL	00350019147933	Grey	No	

Total Bottle Count: ALS: 48, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2304514

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
Telephone :
Facsimile :

E-mail : ALSEnviro.Perth@alsglobal.com
Telephone :
Facsimile :

Project : WA_0958_PFASOMP_23
Order number : pfas-omp Gingin
C-O-C number : 50776
Site : Gingin GW - CG
Sampler :

Page : 1 of 3
Quote number : ES2022MWH AUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 11-Apr-2023 16:50
Client Requested Due : 24-Apr-2023
Date :

Issue Date : 17-Apr-2023
Scheduled Reporting Date : 24-Apr-2023

Delivery Details

Mode of Delivery : Client Drop Off
No. of coolers/boxes : 4
Receipt Detail :

Security Seal : Not Available
Temperature : 24.4 - Ice present
No. of samples received / analysed : 24 / 24

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2304514-001	11-Apr-2023 08:46	0958_MW137S_230411	✓
EP2304514-002	11-Apr-2023 09:27	0958_MW403_230411	✓
EP2304514-003	11-Apr-2023 10:12	0958_MW143S_230411	✓
EP2304514-004	11-Apr-2023 10:26	0958_MW142S_230411	✓
EP2304514-005	11-Apr-2023 10:27	0958_QC104_230411	✓
EP2304514-006	11-Apr-2023 10:48	0958_MW141S_230411	✓
EP2304514-007	11-Apr-2023 10:49	0958_QC106_230411	✓
EP2304514-008	11-Apr-2023 11:19	0958_MW140D_230411	✓
EP2304514-009	11-Apr-2023 11:20	0958_MW139I_230411	✓
EP2304514-010	11-Apr-2023 11:20	0958_MW138S_230411	✓
EP2304514-011	11-Apr-2023 12:16	0958_MW136D_230411	✓
EP2304514-012	11-Apr-2023 12:48	0958_MW135I_230411	✓
EP2304514-013	11-Apr-2023 12:52	0958_MW123I_230411	✓
EP2304514-014	11-Apr-2023 13:19	0958_MW124D_230411	✓
EP2304514-015	11-Apr-2023 13:31	0958_MW122S_230411	✓
EP2304514-016	11-Apr-2023 13:44	0958_MW121D_230411	✓
EP2304514-017	11-Apr-2023 13:45	0958_MW120I_230411	✓
EP2304514-018	11-Apr-2023 13:45	0958_MW119S_230411	✓
EP2304514-019	11-Apr-2023 14:25	0958_QC301_230411	✓
EP2304514-020	11-Apr-2023 14:26	0958_QC302_230411	✓
EP2304514-021	11-Apr-2023 14:27	0958_QC303_230411	✓
EP2304514-022	11-Apr-2023 14:37	0958_QC401_230411	✓
EP2304514-023	11-Apr-2023 14:37	0958_QC402_230411	✓
EP2304514-024	11-Apr-2023 14:38	0958_QC403_230411	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

[REDACTED]

- A4 - AU Tax Invoice (INV)

Email [REDACTED]cardno.com.au

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]

[REDACTED]

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- Chain of Custody (CoC) (COC)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

Email [REDACTED]
Email [REDACTED]
Email [REDACTED]
Email [REDACTED]
Email [REDACTED]
Email [REDACTED]
Email [REDACTED]



CERTIFICATE OF ANALYSIS

Work Order : EP2304514
Client : STANTEC AUSTRALIA PTY LTD
Contact : [REDACTED]
Address : GROUND FLOOR 226 ADELAIDE TERRACE
PERTH 6000
Telephone : ----
Project : WA_0958_PFASOMP_23
Order number : pfas-omp Gingin
C-O-C number : 50776
Sampler : [REDACTED]
Site : Gingin GW - CG
Quote number : SY/139/19 B
No. of samples received : 24
No. of samples analysed : 24

Page : 1 of 17
Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : [REDACTED]
Date Samples Received : 11-Apr-2023 16:50
Date Analysis Commenced : 17-Apr-2023
Issue Date : 19-Apr-2023 15:59



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

[REDACTED]

Senior Organic Chemist

Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: FILTER
 (Matrix: WATER)

Sample ID

0958_MW139I_23041
1

Sampling date / time

11-Apr-2023 11:20

Compound	CAS Number	LOR	Unit
----------	------------	-----	------

EP2304514-009

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----

EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: FILTER
 (Matrix: WATER)

Sample ID

0958_MW139I_23041
1

Sampling date / time

11-Apr-2023 11:20

Compound CAS Number LOR Unit

EP2304514-009

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----

EP231P: PFAS Sums

Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	101	----	----	----	----
13C8-PFOA	----	0.02	%	104	----	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW137S_23041 1	0958_MW403_230411	0958_MW143S_23041 1	0958_MW142S_23041 1	0958_QC104_230411
Sampling date / time				11-Apr-2023 08:46	11-Apr-2023 09:27	11-Apr-2023 10:12	11-Apr-2023 10:26	11-Apr-2023 10:27	
Compound	CAS Number	LOR	Unit	EP2304514-001	EP2304514-002	EP2304514-003	EP2304514-004	EP2304514-005	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.02	<0.01	<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW137S_23041 1	0958_MW403_230411	0958_MW143S_23041 1	0958_MW142S_23041 1	0958_QC104_230411
Sampling date / time					11-Apr-2023 08:46	11-Apr-2023 09:27	11-Apr-2023 10:12	11-Apr-2023 10:26	11-Apr-2023 10:27
Compound	CAS Number	LOR	Unit	EP2304514-001	EP2304514-002	EP2304514-003	EP2304514-004	EP2304514-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.02	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.02	<0.01	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.02	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	103	110	107	109	107	
13C8-PFOA	----	0.02	%	106	102	98.0	95.9	98.7	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW141S_23041 1	0958_QC106_230411	0958_MW140D_23041 1	0958_MW138S_23041 1	0958_MW136D_23041 1
Sampling date / time				11-Apr-2023 10:48	11-Apr-2023 10:49	11-Apr-2023 11:19	11-Apr-2023 11:20	11-Apr-2023 12:16	
Compound	CAS Number	LOR	Unit	EP2304514-006	EP2304514-007	EP2304514-008	EP2304514-010	EP2304514-011	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.04	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.06	0.06	<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	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.04	0.04	<0.01	<0.01	0.04	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW141S_23041 1	0958_QC106_230411	0958_MW140D_23041 1	0958_MW138S_23041 1	0958_MW136D_23041 1
Sampling date / time					11-Apr-2023 10:48	11-Apr-2023 10:49	11-Apr-2023 11:19	11-Apr-2023 11:20	11-Apr-2023 12:16
Compound	CAS Number	LOR	Unit	EP2304514-006	EP2304514-007	EP2304514-008	EP2304514-010	EP2304514-011	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.13	0.10	0.04	0.01	0.04	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.10	0.10	<0.01	0.01	0.04	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.13	0.10	0.04	0.01	0.04	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	106	111	109	108	99.8	
13C8-PFOA	----	0.02	%	105	102	98.4	103	101	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW135I_23041 1	0958_MW123I_23041 1	0958_MW124D_23041 1	0958_MW122S_23041 1	0958_MW121D_23041 1
Sampling date / time				11-Apr-2023 12:48	11-Apr-2023 12:52	11-Apr-2023 13:19	11-Apr-2023 13:31	11-Apr-2023 13:44	
Compound	CAS Number	LOR	Unit	EP2304514-012	EP2304514-013	EP2304514-014	EP2304514-015	EP2304514-016	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.04	<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	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.03	<0.01	0.03	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW135I_23041 1	0958_MW123I_23041 1	0958_MW124D_23041 1	0958_MW122S_23041 1	0958_MW121D_23041 1
Sampling date / time				11-Apr-2023 12:48	11-Apr-2023 12:52	11-Apr-2023 13:19	11-Apr-2023 13:31	11-Apr-2023 13:44	
Compound	CAS Number	LOR	Unit	EP2304514-012	EP2304514-013	EP2304514-014	EP2304514-015	EP2304514-016	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	0.07	<0.01	0.03	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.07	<0.01	0.03	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	0.07	<0.01	0.03	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	112	101	104	102	113	
13C8-PFOA	----	0.02	%	97.8	103	92.4	100	95.9	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW120I_23041 1	0958_MW119S_23041 1	----	----	----
Sampling date / time				11-Apr-2023 13:45	11-Apr-2023 13:45	----	----	----
Compound	CAS Number	LOR	Unit	EP2304514-017	EP2304514-018	-----	-----	-----
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.04	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.05	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW120I_23041 1	0958_MW119S_23041 1	----	----	----
Sampling date / time				11-Apr-2023 13:45	11-Apr-2023 13:45	----	----	----
Compound	CAS Number	LOR	Unit	EP2304514-017	EP2304514-018	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	0.09	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.09	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	0.09	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	96.5	97.9	----	----	----
13C8-PFOA	----	0.02	%	101	104	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_230411	0958_QC302_230411	0958_QC303_230411	0958_QC401_230411	0958_QC402_230411
Sampling date / time				11-Apr-2023 14:25	11-Apr-2023 14:26	11-Apr-2023 14:27	11-Apr-2023 14:37	11-Apr-2023 14:37
Compound	CAS Number	LOR	Unit	EP2304514-019	EP2304514-020	EP2304514-021	EP2304514-022	EP2304514-023
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<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	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_230411	0958_QC302_230411	0958_QC303_230411	0958_QC401_230411	0958_QC402_230411
Sampling date / time				11-Apr-2023 14:25	11-Apr-2023 14:26	11-Apr-2023 14:27	11-Apr-2023 14:37	11-Apr-2023 14:37
Compound	CAS Number	LOR	Unit	EP2304514-019	EP2304514-020	EP2304514-021	EP2304514-022	EP2304514-023
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<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	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	102	97.8	98.5	99.5	97.4
13C8-PFOA	----	0.02	%	95.0	96.0	94.0	97.2	99.0



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

0958_QC403_230411

Sampling date / time

11-Apr-2023 14:38

Compound

CAS Number

LOR

Unit

EP2304514-024

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----

EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

0958_QC403_230411

Sampling date / time

11-Apr-2023 14:38

Compound

CAS Number

LOR

Unit

EP2304514-024

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----

EP231P: PFAS Sums

Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	96.6	----	----	----	----
13C8-PFOA	----	0.02	%	99.4	----	----	----	----



Surrogate Control Limits

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

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

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



QUALITY CONTROL REPORT

Work Order	: EP2304514	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Apr-2023
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 17-Apr-2023
C-O-C number	: 50776	Issue Date	: 19-Apr-2023
Sampler	: [REDACTED], [REDACTED]		
Site	: Gingin GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 24		
No. of samples analysed	: 24		



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
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**



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				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4993903)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	85.7	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	78.6	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	80.7	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	98.1	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	83.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	105	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4996575)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	102	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	107	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	89.3	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	101	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	90.5	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	90.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4993903)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	78.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	80.4	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	76.4	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	76.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	84.0	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	79.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	80.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	73.4	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	81.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	75.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	88.0	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996575)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	87.3	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	93.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	90.2	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	96.2	72.0	130



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996575) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	87.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	85.4	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	89.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	93.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	94.0	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	95.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	99.8	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4993903)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	76.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	74.1	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	75.3	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	78.6	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	84.6	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	94.2	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	79.4	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996575)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	90.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	86.7	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.6	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	99.5	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	96.0	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	97.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4993903)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	82.6	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	79.0	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	80.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	95.6	64.2	133



Sub-Matrix: **WATER**

Method Blank (MB) Report				Laboratory Control Spike (LCS) Report				
				Spike Concentration	Spike Recovery (%)		Acceptable Limits (%)	
					LCS	Low	High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996575)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	91.5	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	81.4	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	86.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	91.3	64.2	133
EP231P: PFAS Sums (QCLot: 4993903)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 4996575)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

- No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2304514	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Apr-2023
Site	: Gingin GW - CG	Issue Date	: 19-Apr-2023
Sampler	: [REDACTED], [REDACTED]	No. of samples received	: 24
Order number	: pfas-omp Gingin	No. of samples analysed	: 24

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Frequency of Quality Control Samples

Matrix: WATER						
Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Method		QC	Regular	Actual	Expected	
		0				
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		0	37	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		0	37	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
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)		11-Apr-2023	17-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔
0958_MW137S_230411,	0958_MW403_230411,							
0958_MW143S_230411,	0958_MW142S_230411,							
0958_QC104_230411,	0958_MW141S_230411,							
0958_QC106_230411,	0958_MW140D_230411,							
0958_MW139I_230411,	0958_MW138S_230411,							
0958_MW136D_230411,	0958_MW135I_230411,							
0958_MW123I_230411,	0958_MW124D_230411,							
0958_MW122S_230411,	0958_MW121D_230411,							
0958_MW120I_230411,	0958_MW119S_230411							
HDPE (no PTFE) (EP231X)		11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔
0958_QC301_230411,	0958_QC302_230411,							
0958_QC303_230411,	0958_QC401_230411,							
0958_QC402_230411,	0958_QC403_230411							



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) 0958_MW137S_230411, 0958_MW143S_230411, 0958_QC104_230411, 0958_QC106_230411, 0958_MW139I_230411, 0958_MW136D_230411, 0958_MW123I_230411, 0958_MW122S_230411, 0958_MW120I_230411,	0958_MW403_230411, 0958_MW142S_230411, 0958_MW141S_230411, 0958_MW140D_230411, 0958_MW138S_230411, 0958_MW135I_230411, 0958_MW124D_230411, 0958_MW121D_230411, 0958_MW119S_230411	11-Apr-2023	17-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔
HDPE (no PTFE) (EP231X) 0958_QC301_230411, 0958_QC303_230411, 0958_QC402_230411,	0958_QC302_230411, 0958_QC401_230411, 0958_QC403_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW137S_230411, 0958_MW143S_230411, 0958_QC104_230411, 0958_QC106_230411, 0958_MW139I_230411, 0958_MW136D_230411, 0958_MW123I_230411, 0958_MW122S_230411, 0958_MW120I_230411,	0958_MW403_230411, 0958_MW142S_230411, 0958_MW141S_230411, 0958_MW140D_230411, 0958_MW138S_230411, 0958_MW135I_230411, 0958_MW124D_230411, 0958_MW121D_230411, 0958_MW119S_230411	11-Apr-2023	17-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔
HDPE (no PTFE) (EP231X) 0958_QC301_230411, 0958_QC303_230411, 0958_QC402_230411,	0958_QC302_230411, 0958_QC401_230411, 0958_QC403_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW137S_230411, 0958_MW143S_230411, 0958_QC104_230411, 0958_QC106_230411, 0958_MW139I_230411, 0958_MW136D_230411, 0958_MW123I_230411, 0958_MW122S_230411, 0958_MW120I_230411,	0958_MW403_230411, 0958_MW142S_230411, 0958_MW141S_230411, 0958_MW140D_230411, 0958_MW138S_230411, 0958_MW135I_230411, 0958_MW124D_230411, 0958_MW121D_230411, 0958_MW119S_230411	11-Apr-2023	17-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔
HDPE (no PTFE) (EP231X) 0958_QC301_230411, 0958_QC303_230411, 0958_QC402_230411,	0958_QC302_230411, 0958_QC401_230411, 0958_QC403_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW137S_230411, 0958_MW143S_230411, 0958_QC104_230411, 0958_QC106_230411, 0958_MW139I_230411, 0958_MW136D_230411, 0958_MW123I_230411, 0958_MW122S_230411, 0958_MW120I_230411,	0958_MW403_230411, 0958_MW142S_230411, 0958_MW141S_230411, 0958_MW140D_230411, 0958_MW138S_230411, 0958_MW135I_230411, 0958_MW124D_230411, 0958_MW121D_230411, 0958_MW119S_230411	11-Apr-2023	17-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔
HDPE (no PTFE) (EP231X) 0958_QC301_230411, 0958_QC303_230411, 0958_QC402_230411,	0958_QC302_230411, 0958_QC401_230411, 0958_QC403_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	19-Apr-2023	08-Oct-2023	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	37	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	37	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth

Work Order Reference
EP2304516



Telephone : 61-8-9476 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0958 PEASOOND_23 client: Stantec

Project Manager:
Phone:

ALS Compass COC Reference: 50776 50779 # Samples: 50780

Sampler:
Phone:

Turnaround Requirements: Standard

Special Instructions:

Please send small exkie to Eurofin (acc23)

Custody:

Relinquished by: <u>STANTEC</u>	Relinquished by: 	Relinquished by:	Received by:
Date / Time: <u>11/04/23 4PM</u>	Date / Time: <u>11/4 1650</u>	Date / Time:	Date / Time:



CHAIN OF CUSTODY

ALS COC#: 50779 ALS Laboratory: EP Perth

CLIENT: MM/HAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFA5OMP_23

SITE: Gingin GW - JS

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Free Ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A

Yes No N/A

°C

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MM/HAUS0002

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MM1011		11/04/2023 08:44 AM	WATER	ALS: 2 Non ALS: 0	No	X		
002	0958_MM1020		11/04/2023 08:55 AM	WATER	ALS: 2 Non ALS: 0	No	X		
003	0958_MM302		11/04/2023 09:11 AM	WATER	ALS: 2 Non ALS: 0	No	X		
004	0958_QC102		11/04/2023 09:13 AM	WATER	ALS: 2 Non ALS: 0	No	X		
005	0958_MM303		11/04/2023 09:29 AM	WATER	ALS: 2 Non ALS: 0	No	X		
006	0958_QC103		11/04/2023 09:32 AM	WATER	ALS: 2 Non ALS: 0	No	X		
007	0958_MM301		11/04/2023 09:45 AM	WATER	ALS: 2 Non ALS: 0	No	X		
008	0958_MM112S		11/04/2023 10:01 AM	WATER	ALS: 4 Non ALS: 0	No	X		
009	0958_MM113S		11/04/2023 10:17 AM	WATER	ALS: 4 Non ALS: 0	No	X		

CLIENT: MMHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP_23

SITE: Gingin GW - JS

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY139/19 B

/ ES2022MMHAUS0002

Yes No N/A
Yes No N/A
C

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_MMW401		11/04/2023 10:33 AM	WATER	ALS: 2 Non ALS: 0	No	X		
011	0958_MMW312		11/04/2023 10:42 AM	WATER	ALS: 2 Non ALS: 0	No	X		
012	0958_QC105		11/04/2023 10:44 AM	WATER	ALS: 2 Non ALS: 0	No	X		
013	0958_MMW313		11/04/2023 11:13 AM	WATER	ALS: 2 Non ALS: 0	No	X		
014	0958_MMW308		11/04/2023 11:58 AM	WATER	ALS: 2 Non ALS: 0	No	X		
015	0958_MMW310		11/04/2023 12:20 PM	WATER	ALS: 4 Non ALS: 0	No	X		
016	0958_MMW309		11/04/2023 12:28 PM	WATER	ALS: 2 Non ALS: 0	No	X		
017	0958_MMW306		11/04/2023 12:42 PM	WATER	ALS: 4 Non ALS: 0	No	X		
018	0958_MMW305		11/04/2023 12:56 PM	WATER	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

ALS COC#: 50779 ALS Laboratory: EP Perth

CLIENT: MMWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_FFASOMP_23

SITE: Gingin GW - JS

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

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

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MMWHAUS0002

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0958_MMW304		11/04/2023 01:10 PM	WATER	ALS: 2 Non ALS: 0	No	X		
020	0958_MMW1050		11/04/2023 01:31 PM	WATER	ALS: 4 Non ALS: 0	No	X		
021	0958_MMW1041		11/04/2023 01:45 PM	WATER	ALS: 2 Non ALS: 0	No	X		
022	0958_MMW114S		11/04/2023 01:56 PM	WATER	ALS: 2 Non ALS: 0	No	X		
023	0958_MMW504		11/04/2023 02:06 PM	WATER	ALS: 2 Non ALS: 0	No	X		
024	0958_MMW505		11/04/2023 02:27 PM	WATER	ALS: 4 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 50779

ALS Laboratory: EP Perth

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSASOMP_23

SITE: Gingin GW - JS

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Biohazard Info:

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

CONTACT PH:

SAMPLER MOBILE:

Random Sample Temperature on Receipt:

°C

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW1011	HDPE (no PTFE)	20 mL	00350822075116	Grey	No	
001	0958_MW1011	HDPE (no PTFE)	20 mL	00350822075161	Grey	No	
002	0958_MW102D	HDPE (no PTFE)	20 mL	00350822075148	Grey	No	
002	0958_MW102D	HDPE (no PTFE)	20 mL	00350822075202	Grey	No	
003	0958_MW302	HDPE (no PTFE)	20 mL	00350822075360	Grey	No	
003	0958_MW302	HDPE (no PTFE)	20 mL	00350822075372	Grey	No	
004	0958_QC102	HDPE (no PTFE)	20 mL	00350822075263	Grey	No	
004	0958_QC102	HDPE (no PTFE)	20 mL	00350822075118	Grey	No	
005	0958_MW303	HDPE (no PTFE)	20 mL	00350822075361	Grey	No	
005	0958_MW303	HDPE (no PTFE)	20 mL	00350822075382	Grey	No	
006	0958_QC103	HDPE (no PTFE)	20 mL	00350822075364	Grey	No	
006	0958_QC103	HDPE (no PTFE)	20 mL	00350822075233	Grey	No	
007	0958_MW301	HDPE (no PTFE)	20 mL	00350822075366	Grey	No	
007	0958_MW301	HDPE (no PTFE)	20 mL	00350822075313	Grey	No	
008	0958_MW112S	HDPE (no PTFE)	20 mL	00350822075131	Grey	No	
008	0958_MW112S	HDPE (no PTFE)	20 mL	00350822075336	Grey	No	
008	0958_MW112S	HDPE (no PTFE)	20 mL	00350822075343	Grey	No	
008	0958_MW112S	HDPE (no PTFE)	20 mL	00350822075184	Grey	No	
009	0958_MW113S	HDPE (no PTFE)	20 mL	00350822075262	Grey	No	
009	0958_MW113S	HDPE (no PTFE)	20 mL	00350822075100	Grey	No	
009	0958_MW113S	HDPE (no PTFE)	20 mL	00350822075235	Grey	No	
009	0958_MW113S	HDPE (no PTFE)	20 mL	00350822075352	Grey	No	
010	0958_MM401	HDPE (no PTFE)	20 mL	00350822075287	Grey	No	
010	0958_MM401	HDPE (no PTFE)	20 mL	00350822075201	Grey	No	
011	0958_MW312	HDPE (no PTFE)	20 mL	00350822075315	Grey	No	
011	0958_MW312	HDPE (no PTFE)	20 mL	00350822075193	Grey	No	



CHAIN OF CUSTODY

COC#: 50779

ALS Laboratory: EP Perth

CLIENT: MMHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFA5OMP_23

SITE: Gingin GW - JS

ORDER NO: plas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard Info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MMHAUS0002

Yes No N/A
Yes No N/A
C

012	0958_QC105	HDPE (no PTFE)	20 mL	00350822075143	Grey	No	
012	0958_QC105	HDPE (no PTFE)	20 mL	00350822075155	Grey	No	
013	0958_MMW313	HDPE (no PTFE)	20 mL	00350822075177	Grey	No	
013	0958_MMW313	HDPE (no PTFE)	20 mL	00350822075260	Grey	No	
014	0958_MMW308	HDPE (no PTFE)	20 mL	00350822075111	Grey	No	
014	0958_MMW308	HDPE (no PTFE)	20 mL	00350822075277	Grey	No	
015	0958_MMW310	HDPE (no PTFE)	20 mL	00350822075218	Grey	No	
015	0958_MMW310	HDPE (no PTFE)	20 mL	00350822075340	Grey	No	
015	0958_MMW310	HDPE (no PTFE)	20 mL	00350621066472	Grey	No	
015	0958_MMW310	HDPE (no PTFE)	20 mL	00350822075194	Grey	No	
016	0958_MMW309	HDPE (no PTFE)	20 mL	00350822075207	Grey	No	
016	0958_MMW309	HDPE (no PTFE)	20 mL	00350822075089	Grey	No	
017	0958_MMW306	HDPE (no PTFE)	20 mL	00350822075231	Grey	No	
017	0958_MMW306	HDPE (no PTFE)	20 mL	00360822075126	Grey	No	
017	0958_MMW306	HDPE (no PTFE)	20 mL	00350822075258	Grey	No	
018	0958_MMW305	HDPE (no PTFE)	20 mL	00350822075361	Grey	No	
018	0958_MMW305	HDPE (no PTFE)	20 mL	00360822075154	Grey	No	
019	0958_MMW304	HDPE (no PTFE)	20 mL	00350822075078	Grey	No	
019	0958_MMW304	HDPE (no PTFE)	20 mL	00350822075197	Grey	No	
020	0958_MMW105D	HDPE (no PTFE)	20 mL	00350822075156	Grey	No	
020	0958_MMW105D	HDPE (no PTFE)	20 mL	00350822075366	Grey	No	
020	0958_MMW105D	HDPE (no PTFE)	20 mL	00350822075306	Grey	No	
021	0958_MMW104I	HDPE (no PTFE)	20 mL	00350822075105	Grey	No	
021	0958_MMW104I	HDPE (no PTFE)	20 mL	00350822075365	Grey	No	
022	0958_MMW114S	HDPE (no PTFE)	20 mL	00350822075237	Grey	No	

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP_23

SITE: Gingin GW - JS

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

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 comments:

022	0958_MW114S	HDPE (no PTFE)	20 mL	00350822075113	Grey	No	
023	0958_MW504	HDPE (no PTFE)	20 mL	00350822075288	Grey	No	
023	0958_MW504	HDPE (no PTFE)	20 mL	00350822075120	Grey	No	
024	0958_MW505	HDPE (no PTFE)	20 mL	00350822075346	Grey	No	
024	0958_MW505	HDPE (no PTFE)	20 mL	00350822075320	Grey	No	
024	0958_MW505	HDPE (no PTFE)	20 mL	00350822075114	Grey	No	
024	0958_MW505	HDPE (no PTFE)	20 mL	00350822075127	Grey	No	

Total Bottle Count: ALS: 60, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2304516

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
Telephone :
Facsimile :

E-mail : ALSEnviro.Perth@alsglobal.com
Telephone :
Facsimile :

Project : WA_0958_PFASOMP_23
Order number : pfas-omp Gingin
C-O-C number : 50779
Site : Gingin GW - JS
Sampler : ,

Page : 1 of 3
Quote number : ES2022MWH AUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 11-Apr-2023 16:50
Client Requested Due : 24-Apr-2023
Date :

Issue Date : 17-Apr-2023
Scheduled Reporting Date : 24-Apr-2023

Delivery Details

Mode of Delivery : Client Drop Off
No. of coolers/boxes : 4
Receipt Detail :

Security Seal : Not Available
Temperature : 24.4 - Ice present
No. of samples received / analysed : 24 / 24

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2304516-001	11-Apr-2023 08:44	0958_MW101I_230411	✓
EP2304516-002	11-Apr-2023 08:55	0958_MW102D_230411	✓
EP2304516-003	11-Apr-2023 09:11	0958_MW302_230411	✓
EP2304516-004	11-Apr-2023 09:13	0958_QC102_230411	✓
EP2304516-005	11-Apr-2023 09:29	0958_MW303_230411	✓
EP2304516-006	11-Apr-2023 09:32	0958_QC103_230411	✓
EP2304516-007	11-Apr-2023 09:45	0958_MW301_230411	✓
EP2304516-008	11-Apr-2023 10:01	0958_MW112S_230411	✓
EP2304516-009	11-Apr-2023 10:17	0958_MW113S_230411	✓
EP2304516-010	11-Apr-2023 10:33	0958_MW401_230411	✓
EP2304516-011	11-Apr-2023 10:42	0958_MW312_230411	✓
EP2304516-012	11-Apr-2023 10:44	0958_QC105_230411	✓
EP2304516-013	11-Apr-2023 11:13	0958_MW313_230411	✓
EP2304516-014	11-Apr-2023 11:58	0958_MW308_230411	✓
EP2304516-015	11-Apr-2023 12:20	0958_MW310_230411	✓
EP2304516-016	11-Apr-2023 12:28	0958_MW309_230411	✓
EP2304516-017	11-Apr-2023 12:42	0958_MW306_230411	✓
EP2304516-018	11-Apr-2023 12:56	0958_MW305_230411	✓
EP2304516-019	11-Apr-2023 13:10	0958_MW304_230411	✓
EP2304516-020	11-Apr-2023 13:31	0958_MW105D_230411	✓
EP2304516-021	11-Apr-2023 13:45	0958_MW104I_230411	✓
EP2304516-022	11-Apr-2023 13:56	0958_MW114S_230411	✓
EP2304516-023	11-Apr-2023 14:06	0958_MW504_230411	✓
EP2304516-024	11-Apr-2023 14:27	0958_MW505_230411	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

[REDACTED]

- A4 - AU Tax Invoice (INV)

Email [REDACTED]cardno.com.au

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]

[REDACTED]

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- Chain of Custody (CoC) (COC)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

Email [REDACTED]
Email [REDACTED]
Email [REDACTED]
Email [REDACTED]
Email [REDACTED]
Email [REDACTED]
Email [REDACTED]



CERTIFICATE OF ANALYSIS

Work Order	: EP2304516	Page	: 1 of 13
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Apr-2023 16:50
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 17-Apr-2023
C-O-C number	: 50779	Issue Date	: 24-Apr-2023 15:28
Sampler	[REDACTED]		
Site	: Gingin GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 24		
No. of samples analysed	: 24		



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

[REDACTED]

Senior Organic Chemist

Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW101I_23041 1	0958_MW102D_23041 1	0958_MW302_230411	0958_QC102_230411	0958_MW303_230411
Sampling date / time				11-Apr-2023 08:44	11-Apr-2023 08:55	11-Apr-2023 09:11	11-Apr-2023 09:13	11-Apr-2023 09:29
Compound	CAS Number	LOR	Unit	EP2304516-001	EP2304516-002	EP2304516-003	EP2304516-004	EP2304516-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.03	<0.02	0.04	0.04	0.12
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	<0.02	0.06	0.06	0.27
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.28	<0.01	1.00	0.91	2.85
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.16	0.16	0.40
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.17	<0.01	0.71	0.71	11.9
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.02	0.02	0.06
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.03	<0.02	0.09	0.09	0.36
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	0.05
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	<0.01	0.14	0.13	0.40
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW101I_23041 1	0958_MW102D_23041 1	0958_MW302_230411	0958_QC102_230411	0958_MW303_230411
Sampling date / time				11-Apr-2023 08:44	11-Apr-2023 08:55	11-Apr-2023 09:11	11-Apr-2023 09:13	11-Apr-2023 09:29
Compound	CAS Number	LOR	Unit	EP2304516-001	EP2304516-002	EP2304516-003	EP2304516-004	EP2304516-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.56	<0.01	2.22	2.12	16.4
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.45	<0.01	1.71	1.62	14.8
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.52	<0.01	2.00	1.90	15.7
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	94.4	98.0	96.1	102	99.9
13C8-PFOA	----	0.02	%	101	99.3	98.9	90.7	94.7



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_QC103_230411	0958_MW301_230411	0958_MW112S_230411 1	0958_MW113S_230411 1	0958_MW401_230411
Sampling date / time				11-Apr-2023 09:32	11-Apr-2023 09:45	11-Apr-2023 10:01	11-Apr-2023 10:17	11-Apr-2023 10:33	
Compound	CAS Number	LOR	Unit	EP2304516-006	EP2304516-007	EP2304516-008	EP2304516-009	EP2304516-010	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.10	0.58	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.25	1.32	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	2.52	11.7	<0.01	<0.01	<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.35	2.67	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	10.8	58.8	<0.01	<0.01	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.04	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	0.2	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.06	0.28	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.34	2.75	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.05	0.63	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.42	2.64	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_QC103_230411	0958_MW301_230411	0958_MW112S_23041 1	0958_MW113S_23041 1	0958_MW401_230411
Sampling date / time					11-Apr-2023 09:32	11-Apr-2023 09:45	11-Apr-2023 10:01	11-Apr-2023 10:17	11-Apr-2023 10:33
Compound	CAS Number	LOR	Unit	EP2304516-006	EP2304516-007	EP2304516-008	EP2304516-009	EP2304516-010	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	14.9	81.6	<0.01	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	13.3	70.5	<0.01	<0.01	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	14.3	77.6	<0.01	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	106	96.6	95.2	105	94.5	
13C8-PFOA	----	0.02	%	99.3	98.6	97.5	102	94.1	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW312_230411	0958_QC105_230411	0958_MW313_230411	0958_MW308_230411	0958_MW310_230411
Sampling date / time				11-Apr-2023 10:42	11-Apr-2023 10:44	11-Apr-2023 11:13	11-Apr-2023 11:58	11-Apr-2023 12:20
Compound	CAS Number	LOR	Unit	EP2304516-011	EP2304516-012	EP2304516-013	EP2304516-014	EP2304516-015
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.04	<0.02	<0.02	0.14	0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	<0.02	<0.02	0.31	0.08
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.32	0.19	0.22	2.77	0.65
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	<0.02	<0.02	0.32	0.21
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.89	0.20	0.25	17.0	11.7
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	0.05	0.03
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	0.04	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.07	0.03	0.03	0.72	0.06
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	0.10	0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	<0.01	<0.01	0.36	0.14
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	0.02	0.07
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	0.03	0.13
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	0.02	0.10
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	0.06
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	0.04
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0958_MW312_230411	0958_QC105_230411	0958_MW313_230411	0958_MW308_230411	0958_MW310_230411
Sampling date / time				11-Apr-2023 10:42	11-Apr-2023 10:44	11-Apr-2023 11:13	11-Apr-2023 11:58	11-Apr-2023 12:20
Compound	CAS Number	LOR	Unit	EP2304516-011	EP2304516-012	EP2304516-013	EP2304516-014	EP2304516-015
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	0.05	0.19
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	1.40	0.42	0.50	21.9	13.5
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.21	0.39	0.47	19.8	12.4
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.34	0.42	0.50	21.2	12.8
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	100	96.4	97.1	95.3	97.9
13C8-PFOA	----	0.02	%	95.6	98.1	95.7	103	94.1



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW309_230411	0958_MW306_230411	0958_MW305_230411	0958_MW304_230411	0958_MW105D_230411
Sampling date / time					11-Apr-2023 12:28	11-Apr-2023 12:42	11-Apr-2023 12:56	11-Apr-2023 13:10	11-Apr-2023 13:31
Compound	CAS Number	LOR	Unit	EP2304516-016	EP2304516-017	EP2304516-018	EP2304516-019	EP2304516-020	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.78	0.45	0.37	0.25	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	1.56	1.28	0.64	0.46	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	20.9	3.28	1.75	2.62	<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	1.12	0.14	0.12	0.15	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	20.4	1.31	4.27	2.33	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.12	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.3	<0.1	0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.62	0.13	0.14	0.07	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	3.39	1.03	0.59	0.42	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.74	0.12	0.06	0.06	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	1.28	0.12	0.10	0.11	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW309_230411	0958_MW306_230411	0958_MW305_230411	0958_MW304_230411	0958_MW105D_230411
Sampling date / time				11-Apr-2023 12:28	11-Apr-2023 12:42	11-Apr-2023 12:56	11-Apr-2023 13:10	11-Apr-2023 13:31
Compound	CAS Number	LOR	Unit	EP2304516-016	EP2304516-017	EP2304516-018	EP2304516-019	EP2304516-020
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	2.33	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	53.5	7.86	8.14	6.47	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	41.3	4.59	6.02	4.95	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	50.7	6.44	7.38	5.86	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	83.8	97.4	97.8	97.2	96.8
13C8-PFOA	----	0.02	%	96.2	97.0	95.4	96.9	93.3



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW104I_23041 1	0958_MW114S_23041 1	0958_MW504_230411	0958_MW505_230411	----
Sampling date / time				11-Apr-2023 13:45	11-Apr-2023 13:56	11-Apr-2023 14:06	11-Apr-2023 14:27	----
Compound	CAS Number	LOR	Unit	EP2304516-021	EP2304516-022	EP2304516-023	EP2304516-024	-----
				Result	Result	Result	Result	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.28	<0.02	0.10	<0.02	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.36	0.02	0.28	<0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	1.87	0.23	4.29	0.10	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.14	<0.02	0.58	<0.02	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.26	0.55	11.8	0.20	----
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	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.10	<0.02	0.07	<0.02	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.51	0.03	0.46	0.02	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.08	<0.02	0.05	<0.02	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.13	0.01	0.35	<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 (PFTTrDA)	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								
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	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW104I_23041 1	0958_MW114S_23041 1	0958_MW504_230411	0958_MW505_230411	----
Sampling date / time				11-Apr-2023 13:45	11-Apr-2023 13:56	11-Apr-2023 14:06	11-Apr-2023 14:27	----
Compound	CAS Number	LOR	Unit	EP2304516-021	EP2304516-022	EP2304516-023	EP2304516-024	-----
				Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
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	4.73	0.84	18.0	0.32	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	3.13	0.78	16.1	0.30	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	4.23	0.82	17.1	0.32	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	99.8	91.3	92.5	100	----
13C8-PFOA	----	0.02	%	100	102	103	99.8	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2304516	Page	: 1 of 11
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Apr-2023
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 17-Apr-2023
C-O-C number	: 50779	Issue Date	: 24-Apr-2023
Sampler	: [REDACTED]		
Site	: Gingin GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 24		
No. of samples analysed	: 24		



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
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4996577)									
EP2304516-008	0958_MW112S_230411	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2304516-015	0958_MW310_230411	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.65	0.69	5.7	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	11.7	11.0	6.5	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.08	0.10	25.9	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.21	0.22	8.4	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.03	<0.02	44.2	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4996583)									
EP2304516-024	0958_MW505_230411	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.10	0.10	0.0	0% - 50%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.20	0.21	6.0	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2304517-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.03	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit



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: 4996583) - continued									
EP2304517-005	Anonymous	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4996577)									
EP2304516-008	0958_MW112S_230411	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2304516-015	0958_MW310_230411	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.14	0.14	0.0	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.06	0.08	32.8	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.07	0.07	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.13	0.13	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	0.10	0.10	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	0.06	0.05	21.9	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4996583)									
EP2304516-024	0958_MW505_230411	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2304517-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4996583) - continued									
EP2304517-005	Anonymous	EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4996577)									
EP2304516-008	0958_MW112S_230411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2304516-015	0958_MW310_230411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.04	0.03	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4996583)									
EP2304516-024	0958_MW505_230411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4996583) - continued									
EP2304516-024	0958_MW505_230411	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2304517-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4996577)							
EP2304516-008	0958_MW112S_230411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2304516-015	0958_MW310_230411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	0.19	0.19	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4996583)									
EP2304516-024	0958_MW505_230411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2304516
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP_23



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4996583) - continued									
EP2304516-024	0958_MW505_230411	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2304517-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4996577)									
EP2304516-008	0958_MW112S_230411	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EP2304516-015	0958_MW310_230411	EP231X: Sum of PFAS	----	0.01	µg/L	13.5	12.8	5.0	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	12.4	11.7	5.5	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	12.8	12.1	5.1	0% - 20%
EP231P: PFAS Sums (QC Lot: 4996583)									
EP2304516-024	0958_MW505_230411	EP231X: Sum of PFAS	----	0.01	µg/L	0.32	0.31	3.2	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.30	0.31	3.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.32	0.31	3.2	0% - 20%
EP2304517-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.02	0.03	40.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	0.03	40.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.02	0.03	40.0	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				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4996577)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	87.7	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	91.2	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	84.3	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	98.3	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	89.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	116	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4996583)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	95.4	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	93.1	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	81.8	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	83.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	82.3	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.0	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996577)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	94.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	91.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	92.8	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	93.8	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	99.4	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	101	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	105	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	104	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	101	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	102	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996583)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	81.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	84.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	88.2	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	85.4	72.0	130



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996583) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	87.0	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	84.8	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	88.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	91.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	89.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	81.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	92.2	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996577)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	97.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	102	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	96.1	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	104	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	107	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	102	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	98.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996583)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	73.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	85.7	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	73.3	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	93.8	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	76.5	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	89.8	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	90.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996577)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	95.2	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	99.0	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	102	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	111	64.2	133



Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit						
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996583)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	89.8	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	103	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	91.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	85.9	64.2	133
EP231P: PFAS Sums (QCLot: 4996577)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 4996583)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 4996577)							
EP2304516-009	0958_MW113S_230411	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	91.5	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	112	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	86.8	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	109	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	88.6	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	84.9	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4996583)							
EP2304517-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	103	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	119	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	# Not Determined	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	103	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	# Not Determined	65.0	140



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: 4996583) - continued							
EP2304517-001	Anonymous	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	95.0	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996577)							
EP2304516-009	0958_MW113S_230411	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	87.1	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	84.6	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	86.0	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	93.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	87.0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	86.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	99.8	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	92.6	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	81.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	78.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	85.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996583)							
EP2304517-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	84.4	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	90.3	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	91.9	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	106	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	99.5	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	95.6	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	91.2	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	103	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	105	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	100	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	113	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996577)							
EP2304516-009	0958_MW113S_230411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	91.8	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	95.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	81.1	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	89.9	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	95.1	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	84.8	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	82.8	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996583)							
EP2304517-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	90.0	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	98.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.6	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	97.4	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	96.6	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	106	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	103	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996577)							
EP2304516-009	0958_MW113S_230411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	98.3	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	110	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	81.9	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	78.5	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996583)							
EP2304517-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	105	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	97.7	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	98.3	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2304516	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Apr-2023
Site	: Gingin GW - JS	Issue Date	: 24-Apr-2023
Sampler	: [REDACTED]	No. of samples received	: 24
Order number	: pfas-omp Gingin	No. of samples analysed	: 24

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2304517--001	Anonymous	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	EP2304517--001	Anonymous	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

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.

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)	11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	20-Apr-2023	08-Oct-2023	✓	
0958_MW101I_230411,								0958_MW102D_230411,
0958_MW302_230411,								0958_QC102_230411,
0958_MW303_230411,								0958_QC103_230411,
0958_MW301_230411,								0958_MW112S_230411,
0958_MW113S_230411,								0958_MW401_230411,
0958_MW312_230411,								0958_QC105_230411,
0958_MW313_230411,								0958_MW308_230411,
0958_MW310_230411,								0958_MW309_230411,
0958_MW306_230411,								0958_MW305_230411,
0958_MW304_230411,								0958_MW105D_230411,
0958_MW104I_230411,								0958_MW114S_230411,
0958_MW504_230411,	0958_MW505_230411							

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) 0958_MW101I_230411, 0958_MW302_230411, 0958_MW303_230411, 0958_MW301_230411, 0958_MW113S_230411, 0958_MW312_230411, 0958_MW313_230411, 0958_MW310_230411, 0958_MW306_230411, 0958_MW304_230411, 0958_MW104I_230411, 0958_MW504_230411,	0958_MW102D_230411, 0958_QC102_230411, 0958_QC103_230411, 0958_MW112S_230411, 0958_MW401_230411, 0958_QC105_230411, 0958_MW308_230411, 0958_MW309_230411, 0958_MW305_230411, 0958_MW105D_230411, 0958_MW114S_230411, 0958_MW505_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	20-Apr-2023	08-Oct-2023	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW101I_230411, 0958_MW302_230411, 0958_MW303_230411, 0958_MW301_230411, 0958_MW113S_230411, 0958_MW312_230411, 0958_MW313_230411, 0958_MW310_230411, 0958_MW306_230411, 0958_MW304_230411, 0958_MW104I_230411, 0958_MW504_230411,	0958_MW102D_230411, 0958_QC102_230411, 0958_QC103_230411, 0958_MW112S_230411, 0958_MW401_230411, 0958_QC105_230411, 0958_MW308_230411, 0958_MW309_230411, 0958_MW305_230411, 0958_MW105D_230411, 0958_MW114S_230411, 0958_MW505_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	20-Apr-2023	08-Oct-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW101I_230411, 0958_MW302_230411, 0958_MW303_230411, 0958_MW301_230411, 0958_MW113S_230411, 0958_MW312_230411, 0958_MW313_230411, 0958_MW310_230411, 0958_MW306_230411, 0958_MW304_230411, 0958_MW104I_230411, 0958_MW504_230411,	0958_MW102D_230411, 0958_QC102_230411, 0958_QC103_230411, 0958_MW112S_230411, 0958_MW401_230411, 0958_QC105_230411, 0958_MW308_230411, 0958_MW309_230411, 0958_MW305_230411, 0958_MW105D_230411, 0958_MW114S_230411, 0958_MW505_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	20-Apr-2023	08-Oct-2023	✓

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)		11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	20-Apr-2023	08-Oct-2023	✓
0958_MW101I_230411,	0958_MW102D_230411,							
0958_MW302_230411,	0958_QC102_230411,							
0958_MW303_230411,	0958_QC103_230411,							
0958_MW301_230411,	0958_MW112S_230411,							
0958_MW113S_230411,	0958_MW401_230411,							
0958_MW312_230411,	0958_QC105_230411,							
0958_MW313_230411,	0958_MW308_230411,							
0958_MW310_230411,	0958_MW309_230411,							
0958_MW306_230411,	0958_MW305_230411,							
0958_MW304_230411,	0958_MW105D_230411,							
0958_MW104I_230411,	0958_MW114S_230411,							
0958_MW504_230411,	0958_MW505_230411							



Quality Control Parameter Frequency Compliance

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

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

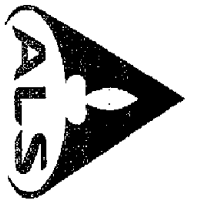
Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2304517



Telephone : 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0958 - PEASOFT - 23 Client: Stantec Project Manager: [Redacted]

ALS Compass COC Reference: 50776 50780 # Samples: 50779 Sampler: [Redacted]
Phone: [Redacted]

Turnaround Requirements: Standard ✓

Special Instructions:

Please send small ekie to Eurofin (acc's)

Custody:			
Relinquished by: <u>STANTEC</u>	R <u>[Redacted]</u>	Relinquished by:	Received by:
Date / Time: <u>11/04/23 4:57</u>	Date / Time: <u>11/4 1650</u>	Date / Time:	Date / Time:

**CHAIN OF CUSTODY**

ALS) COC#: 50780

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFA5OMP_23

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

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

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MM402		11/04/2023 08:53 AM	WATER	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab QC
002	0958_POT103		11/04/2023 09:08 AM	WATER	ALS: 2 Non ALS: 0	No	X		
003	0958_QC101		11/04/2023 09:08 AM	WATER	ALS: 2 Non ALS: 0	No	X		
004	0958_MM133D		11/04/2023 09:50 AM	WATER	ALS: 2 Non ALS: 0	No	X		
005	0958_MM1321		11/04/2023 10:10 AM	WATER	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab QC
006	0958_MM131D		11/04/2023 10:18 AM	WATER	ALS: 2 Non ALS: 0	No	X		
007	0958_MM130D		11/04/2023 10:35 AM	WATER	ALS: 2 Non ALS: 0	No	X		
008	0958_MM129S		11/04/2023 10:47 AM	WATER	ALS: 2 Non ALS: 0	No	X		
009	0958_MM128D		11/04/2023 11:02 AM	WATER	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 50780

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSASOMP_23

SITE: Gingin GW - MB

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

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 comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_QC107		11/04/2023 11:03 AM	WATER	ALS: 2 Non ALS: 0	No	X		
011	0958_MW1261		11/04/2023 11:18 AM	WATER	ALS: 4 Non ALS: 0	No	X		
012	0958_MW1255		11/04/2023 11:40 AM	WATER	ALS: 2 Non ALS: 0	No	X		
013	0958_MW1065		11/04/2023 12:01 PM	WATER	ALS: 2 Non ALS: 0	No	X		
014	0958_MW1155		11/04/2023 12:20 PM	WATER	ALS: 2 Non ALS: 0	No	X		
015	0958_MW1095		11/04/2023 12:37 PM	WATER	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab QC
016	0958_MW1105		11/04/2023 12:50 PM	WATER	ALS: 2 Non ALS: 0	No	X		
017	0958_POT102		11/04/2023 01:24 PM	WATER	ALS: 2 Non ALS: 0	No	X		
018	0958_MW1165		11/04/2023 01:39 PM	WATER	ALS: 2 Non ALS: 0	No	X		

CLIENT: MMHAUS - STANTEC AUSTRALIA PTY LTD	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
PROJECT: WA_0958_PFSOMP_23	DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:
SITE: Gingin GW - MB	TURNAROUND REQUIREMENTS: 5 Days		LABORATORY USE ONLY (Circle)	
ORDER NO: pfas-omp Gingin	Biohazard info:		Custody Seal Intact? Yes No N/A	
PROJECT MANAGER:	CONTACT PH:	SAMPLER MOBILE:	Free ice / frozen ice bricks present upon receipt? Yes No N/A	
PRIMARY SAMPLER:	QUOTE NO: SY/139/19 B / ES2022MMHAUS0002		Random Sample Temperature on Receipt: °C	
EMAIL REPORTS TO:	Other comments:			
EMAIL INVOICES TO:				

SAMPLE DETAILS					ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	ADDITIONAL INFORMATION
019	0958_MMW1171		11/04/2023 01:55 PM	WATER	ALS: 4 Non ALS: 0	No	
020	0958_MMW118D		11/04/2023 02:07 PM	WATER	ALS: 2 Non ALS: 0	No	
021	0958_POT104		11/04/2023 02:18 PM	WATER	ALS: 2 Non ALS: 0	No	



CHAIN OF CUSTODY

ALS COC#: 50780 ALS Laboratory: EP Perth

CLIENT: MWH/HAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFA5OMP_23

SITE: Girdgin GW - MB

ORDER NO: pfas-omp Girdgin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Free Ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A

Yes No N/A

°C

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY139/19 B

/ ES2022MWH/HAUS0002

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW402	HDPE (no PTFE)	20 mL	00350522039129	Grey	No	
001	0958_MW402	HDPE (no PTFE)	20 mL	00350822075141	Grey	No	
001	0958_MW402	HDPE (no PTFE)	20 mL	00350522039250	Grey	No	
001	0958_MW402	HDPE (no PTFE)	20 mL	00350822075270	Grey	No	
002	0958_POT103	HDPE (no PTFE)	20 mL	00350822075075	Grey	No	
002	0958_POT103	HDPE (no PTFE)	20 mL	00350822075091	Grey	No	
003	0958_QC101	HDPE (no PTFE)	20 mL	00350522039171	Grey	No	
003	0958_QC101	HDPE (no PTFE)	20 mL	00350522039249	Grey	No	
004	0958_MW133D	HDPE (no PTFE)	20 mL	00350822075369	Grey	No	
004	0958_MW133D	HDPE (no PTFE)	20 mL	00350822075162	Grey	No	
005	0958_MW132I	HDPE (no PTFE)	20 mL	00350822075153	Grey	No	
005	0958_MW132I	HDPE (no PTFE)	20 mL	00350822075147	Grey	No	
005	0958_MW132I	HDPE (no PTFE)	20 mL	00350522039103	Grey	No	
005	0958_MW132I	HDPE (no PTFE)	20 mL	00350522039044	Grey	No	
006	0958_MW131D	HDPE (no PTFE)	20 mL	00350822075222	Grey	No	
006	0958_MW131D	HDPE (no PTFE)	20 mL	00350822075098	Grey	No	
007	0958_MW130D	HDPE (no PTFE)	20 mL	00350822075350	Grey	No	
007	0958_MW130D	HDPE (no PTFE)	20 mL	00350822075335	Grey	No	
008	0958_MW129S	HDPE (no PTFE)	20 mL	00350822075305	Grey	No	
008	0958_MW129S	HDPE (no PTFE)	20 mL	00350822075339	Grey	No	
009	0958_MW128D	HDPE (no PTFE)	20 mL	00350822075128	Grey	No	
009	0958_MW128D	HDPE (no PTFE)	20 mL	00350822075248	Grey	No	
010	0958_QC107	HDPE (no PTFE)	20 mL	00350522039131	Grey	No	
010	0958_QC107	HDPE (no PTFE)	20 mL	00350522039052	Grey	No	
011	0958_MW126I	HDPE (no PTFE)	20 mL	00350522039295	Grey	No	
011	0958_MW126I	HDPE (no PTFE)	20 mL	00350522039180	Grey	No	

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PASOMP_23

SITE: Girgin GW - MB

ORDER NO: pfas-omp Girgin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

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 comments:

011	0958_MM1261	HDPE (no PTFE)	20 mL	00350822057746	Grey	No	
011	0958_MM1261	HDPE (no PTFE)	20 mL	00350822057611	Grey	No	
012	0958_MM125S	HDPE (no PTFE)	20 mL	00350822075328	Grey	No	
012	0958_MM125S	HDPE (no PTFE)	20 mL	00350822075304	Grey	No	
013	0958_MM106S	HDPE (no PTFE)	20 mL	00350822075275	Grey	No	
013	0958_MM106S	HDPE (no PTFE)	20 mL	00350822075284	Grey	No	
014	0958_MM115S	HDPE (no PTFE)	20 mL	00350822075359	Grey	No	
014	0958_MM115S	HDPE (no PTFE)	20 mL	00350822075310	Grey	No	
015	0958_MM109S	HDPE (no PTFE)	20 mL	00350522039036	Grey	No	
015	0958_MM109S	HDPE (no PTFE)	20 mL	00350522039105	Grey	No	
015	0958_MM109S	HDPE (no PTFE)	20 mL	00350822075151	Grey	No	
015	0958_MM109S	HDPE (no PTFE)	20 mL	00350822075383	Grey	No	
015	0958_MM109S	HDPE (no PTFE)	20 mL	00350822075341	Grey	No	
016	0958_MM110S	HDPE (no PTFE)	20 mL	00350822075344	Grey	No	
016	0958_MM110S	HDPE (no PTFE)	20 mL	00350822075326	Grey	No	
017	0958_POT102	HDPE (no PTFE)	20 mL	00350822075077	Grey	No	
017	0958_POT102	HDPE (no PTFE)	20 mL	00350822075271	Grey	No	
018	0958_MM116S	HDPE (no PTFE)	20 mL	00350822075164	Grey	No	
018	0958_MM116S	HDPE (no PTFE)	20 mL	00350622039304	Grey	No	
019	0958_MM1171	HDPE (no PTFE)	20 mL	00350622039275	Grey	No	
019	0958_MM1171	HDPE (no PTFE)	20 mL	00350822075187	Grey	No	
019	0958_MM1171	HDPE (no PTFE)	20 mL	00350822075312	Grey	No	
019	0958_MM1171	HDPE (no PTFE)	20 mL	00350822075196	Grey	No	
020	0958_MM118D	HDPE (no PTFE)	20 mL	00350822075368	Grey	No	
021	0958_POT104	HDPE (no PTFE)	20 mL	00350822075093	Grey	No	
021	0958_POT104	HDPE (no PTFE)	20 mL	00350822075299	Grey	No	

Total Bottle Count: ALS: 52, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2304517

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
Telephone :
Facsimile :

E-mail : ALSEnviro.Perth@alsglobal.com
Telephone :
Facsimile :

Project : WA_0958_PFASOMP_23
Order number : pfas-omp Gingin
C-O-C number : 50780
Site : Gingin GW - MB
Sampler : ,

Page : 1 of 3
Quote number : ES2022MWHAUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 11-Apr-2023 16:50
Client Requested Due : 24-Apr-2023
Date :

Issue Date : 17-Apr-2023
Scheduled Reporting Date : **24-Apr-2023**

Delivery Details

Mode of Delivery : Client Drop Off
No. of coolers/boxes : 4
Receipt Detail :

Security Seal : Not Available
Temperature : 24.4 - Ice present
No. of samples received / analysed : 21 / 21

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2304517-001	11-Apr-2023 08:53	0958_MW402_230411	✓
EP2304517-002	11-Apr-2023 09:08	0958_POT103_230411	✓
EP2304517-003	11-Apr-2023 09:08	0958_QC101_230411	✓
EP2304517-004	11-Apr-2023 09:50	0958_MW133D_230411	✓
EP2304517-005	11-Apr-2023 10:10	0958_MW132I_230411	✓
EP2304517-006	11-Apr-2023 10:18	0958_MW131D_230411	✓
EP2304517-007	11-Apr-2023 10:35	0958_MW130D_230411	✓
EP2304517-008	11-Apr-2023 10:47	0958_MW129S_230411	✓
EP2304517-009	11-Apr-2023 11:02	0958_MW128D_230411	✓
EP2304517-010	11-Apr-2023 11:03	0958_QC107_230411	✓
EP2304517-011	11-Apr-2023 11:18	0958_MW126I_230411	✓
EP2304517-012	11-Apr-2023 11:40	0958_MW125S_230411	✓
EP2304517-013	11-Apr-2023 12:01	0958_MW106S_230411	✓
EP2304517-014	11-Apr-2023 12:20	0958_MW115S_230411	✓
EP2304517-015	11-Apr-2023 12:37	0958_MW109S_230411	✓
EP2304517-016	11-Apr-2023 12:50	0958_MW110S_230411	✓
EP2304517-017	11-Apr-2023 13:24	0958_POT102_230411	✓
EP2304517-018	11-Apr-2023 13:39	0958_MW116S_230411	✓
EP2304517-019	11-Apr-2023 13:55	0958_MW117I_230411	✓
EP2304517-020	11-Apr-2023 14:07	0958_MW118D_230411	✓
EP2304517-021	11-Apr-2023 14:18	0958_POT104_230411	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

[REDACTED]	
- A4 - AU Tax Invoice (INV)	Email [REDACTED]cardno.com.au
DERP LAB REPORTS	
- EDI Format - ESDAT (ESDAT)	Email [REDACTED]
[REDACTED]	
- *AU Certificate of Analysis - NATA (COA)	Email [REDACTED]
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email [REDACTED]
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email [REDACTED]
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email [REDACTED]
- Chain of Custody (CoC) (COC)	Email [REDACTED]
- EDI Format - ESDAT (ESDAT)	Email [REDACTED]
- EDI Format - XTab (XTAB)	Email [REDACTED]



CERTIFICATE OF ANALYSIS

Work Order	: EP2304517	Page	: 1 of 13
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Apr-2023 16:50
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 17-Apr-2023
C-O-C number	: 50780	Issue Date	: 21-Apr-2023 16:49
Sampler	: [REDACTED], [REDACTED]		
Site	: Gingin GW - MB		
Quote number	: SY/139/19 B		
No. of samples received	: 21		
No. of samples analysed	: 21		



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
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW402_230411	0958_MW133D_230411	0958_MW132I_230411	0958_MW131D_230411	0958_MW130D_230411
				1	1	1	1	1
Sampling date / time				11-Apr-2023 08:53	11-Apr-2023 09:50	11-Apr-2023 10:10	11-Apr-2023 10:18	11-Apr-2023 10:35
Compound	CAS Number	LOR	Unit	EP2304517-001	EP2304517-004	EP2304517-005	EP2304517-006	EP2304517-007
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.12	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.16	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.89	0.01	0.02	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.10	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.68	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.03	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.17	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.03	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.06	<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	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW402_230411	0958_MW133D_230411	0958_MW132I_230411	0958_MW131D_230411	0958_MW130D_230411
					1	1	1	1	1
Sampling date / time				11-Apr-2023 08:53	11-Apr-2023 09:50	11-Apr-2023 10:10	11-Apr-2023 10:18	11-Apr-2023 10:35	
Compound	CAS Number	LOR	Unit	EP2304517-001	EP2304517-004	EP2304517-005	EP2304517-006	EP2304517-007	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	2.24	0.01	0.02	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.57	0.01	0.02	<0.01	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.98	0.01	0.02	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	105	103	98.8	100	97.1	
13C8-PFOA	----	0.02	%	96.9	98.3	99.9	99.4	99.8	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW129S_23041 1	0958_MW128D_23041 1	0958_QC107_230411	0958_MW126I_23041 1	0958_MW125S_23041 1
Sampling date / time				11-Apr-2023 10:47	11-Apr-2023 11:02	11-Apr-2023 11:03	11-Apr-2023 11:18	11-Apr-2023 11:40	
Compound	CAS Number	LOR	Unit	EP2304517-008	EP2304517-009	EP2304517-010	EP2304517-011	EP2304517-012	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<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	<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW129S_23041 1	0958_MW128D_23041 1	0958_QC107_230411	0958_MW126I_23041 1	0958_MW125S_23041 1
Sampling date / time				11-Apr-2023 10:47	11-Apr-2023 11:02	11-Apr-2023 11:03	11-Apr-2023 11:18	11-Apr-2023 11:40	
Compound	CAS Number	LOR	Unit	EP2304517-008	EP2304517-009	EP2304517-010	EP2304517-011	EP2304517-012	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	<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	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	91.1	102	104	112	106	
13C8-PFOA	----	0.02	%	100	102	102	100	102	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW106S_23041 1	0958_MW115S_23041 1	0958_MW109S_23041 1	0958_MW110S_23041 1	0958_MW116S_23041 1
Sampling date / time				11-Apr-2023 12:01	11-Apr-2023 12:20	11-Apr-2023 12:37	11-Apr-2023 12:50	11-Apr-2023 13:39	
Compound	CAS Number	LOR	Unit	EP2304517-013	EP2304517-014	EP2304517-015	EP2304517-016	EP2304517-018	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.07	0.18	0.02	0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.13	0.35	0.03	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW106S_23041 1	0958_MW115S_23041 1	0958_MW109S_23041 1	0958_MW110S_23041 1	0958_MW116S_23041 1
Sampling date / time				11-Apr-2023 12:01	11-Apr-2023 12:20	11-Apr-2023 12:37	11-Apr-2023 12:50	11-Apr-2023 13:39	
Compound	CAS Number	LOR	Unit	EP2304517-013	EP2304517-014	EP2304517-015	EP2304517-016	EP2304517-018	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	0.20	0.56	0.05	0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.20	0.53	0.05	0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	0.20	0.54	0.05	0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	107	104	105	105	109	
13C8-PFOA	----	0.02	%	101	98.6	102	101	102	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW117I_23041 1	0958_MW118D_23041 1	----	----	----
Sampling date / time				11-Apr-2023 13:55	11-Apr-2023 14:07	----	----	----
Compound	CAS Number	LOR	Unit	EP2304517-019	EP2304517-020	-----	-----	-----
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.01	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW117I_23041 1	0958_MW118D_23041 1	----	----	----
Sampling date / time				11-Apr-2023 13:55	11-Apr-2023 14:07	----	----	----
Compound	CAS Number	LOR	Unit	EP2304517-019	EP2304517-020	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.01	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	109	105	----	----	----
13C8-PFOA	----	0.02	%	104	105	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0958_POT103_23041 1	0958_QC101_230411	0958_POT102_23041 1	0958_POT104_23041 1	----
Sampling date / time				11-Apr-2023 09:08	11-Apr-2023 09:08	11-Apr-2023 13:24	11-Apr-2023 14:18	----	
Compound	CAS Number	LOR	Unit	EP2304517-002	EP2304517-003	EP2304517-017	EP2304517-021	-----	
				Result	Result	Result	Result	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.04	0.04	0.04	0.04	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	0.05	0.05	0.06	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.29	0.30	0.25	0.30	----	
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	0.19	0.20	0.18	0.20	----	
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	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.04	0.04	0.03	0.03	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.17	0.17	0.16	0.14	----	
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	0.03	0.03	0.02	0.02	----	
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									
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	----	



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0958_POT103_23041 1	0958_QC101_230411	0958_POT102_23041 1	0958_POT104_23041 1	----
Sampling date / time				11-Apr-2023 09:08	11-Apr-2023 09:08	11-Apr-2023 13:24	11-Apr-2023 14:18	----
Compound	CAS Number	LOR	Unit	EP2304517-002	EP2304517-003	EP2304517-017	EP2304517-021	-----
				Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
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	0.82	0.85	0.73	0.79	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.48	0.50	0.43	0.50	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.76	0.78	0.68	0.73	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	96.1	98.3	111	105	----
13C8-PFOA	----	0.02	%	102	100	103	103	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	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	: EP2304517	Page	: 1 of 10
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Apr-2023
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 17-Apr-2023
C-O-C number	: 50780	Issue Date	: 21-Apr-2023
Sampler	: [REDACTED]		
Site	: Gingin GW - MB		
Quote number	: SY/139/19 B		
No. of samples received	: 21		
No. of samples analysed	: 21		



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
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4996583)									
EP2304516-024	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.10	0.10	0.0	0% - 50%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.20	0.21	6.0	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2304517-005	0958_MW132I_230411	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.03	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4996586)									
EP2304517-019	0958_MW117I_230411	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.01	0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4996583)									
EP2304516-024	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4996583) - continued									
EP2304516-024	Anonymous	EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2304517-005	0958_MW132I_230411	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4996586)									
EP2304517-019	0958_MW117I_230411	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4996583)									
EP2304516-024	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 4996583) - continued									
EP2304516-024	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2304517-005	0958_MW132I_230411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4996586)							
EP2304517-019	0958_MW117I_230411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4996583)									
EP2304516-024	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4996583) - continued									
EP2304517-005	0958_MW132I_230411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4996586)									
EP2304517-019	0958_MW117I_230411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4996583)									
EP2304516-024	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.32	0.31	3.2	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.30	0.31	3.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.32	0.31	3.2	0% - 20%
EP2304517-005	0958_MW132I_230411	EP231X: Sum of PFAS	----	0.01	µg/L	0.02	0.03	40.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	0.03	40.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.02	0.03	40.0	No Limit
EP231P: PFAS Sums (QC Lot: 4996586)									
EP2304517-019	0958_MW117I_230411	EP231X: Sum of PFAS	----	0.01	µg/L	0.01	0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.01	0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.01	0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

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: 4996583)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	95.4	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	93.1	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	81.8	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	83.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	82.3	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.0	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4996586)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	97.6	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	116	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	86.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	91.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	94.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	83.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996583)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	81.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	84.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	88.2	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	85.4	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	87.0	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	84.8	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	88.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	91.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	89.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	81.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	92.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996586)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	83.3	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	86.4	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	89.2	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	91.0	72.0	130



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996586) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	92.6	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	93.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	93.2	72.0	134
EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	90.6	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	94.0	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996583)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	73.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	85.7	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	73.3	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	93.8	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	76.5	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	89.8	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	90.2	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996586)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	85.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	93.2	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	72.5	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	93.9	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	94.2	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	108	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	100	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996583)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	89.8	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	103	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	91.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	85.9	64.2	133



Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit						
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996586)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	96.9	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	108	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	99.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	96.7	64.2	133
EP231P: PFAS Sums (QCLot: 4996583)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 4996586)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 4996583)							
EP2304517-001	0958_MW402_230411	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	103	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	119	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	# Not Determined	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	103	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	# Not Determined	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	95.0	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4996586)							
EP2304520-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	126	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	122	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	116	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	114	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	123	65.0	140



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: 4996586) - continued							
EP2304520-001	Anonymous	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	106	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996583)							
EP2304517-001	0958_MW402_230411	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	84.4	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	90.3	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	91.9	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	106	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	99.5	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	95.6	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	91.2	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	103	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	105	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	100	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	113	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996586)							
EP2304520-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	108	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	106	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	122	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	126	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	119	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	117	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	115	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	111	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	102	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	97.5	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	105	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996583)							
EP2304517-001	0958_MW402_230411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	90.0	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	98.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.6	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	97.4	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	96.6	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	106	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	103	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996586)							
EP2304520-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	100	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	91.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	104	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	99.8	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	113	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996583)							
EP2304517-001	0958_MW402_230411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	105	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	97.7	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	98.3	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996586)							
EP2304520-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	125	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	137	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	118	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	103	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2304517	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 11-Apr-2023
Site	: Gingin GW - MB	Issue Date	: 21-Apr-2023
Sampler	: [REDACTED]	No. of samples received	: 21
Order number	: pfas-omp Gingin	No. of samples analysed	: 21

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2304517--001	0958_MW402_230411	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	EP2304517--001	0958_MW402_230411	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC 3	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMS/MS	3	40	7.50	10.00	NEPM 2013 B3 & ALS QC Standard

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW402_230411, 0958_QC101_230411, 0958_MW132I_230411, 0958_MW130D_230411, 0958_MW128D_230411, 0958_MW126I_230411, 0958_MW106S_230411, 0958_MW109S_230411,	0958_POT103_230411, 0958_MW133D_230411, 0958_MW131D_230411, 0958_MW129S_230411, 0958_QC107_230411, 0958_MW125S_230411, 0958_MW115S_230411, 0958_MW110S_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	20-Apr-2023	08-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0958_POT102_230411, 0958_MW117I_230411, 0958_POT104_230411	0958_MW116S_230411, 0958_MW118D_230411,	11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	21-Apr-2023	08-Oct-2023	✓



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0958_MW402_230411, 0958_QC101_230411, 0958_MW132I_230411, 0958_MW130D_230411, 0958_MW128D_230411, 0958_MW126I_230411, 0958_MW106S_230411, 0958_MW109S_230411,	0958_POT103_230411, 0958_MW133D_230411, 0958_MW131D_230411, 0958_MW129S_230411, 0958_QC107_230411, 0958_MW125S_230411, 0958_MW115S_230411, 0958_MW110S_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	20-Apr-2023	08-Oct-2023	✔
HDPE (no PTFE) (EP231X) 0958_POT102_230411, 0958_MW117I_230411, 0958_POT104_230411	0958_MW116S_230411, 0958_MW118D_230411,	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	21-Apr-2023	08-Oct-2023	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW402_230411, 0958_QC101_230411, 0958_MW132I_230411, 0958_MW130D_230411, 0958_MW128D_230411, 0958_MW126I_230411, 0958_MW106S_230411, 0958_MW109S_230411,	0958_POT103_230411, 0958_MW133D_230411, 0958_MW131D_230411, 0958_MW129S_230411, 0958_QC107_230411, 0958_MW125S_230411, 0958_MW115S_230411, 0958_MW110S_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	20-Apr-2023	08-Oct-2023	✔
HDPE (no PTFE) (EP231X) 0958_POT102_230411, 0958_MW117I_230411, 0958_POT104_230411	0958_MW116S_230411, 0958_MW118D_230411,	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	21-Apr-2023	08-Oct-2023	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW402_230411, 0958_QC101_230411, 0958_MW132I_230411, 0958_MW130D_230411, 0958_MW128D_230411, 0958_MW126I_230411, 0958_MW106S_230411, 0958_MW109S_230411,	0958_POT103_230411, 0958_MW133D_230411, 0958_MW131D_230411, 0958_MW129S_230411, 0958_QC107_230411, 0958_MW125S_230411, 0958_MW115S_230411, 0958_MW110S_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	20-Apr-2023	08-Oct-2023	✔
HDPE (no PTFE) (EP231X) 0958_POT102_230411, 0958_MW117I_230411, 0958_POT104_230411	0958_MW116S_230411, 0958_MW118D_230411,	11-Apr-2023	18-Apr-2023	08-Oct-2023	✔	21-Apr-2023	08-Oct-2023	✔

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW402_230411, 0958_QC101_230411, 0958_MW132I_230411, 0958_MW130D_230411, 0958_MW128D_230411, 0958_MW126I_230411, 0958_MW106S_230411, 0958_MW109S_230411,	0958_POT103_230411, 0958_MW133D_230411, 0958_MW131D_230411, 0958_MW129S_230411, 0958_QC107_230411, 0958_MW125S_230411, 0958_MW115S_230411, 0958_MW110S_230411	11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	20-Apr-2023	08-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0958_POT102_230411, 0958_MW117I_230411, 0958_POT104_230411	0958_MW116S_230411, 0958_MW118D_230411,	11-Apr-2023	18-Apr-2023	08-Oct-2023	✓	21-Apr-2023	08-Oct-2023	✓



Quality Control Parameter Frequency Compliance

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

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

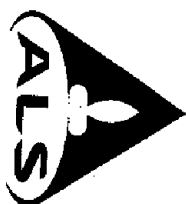
Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	40	7.50	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2304599



Telephone : +61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA_0958 - PFASOTD_23 Client: Stantec

Project Manager:

Phone:

ALS Compass COC Reference: 50846 # Samples: 3 Samples

Sampler:

Phone:

Turnaround Requirements:

Standard

Special Instructions:

Custody:

Relinquished by: <u>STANTEC</u>	Received by: 	Relinquished by:	Received by:
Date / Time: <u>12/04/23</u>	Date / Time: <u>12/4 1600</u>	Date / Time:	Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass

CHAIN OF CUSTODY

(ALS) COC#: 50846

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PASOMP_23

SITE: Gingin GW - JS

ORDER NO: pas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (circle)

Custody Seal Intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A

Yes No N/A

°C

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

SAMPLE DETAILS

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW134D		12/04/2023 09:04 AM	WATER	ALS: 2 Non ALS: 0	No	X			
002	0958_QC301		12/04/2023 02:45 PM	WATER	ALS: 2 Non ALS: 0	No		X		
003	0958_QC401		12/04/2023 02:46 PM	WATER	ALS: 2 Non ALS: 0	No		X		

ANALYSIS REQUIRED



CHAIN OF CUSTODY

COC#: 50846 ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP_23

SITE: Gingin GW - JS

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY1139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW134D	HDPE (no PTFE)	20 mL	00350822075294	Grey	No	
001	0958_MW134D	HDPE (no PTFE)	20 mL	00350822075190	Grey	No	
002	0958_QC301	HDPE (no PTFE)	20 mL	00350822075256	Grey	No	
002	0958_QC301	HDPE (no PTFE)	20 mL	00350822075094	Grey	No	
003	0958_QC401	HDPE (no PTFE)	20 mL	00350822075283	Grey	No	
003	0958_QC401	HDPE (no PTFE)	20 mL	00350822075138	Grey	No	

Total Bottle Count: ALS: 6, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2304599

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
Telephone :
Facsimile :

E-mail : ALSEnviro.Perth@alsglobal.com
Telephone :
Facsimile :

Project : WA_0958_PFASOMP_23
Order number : pfas-omp Gingin
C-O-C number : 50846
Site : Gingin GW - JS
Sampler :

Page : 1 of 2
Quote number : ES2022MWAUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 12-Apr-2023 16:00
Client Requested Due : 24-Apr-2023
Date :

Issue Date : 17-Apr-2023
Scheduled Reporting Date : 24-Apr-2023

Delivery Details

Mode of Delivery : Client Drop Off
No. of coolers/boxes : 3
Receipt Detail :

Security Seal : Not Available
Temperature : 8.2 - Ice present
No. of samples received / analysed : 3 / 3

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2304599-001	12-Apr-2023 09:04	0958_MW134D_230414	✓
EP2304599-002	12-Apr-2023 14:45	0958_QC301_230414	✓
EP2304599-003	12-Apr-2023 14:46	0958_QC401_230414	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

██████████	- A4 - AU Tax Invoice (INV)	Email	██████████cardno.com.au
DERP LAB REPORTS			
██████████	- EDI Format - ESDAT (ESDAT)	Email	██████████
██████████	- *AU Certificate of Analysis - NATA (COA)	Email	██████████
	- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	██████████
	- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	██████████
	- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	██████████
	- Chain of Custody (CoC) (COC)	Email	██████████
	- EDI Format - ESDAT (ESDAT)	Email	██████████
	- EDI Format - XTab (XTAB)	Email	██████████



CERTIFICATE OF ANALYSIS

Work Order	: EP2304599	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 12-Apr-2023 16:00
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 18-Apr-2023
C-O-C number	: 50846	Issue Date	: 21-Apr-2023 16:41
Sampler	: [REDACTED] [REDACTED]		
Site	: Gingin GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 3		
No. of samples analysed	: 3		



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
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW134D_23041
4

Sampling date / time

12-Apr-2023 09:04

Compound	CAS Number	LOR	Unit
----------	------------	-----	------

EP2304599-001

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----

EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW134D_23041
4

Sampling date / time

12-Apr-2023 09:04

Compound	CAS Number	LOR	Unit
----------	------------	-----	------

EP2304599-001

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----

EP231P: PFAS Sums

Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	104	----	----	----	----
13C8-PFOA	----	0.02	%	98.1	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0958_QC301_230414	0958_QC401_230414	----	----	----
Sampling date / time				12-Apr-2023 14:45	12-Apr-2023 14:46	----	----	----	
Compound	CAS Number	LOR	Unit	EP2304599-002	EP2304599-003	-----	-----	-----	
				Result	Result	----	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	----	----	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----	



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_230414	0958_QC401_230414	----	----	----
Sampling date / time				12-Apr-2023 14:45	12-Apr-2023 14:46	----	----	----
Compound	CAS Number	LOR	Unit	EP2304599-002	EP2304599-003	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	93.9	103	----	----	----
13C8-PFOA	----	0.02	%	96.6	95.6	----	----	----



Surrogate Control Limits

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

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



QUALITY CONTROL REPORT

Work Order	: EP2304599	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 12-Apr-2023
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 18-Apr-2023
C-O-C number	: 50846	Issue Date	: 21-Apr-2023
Sampler	: [REDACTED] [REDACTED]		
Site	: Gingin GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 3		
No. of samples analysed	: 3		



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
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**



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				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4996575)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	102	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	107	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	89.3	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	101	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	90.5	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	90.4	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4996587)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	88.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	97.2	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	87.2	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	91.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	87.3	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	116	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996575)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	87.3	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	93.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	90.2	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	96.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	87.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	85.4	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	89.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	93.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	94.0	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	95.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	99.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4996587)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	89.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	85.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	88.8	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	90.0	72.0	130



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: 4996587) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	85.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	88.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	90.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	82.2	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	80.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	89.4	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996575)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	90.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	86.7	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.6	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	99.5	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	96.0	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	97.4	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4996587)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	101	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	75.4	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	77.7	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	90.5	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	91.9	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	103	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	89.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996575)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	91.5	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	81.4	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	86.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	91.3	64.2	133



Sub-Matrix: **WATER**

Method Blank (MB) Report				Laboratory Control Spike (LCS) Report				
				Spike Concentration	Spike Recovery (%)		Acceptable Limits (%)	
					LCS	Low	High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4996587)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	88.6	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	91.2	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	101	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	86.3	64.2	133
EP231P: PFAS Sums (QCLot: 4996575)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 4996587)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2304599	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 12-Apr-2023
Site	: Gingin GW - JS	Issue Date	: 21-Apr-2023
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 3
Order number	: pfas-omp Gingin	No. of samples analysed	: 3

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Method	0				
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	38	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	38	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
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0958_QC301_230414, 0958_QC401_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✓	19-Apr-2023	09-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0958_MW134D_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✓	21-Apr-2023	09-Oct-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0958_QC301_230414, 0958_QC401_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✓	19-Apr-2023	09-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0958_MW134D_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✓	21-Apr-2023	09-Oct-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0958_QC301_230414, 0958_QC401_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✓	19-Apr-2023	09-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0958_MW134D_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✓	21-Apr-2023	09-Oct-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0958_QC301_230414, 0958_QC401_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✓	19-Apr-2023	09-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0958_MW134D_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✓	21-Apr-2023	09-Oct-2023	✓



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_QC301_230414,	0958_QC401_230414	12-Apr-2023	18-Apr-2023	09-Oct-2023	✔	19-Apr-2023	09-Oct-2023	✔
HDPE (no PTFE) (EP231X) 0958_MW134D_230414		12-Apr-2023	18-Apr-2023	09-Oct-2023	✔	21-Apr-2023	09-Oct-2023	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	38	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	38	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



☐ **Brisbane**
Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mgtlabmark.com.au

☐ **Melbourne**
2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgltabmark.com.au

CHAIN OF CUSTODY RECORD

Page 1 of 1

CLIENT DETAILS

Company Name : Stantec Australia

Contact Name	
--------------	--

Purchase Order :

304700525

COC Number :

304700525 -01

Office Address : 226 Adelaide Tce, Perth, WA 6000

PROJECT Number :	WA 0958 PFASOMP 23
------------------	--------------------

Eurofins | mgt quote ID :

Email for COC/SRN/Results :

PROJECT Name :	
----------------	--

WA_0958_PFASOMP_23

Data output format: PDF; ESDAT

Analytes

Some common holding times (with correct preservation).
For further information contact the lab

Special Directions & Comments:

Please send ESdat files to [REDACTED] with the project No in the header file

Please send invoice to

Eurofins | mg/L DI water batch number:

PFAS (28 analytes)

Waters

Soils

BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:

Sample comments:

1LP	250P	125P	1LA	40mL vial	125mL A	Jar
-----	------	------	-----	-----------	---------	-----

	Sample ID	Date	Matrix
1	0958_QC201_230411	11/04/2023	Water
2	0958_QC202_230411	11/04/2023	Water
3	0958_QC203_230411	11/04/2023	Water
4	0958_QC204_230411	11/04/2023	Water
5	0958_QC205_230411	11/04/2023	Water
6	0958_QC206_230411	11/04/2023	Water
7	0958_QC207_230411	11/04/2023	Water
8			
9			
10			
11			
12			

Laboratory Staff

Turn around time

Method Of Shipment

Temperature on arrival:

Relinquished By:
Stantec

Received By:

1 DAY ☐ 2 DAY ☐ 3 DAY ☐

☒ Courier
☐ Hand Delivered
☐ Postal

Courier Consignment # :

Date & Time :

11/04/2023

Date & Time :

Signature: _____

Signature: _____

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091
NATA# 1261 Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rourke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

Sample Receipt Advice

Company name: Stantec Australia Pty Ltd (WA)
Contact name: [REDACTED]
Project name: WA_0958_PFASOMP_23
Project ID: Not provided
Turnaround time: 5 Day
Date/Time received: Apr 17, 2023 4:00 PM
Eurofins reference: 981667

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.
- N/A 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:

[REDACTED] on phone : or by email: [REDACTED]

Results will be delivered electronically via email to [REDACTED] - [REDACTED]

Note: A copy of these results will also be delivered to the general Stantec Australia Pty Ltd (WA) email address.

**Eurofins ARL Pty Ltd**

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091

Brisbane
1/21 Smallwood Place
Murarie
QLD 4172
Tel: +61 7 3902 4600

Newcastle
1/2 Frost Drive
Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 45 51
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: 0800 856 450
IANZ# 1290

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

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226,Adelaide Terrace
Perth
WA 6000
Project Name: WA_0958_PFASOMP_23

Order No.: 304700525
Report #: 981667
Phone: [REDACTED]
Fax: [REDACTED]

Received: Apr 17, 2023 4:00 PM
Due: Apr 24, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_230411	Apr 11, 2023		Water	L23-Ap0035525	X
2	0958_QC202_230411	Apr 11, 2023		Water	L23-Ap0035526	X
3	0958_QC203_230411	Apr 11, 2023		Water	L23-Ap0035527	X
4	0958_QC204_230411	Apr 11, 2023		Water	L23-Ap0035528	X
5	0958_QC205_230411	Apr 11, 2023		Water	L23-Ap0035529	X
6	0958_QC206_230411	Apr 11, 2023		Water	L23-Ap0035530	X
7	0958_QC207_230411	Apr 11, 2023		Water	L23-Ap0035531	X

Test Counts

7

Stantec Australia Pty Limited
6F 226, Adelaide Terrace
Perth
WA 6000



NATA Accredited
Accreditation Number 2377
Site Number 2370

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:

Report **981667-W**
Project name **WA_0958_PFASOMP_23**
Received Date **Apr 17, 2023**

Client Sample ID			0958_QC201_2 30411	0958_QC202_2 30411	0958_QC203_2 30411	0958_QC204_2 30411
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L23- Ap0035525	L23- Ap0035526	L23- Ap0035527	L23- Ap0035528
Date Sampled			Apr 11, 2023	Apr 11, 2023	Apr 11, 2023	Apr 11, 2023
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.06	< 0.05	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.04	0.03	0.06	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.16	0.08	0.32	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.01	^{N09} 0.01	^{N09} 0.05	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 0.03	^{N09} 0.17	^{N09} 0.53	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.02	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	57	101	105	84
13C5-PFPeA (surr.)	1	%	91	88	90	77
13C5-PFHxA (surr.)	1	%	96	95	90	91
13C4-PFHpA (surr.)	1	%	96	93	98	95
13C8-PFOA (surr.)	1	%	92	86	76	93
13C5-PFNA (surr.)	1	%	100	92	93	88
13C6-PFDA (surr.)	1	%	84	83	46	71
13C2-PFUnDA (surr.)	1	%	66	66	59	54
13C2-PFDoDA (surr.)	1	%	75	69	62	55
13C2-PFTeDA (surr.)	1	%	68	54	51	38
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	91	78	68	65
D3-N-MeFOSA (surr.)	1	%	81	79	50	62
D5-N-EtFOSA (surr.)	1	%	85	81	49	62

Client Sample ID			0958_QC201_2 30411	0958_QC202_2 30411	0958_QC203_2 30411	0958_QC204_2 30411
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L23- Ap0035525	L23- Ap0035526	L23- Ap0035527	L23- Ap0035528
Date Sampled			Apr 11, 2023	Apr 11, 2023	Apr 11, 2023	Apr 11, 2023
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
D7-N-MeFOSE (surr.)	1	%	95	88	62	63
D9-N-EtFOSE (surr.)	1	%	80	68	52	50
D5-N-EtFOSAA (surr.)	1	%	95	64	61	58
D3-N-MeFOSAA (surr.)	1	%	85	65	66	54
Perfluoroalkyl sulfonic acids (PFSA's)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	^{N09} 0.04	^{N09} 0.04	^{N09} 0.11	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	0.02	< 0.01	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 0.05	^{N09} 0.08	^{N09} 0.44	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.30	^{N09} 0.86	^{N09} 2.3	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.02	^{N09} 0.13	^{N09} 0.42	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.24	^{N09} 0.99	^{N09} 9.1	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	111	116	107	107
18O2-PFHxS (surr.)	1	%	100	89	107	107
13C8-PFOS (surr.)	1	%	91	92	104	80
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)						
1H,1H,2H,2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H,1H,2H,2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
1H,1H,2H,2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H,1H,2H,2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	59	64	73	59
13C2-6:2 FTSA (surr.)	1	%	48	49	54	55
13C2-8:2 FTSA (surr.)	1	%	91	77	75	78
13C2-10:2 FTSA (surr.)	1	%	89	71	79	71
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	0.54	1.85	11.4	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.27	1.16	9.63	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.57	2.02	11.93	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.88	2.18	12.47	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	0.97	2.41	13.33	< 0.1

Client Sample ID			0958_QC205_2 30411	0958_QC206_2 30411	0958_QC207_2 30411
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L23- Ap0035529	L23- Ap0035530	L23- Ap0035531
Date Sampled			Apr 11, 2023	Apr 11, 2023	Apr 11, 2023
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.02	0.01	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01

Client Sample ID			0958_QC205_2 30411	0958_QC206_2 30411	0958_QC207_2 30411
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L23- Ap0035529	L23- Ap0035530	L23- Ap0035531
Date Sampled			Apr 11, 2023	Apr 11, 2023	Apr 11, 2023
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	78	87	94
13C5-PFPeA (surr.)	1	%	93	77	90
13C5-PFHxA (surr.)	1	%	93	94	105
13C4-PFHpA (surr.)	1	%	98	100	112
13C8-PFOA (surr.)	1	%	100	95	109
13C5-PFNA (surr.)	1	%	98	88	108
13C6-PFDA (surr.)	1	%	83	70	99
13C2-PFUnDA (surr.)	1	%	63	52	72
13C2-PFDoDA (surr.)	1	%	65	52	76
13C2-PFTeDA (surr.)	1	%	53	52	64
Perfluoroalkyl sulfonamido substances					
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	64	61	92
D3-N-MeFOSA (surr.)	1	%	58	58	98
D5-N-EtFOSA (surr.)	1	%	65	58	104
D7-N-MeFOSE (surr.)	1	%	56	60	102
D9-N-EtFOSE (surr.)	1	%	47	47	85
D5-N-EtFOSAA (surr.)	1	%	84	55	84
D3-N-MeFOSAA (surr.)	1	%	80	54	80
Perfluoroalkyl sulfonic acids (PFSAs)					
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 0.01	< 0.01	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.14	^{N09} 0.06	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.16	^{N09} 0.05	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	112	115	121
18O2-PFHxS (surr.)	1	%	111	110	119
13C8-PFOS (surr.)	1	%	82	77	95

Client Sample ID			0958_QC205_230411	0958_QC206_230411	0958_QC207_230411
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L23-Ap0035529	L23-Ap0035530	L23-Ap0035531
Date Sampled			Apr 11, 2023	Apr 11, 2023	Apr 11, 2023
Test/Reference	LOR	Unit			
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	67	74	109
13C2-6:2 FTSA (surr.)	1	%	58	60	78
13C2-8:2 FTSA (surr.)	1	%	85	79	105
13C2-10:2 FTSA (surr.)	1	%	79	67	99
PFASs Summations					
Sum (PFHxS + PFOS)*	0.01	ug/L	0.3	0.11	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.16	0.05	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.3	0.11	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.32	0.12	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	0.33	0.12	< 0.1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Apr 19, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Apr 19, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAAs)	Melbourne	Apr 19, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Apr 19, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Apr 18, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226,Adelaide Terrace
Perth
WA 6000
Project Name: WA_0958_PFASOMP_23

Order No.: 304700525
Report #: 981667
Phone: [REDACTED]
Fax: [REDACTED]

Received: Apr 17, 2023 4:00 PM
Due: Apr 24, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X
External Laboratory						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_230411	Apr 11, 2023		Water	L23-Ap0035525	X
2	0958_QC202_230411	Apr 11, 2023		Water	L23-Ap0035526	X
3	0958_QC203_230411	Apr 11, 2023		Water	L23-Ap0035527	X
4	0958_QC204_230411	Apr 11, 2023		Water	L23-Ap0035528	X
5	0958_QC205_230411	Apr 11, 2023		Water	L23-Ap0035529	X
6	0958_QC206_230411	Apr 11, 2023		Water	L23-Ap0035530	X
7	0958_QC207_230411	Apr 11, 2023		Water	L23-Ap0035531	X
Test Counts						7

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to '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 prior to sample receipt deadlines as stated on the SRA.

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

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

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
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 a moisture has been determined on a solid sample the result is expressed on a dry 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 is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA's)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	116			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	117			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	100			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	94			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	103			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	93			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	97			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	96			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	104			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	147			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	103			50-150	Pass	

Test			Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery								
Perfluoroalkyl sulfonamido substances								
Perfluorooctane sulfonamide (FOSA)			%	103		50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	100		50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	106		50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	103		50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	95		50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	101		50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	97		50-150	Pass	
LCS - % Recovery								
Perfluoroalkyl sulfonic acids (PFASs)								
Perfluorobutanesulfonic acid (PFBS)			%	92		50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	111		50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	94		50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	109		50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	97		50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	80		50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	90		50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	98		50-150	Pass	
LCS - % Recovery								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)								
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	89		50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	91		50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	93		50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	104		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				
Perfluorotridecanoic acid (PFTTrDA)	M23-Ap0040830	NCP	%	138		50-150	Pass	
Spike - % Recovery								
Perfluoroalkyl carboxylic acids (PFCAs)								
				Result 1				
Perfluorobutanoic acid (PFBA)	L23-Ap0035531	CP	%	105		50-150	Pass	
Perfluoropentanoic acid (PFPeA)	L23-Ap0035531	CP	%	106		50-150	Pass	
Perfluorohexanoic acid (PFHxA)	L23-Ap0035531	CP	%	102		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	L23-Ap0035531	CP	%	98		50-150	Pass	
Perfluorooctanoic acid (PFOA)	L23-Ap0035531	CP	%	108		50-150	Pass	
Perfluorononanoic acid (PFNA)	L23-Ap0035531	CP	%	97		50-150	Pass	
Perfluorodecanoic acid (PFDA)	L23-Ap0035531	CP	%	104		50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	L23-Ap0035531	CP	%	103		50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	L23-Ap0035531	CP	%	112		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L23-Ap0035531	CP	%	111		50-150	Pass	
Spike - % Recovery								
Perfluoroalkyl sulfonamido substances								
				Result 1				
Perfluorooctane sulfonamide (FOSA)	L23-Ap0035531	CP	%	105		50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L23-Ap0035531	CP	%	107		50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L23-Ap0035531	CP	%	120		50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L23-Ap0035531	CP	%	109		50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L23-Ap0035531	CP	%	104			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L23-Ap0035531	CP	%	112			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L23-Ap0035531	CP	%	101			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	L23-Ap0035531	CP	%	98			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	L23-Ap0035531	CP	%	105			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	L23-Ap0035531	CP	%	91			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	L23-Ap0035531	CP	%	112			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	L23-Ap0035531	CP	%	99			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	L23-Ap0035531	CP	%	94			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	L23-Ap0035531	CP	%	100			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	L23-Ap0035531	CP	%	86			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L23-Ap0035531	CP	%	93			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L23-Ap0035531	CP	%	97			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L23-Ap0035531	CP	%	98			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L23-Ap0035531	CP	%	106			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	L23-Ap0035529	CP	ug/L	0.02	0.02	2.4	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	L23-Ap0035529	CP	ug/L	0.01	< 0.01	8.0	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	L23-Ap0035529	CP	ug/L	0.14	0.14	1.5	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	L23-Ap0035529	CP	ug/L	0.16	0.16	1.7	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L23-Ap0035529	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L23-Ap0035529	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
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:

[Redacted Signature]

Analytical Services Manager
Senior Analyst-PFAS

[Redacted Signature]

Business Unit Manager

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request

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APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES



now



Monitoring Date	Location	Sample_ID	Screen Interval (mb TOC (mAHD)	Well Depth (m)	SWL (mbTOC)	RWL (mAHD)	Observations	Sampling Method	R1 - Temp (°C)	R1 - DO (mg/L)	R1 - EC (us/Cm)	R1 - TDS (mg/L)	R1 - pH	R1 - Eh (mV)	
11/04/2023	MW101I	0958_MW101I_230411	19.78-22.78	73.5	23.5	12.12	61.38	HydraSleeve	21.4	2.3	414.6	244.75	5.69	-4.4	
11/04/2023	MW102D	0958_MW102D_230411	40.02-43.02	73.41	43.4	12.18	61.23	HydraSleeve	21.8	0.8	205.8	120.45	5.93	-42.5	
11/04/2023	MW104I	0958_MW104I_230411	19.5-22.9	73.74	22.9	12.2	61.54	HydraSleeve	22.7	0.76	101.9	58.85	5.59	15.1	
11/04/2023	MW105D	0958_MW105D_230411	39-42.5	73.79	42.3	12.27	61.52	HydraSleeve	23.2	2.07	106.5	60.5	5.93	71.1	
11/04/2023	MW106S	0958_MW106S_230411	6.8-10.8	71.54	11.0	6.725	64.815	HydraSleeve	20	1.11	316.2	205.6	3.28	40.9	
11/04/2023	MW107S		5.5-9.5	71.6	9.5			Dry							
11/04/2023	MW108S		5.0-9.0	70.9	9.0			Dry							
11/04/2023	MW109S	0958_MW109S_230411	5.8-10.3	73.45	10.3	7.72	65.73	HydraSleeve	20.9	1.07	128.6	83.6	4.00	31	
11/04/2023	MW110S	0958_MW110S_230411	6.5-10.0	73.74	10.0	8.29	65.45	HydraSleeve	20.1	1.56	140.3	91.2	4.28	29.4	
11/04/2023	MW111S		6.5-9.5	73.87	9.5			Bore dry							
11/04/2023	MW112S	0958_MW112S_230411	7.5-10.5	73.69	10.5	8.54	65.15	HydraSleeve	21.4	4.13	130.9	75.9	6.93	342.2	
11/04/2023	MW113S	0958_MW113S_230411	6.5-9.5	73.79	9.6	8.65	65.14	HydraSleeve	21.3	3.52	173	102.3	3.8	340.7	
11/04/2023	MW114S	0958_MW114S_230411	5.0-8.0	73.68	8.0	7.39	66.29	Not enough water in Sleeve for field parameters	HydraSleeve						
11/04/2023	MW115S	0958_MW115S_230411	5.0-8.0	70.79	8.0	5.58	65.21	HydraSleeve	22.4	1.1	1729	1123	3.66	51.4	
11/04/2023	MW116S	0958_MW116S_230411	8.0-11.0	74.43	11.0	9.625	64.805	HydraSleeve	20	3.09	188.3	122.3	3.74	86.2	
11/04/2023	MW117I	0958_MW117I_230411	21.3-23.3	74.19	23.0	13.915	60.275	HydraSleeve	20.2	1.14	120.4	78.3	5.24	64.8	
11/04/2023	MW118D	0958_MW118D_230411	41-43	74.19	43.0	13.615	60.575	HydraSleeve	20.4	1.3	204.3	132.8	5.44	-39.8	
11/04/2023	MW119S	0958_MW119S_230411	10.1-13.1	74.06	13.1	12.195	61.865	HydraSleeve	20.3	6.15	130.4	92.95	3.89	111.4	
11/04/2023	MW120I	0958_MW120I_230411	19.94-22.94	73.84	23.0	15.114	58.726	HydraSleeve	20.1	1.46	91.1	65.65	5.02	77	
11/04/2023	MW121D	0958_MW121D_230411	39.8-42.8	73.96	42.8	15.243	58.717	HydraSleeve	20.3	0.81	150.5	107.25	5.47	48.6	
11/04/2023	MW122S	0958_MW122S_230411	10.5-13.5	75.84	13.5	12.621	63.219	HydraSleeve	20.1	5.19	185.2	132.6	3.86	117.8	
11/04/2023	MW123I	0958_MW123I_230411	20-23	76.03	23.0	16.901	59.129	HydraSleeve	20.8	2.63	135.5	95.55	5.13	110.1	
11/04/2023	MW124D	0958_MW124D_230411	39.5-42.5	75.87	42.5	16.747	59.123	HydraSleeve	20	1.34	274.3	196.95	6.38	108.6	
11/04/2023	MW125S	0958_MW125S_230411	14.25-17.25	74.88	18.0	14.84	60.04	Not enough water in sleeve, handbailed	HandBailing	19.2	0.48	125.8	81.8	5.16	-42.6
11/04/2023	MW126I	0958_MW126I_230411	33.5-36.5	73.5	36.5	13.29	60.21	HydraSleeve	19.5	0.99	190.1	123.5	5.42	-25.9	
11/04/2023	MW128D	0958_MW128D_230411	47-50	74.4	50.0	16.97	57.43	HydraSleeve	19.6	0.73	235.7	153.2	4.91	9.1	
11/04/2023	MW129S	0958_MW129S_230411	15.3-18.3	73.51	18.0	16.065	57.445	HydraSleeve	19.4	0.88	188.7	122.6	5.16	-52.4	
11/04/2023	MW130D	0958_MW130D_230411	33.5-36.5	72.77	36.5	15.62	57.15	HydraSleeve	20	1.28	205.7	133.7	5.81	-70.4	
11/04/2023	MW131D	0958_MW131D_230411	52.5-55.5	76.59	55.5	19.77	56.82	HydraSleeve	19.6	1.16	149.4	97.1	5.37	-63.4	
11/04/2023	MW132I	0958_MW132I_230411	18.5-21.5	76.43	21.0	19.655	56.775	HydraSleeve	19.6	1.91	129.1	83.9	5.61	-74.9	
11/04/2023	MW133D	0958_MW133D_230411	40.9-43.9	76.49	43.5	19.55	56.94	HydraSleeve	19.9	1.38	217.7	141.2	5.55	-14.1	
11/04/2023	MW134D		53-56	78.48	56.0			Bore dry at 22.795 m. Blocked requires clearing							
12/04/2023	MW134D	0958_MW134D_230412	53-56	78.48	56.0	21.83	56.65	Bore cleared and sampled	HydraSleeve	22.5	2.65	326.1	188.1	6	44
11/04/2023	MW135I	0958_MW135I_230411	21.1-23.6	77.67	24.0	21.154	56.516	HydraSleeve	18.9	0.73	227.8	167.7	5.45	38.9	
11/04/2023	MW136D	0958_MW136D_230411	41-44	78.24	44.9	21.673	56.567	HydraSleeve	19.2	0.86	162.7	118.95	5.63	17.6	
11/04/2023	MW137S	0958_MW137S_230411	4.7-8.7	73.12	8.7	8.354	64.766	HydraSleeve	20.1	1.99	258.2	185.9	5	84.9	
11/04/2023	MW138S	0958_MW138S_230411	9.0-15.0	74.17	15.0	9.273	64.897	HydraSleeve	19.8	1.5	167.6	120.9	3.97	127.1	
11/04/2023	MW139I	0958_MW139I_230411	27.0-30.0	73.99	30.0	13.97	60.02	HydraSleeve	19.2	1.07	186.6	136.5	5.86	89.2	
11/04/2023	MW140D	0958_MW140D_230411	51.5-54.5	73.9	54.0	13.82	60.08	HydraSleeve	19.7	3.02	398	287.95	7.29	122.5	
11/04/2023	MW141S	0958_MW141S_230411	13.5-16.5	74.36	16.5	10.701	63.659	HydraSleeve	18.2	0.89	203.8	152.1	4.15	128.4	
11/04/2023	MW142S	0958_MW142S_230411	12.4-15.4	76.34	15.5	13.459	62.881	HydraSleeve	18.6	2.14	274.7	203.45	3.97	117.2	
11/04/2023	MW143S	0958_MW143S_230411	14-18.5	75.81	18.5	18.082	57.728	HydraSleeve	19.7	2.7	214	154.05	4.91	110.9	
11/04/2023	MW301	0958_MW301_230411	7-10	74.547	10.0	8.8	65.747	HydraSleeve	21.7	5.53	185.3	108.9	6.61	383.5	
11/04/2023	MW302	0958_MW302_230411	7-10	74.7115	10.0	8.18	66.532	HydraSleeve	21.9	5.04	141.5	83.05	5.78	337.2	
11/04/2023	MW303	0958_MW303_230411	7_10	74.574	10.0	8.84	65.734	HydraSleeve	22.4	5.63	118.1	68.2	6.84	348.1	
11/04/2023	MW304	0958_MW304_230411	6.5-9.5	74.0937	9.5	8.12	65.974	HydraSleeve	23.9	1.29	209.5	117.7	5.5	229.3	
11/04/2023	MW305	0958_MW305_230411	6.0-9.0	73.885	9.0	7.9	65.985	HydraSleeve	22.3	4.05	110.3	82.5	6.89	45.6	
11/04/2023	MW306	0958_MW306_230411	6.0-9.0	73.965	9.0	7.95	66.015	HydraSleeve	23.1	1.44	232	132.55	4.06	328	
11/04/2023	MW308	0958_MW308_230411	6.0-9.0	73.691	9.0	7.69	66.001	HydraSleeve	23.3	3.63	190.1	107.8	6.39	177.7	
11/04/2023	MW309	0958_MW309_230411	6.5-9.5	73.899	9.5	7.96	65.939	HydraSleeve	22.1	2.73	125	73.15	5.47	170	
11/04/2023	MW310	0958_MW310_230411	6.0-9.0	73.806	9.0	7.82	65.986	HydraSleeve	23.3	2.28	93.3	52.8	6.2	163.5	
11/04/2023	MW312	0958_MW312_230411	6.5-9.5	74.5413	9.5	8.62	65.921	HydraSleeve	23.1	2.75	208.7	119.35	5.61	177.9	
11/04/2023	MW313	0958_MW313_230411	7.5-10.5	74.6882	10.5	8.78	65.908	HydraSleeve	22.3	3.2	147.9	85.8	5.73	178.5	
11/04/2023	MW401	0958_MW401_230411	NA	NA	NA			Tap	24	0.73	173.6	97.35	5.85	90.1	
11/04/2023	MW402	0958_MW402_230411	NA	NA	NA			Tap	21	0.89	890	577	5.15	-120.6	
11/04/2023	MW403	0958_MW403_230411	14-26	73.84	26.0	21.503	52.337	HydraSleeve	19.8	1.05	294.7	213.2	5.48	92.3	
11/04/2023	MW504	0958_MW504_230411	10.0-13.0	72.82	13.0	7.7	65.12	PH probe failed	HydraSleeve	24.3	2.65	115.3	63.8		161.9
11/04/2023	MW505	0958_MW505_230411	10-13	73.83	13.0	8.49	65.34	HydraSleeve	24	1.92	102.6	57.75	5.89	195.6	
11/04/2023	POT102	0958_POT102_230411	NA	NA	NA			Tap	22	2	995	646	6.29	132.5	
11/04/2023	POT103	0958_POT103_230411	NA	NA	NA			Tap	29.9	2.46	1067	694	8.37	-9.1	
11/04/2023	POT104	0958_POT104_230411	NA	NA	NA			Tap	23.8	4.81	1032	670	6.65	200.5	



Calibration Report

Multi-Parameter Water Quality Instrument

Customer:

Contact:

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 20D101040

Cable length: 1m 20B140029

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	172.90 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 57.91
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV -1 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature	Check Temp NATA	Room Temp	22.7	-0.3	°C	NA	22.4	°C
pH (22M)	pH 7.00	375757	7.01	-4.30	mV	6.99	7.01	pH
pH (22M)	pH 4.00	378281	4.00	168.60	mV	4.02	4.00	pH
Conductivity (20A100065)	2764 µS/cm at 25°C	21/1012	2764	GLP	4.94	2772	2764	µS/cm
ORP (200408SIA605101)	Zobell A & B	22/0309	235	235	mV	221.5	235.4	mV
Zero DO (20C100608)	NaSO3 in distilled water	10175	0.0	NA	NA	0.1	0.0	%
100% DO (20C100608)	100% Air Saturation	Air	100.0	5.52	uA	97.3	100.0	%

Calibrated by:

Calibration Date: 04-Apr-23

Next Due: 01-Oct-23



Calibration Report

Multi-Parameter Water Quality Instrument

Customer:

Contact:

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 22B104437

Cable length: 1m (22B100428)

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	174.50 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.62
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 9 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	polarographic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (22B100315)	Check Temp NATA	Room Temp	21	0	°C	NA	21	°C
pH (22B)	pH 7.00	375757	7.01	-20.30	mV	7.06	7.01	pH
pH (22B)	pH 4.00	378281	4.00	154.20	mV	4.04	4.00	pH
Conductivity (22B100315)	2764 µS/cm at 25°C	21/1012	2764	GLP	5.03	2792	2764	µS/cm
ORP (22A)	Zobell A & B	22/0309	238	238	mV	208.1	228.8	mV
Zero DO (22B100173)	NaSO3 in distilled water	10175	0.0	NA	NA	-0.3	0.0	%
100% DO (22B100173)	100% Air Saturation	Air	100.0	6.1	uA	104.6	100.0	%

Calibrated by:

Calibration Date: 05-Apr-23

Next Due: 02-Oct-23



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: Cardno
Contact: Jacob

Manufacturer: YSI
Instrument: Professional Plus with Quatro cable
Serial #: 21G105325
Cable length: 4m (21F100778)

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	174.60 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.39
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 7 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature	Check Temp NATA	Room Temp	23.5	-0.2	°C	NA	23.3	°C
pH 21G	pH 7.00	375757	7.01	-2.10	mV	7.04	7.01	pH
pH 21G	pH 4.00	378281	4.00	172.50	mV	4.07	4.00	pH
Conductivity (21H100008)	2764 µS/cm at 25°C	21/1012	2764	GLP	5.20	2654	2764	µS/cm
ORP (Reference check only) 21O	Zobell A & B	22/0309	233	233	mV	223.2	225.5	mV
Zero DO (21G100131)	NaSO3 in distilled water	10175	0.0	NA	NA	-0.5	0.0	%
100% DO (21G100131)	100% Air Saturation	Air	100.0	6.4	uA	111.3	100.0	%

Calibrated by:

Calibration Date: 25-Mar-23

Next Due: 21-Sep-23

Date of Bump Test	Site ID	Unit Brand/ Model	Ambient Air Oxygen Calibration	Zero Oxygen Solution Calibration	% Standard Concentrations	Ambient Temperature (°C)	Bump Test Reading	Bump Test Readings within ±5%?	Comment	Test by (Name)	(Signature)
11/4/23	0958	YSI #22810437	100% Saturation? ☒ N	0% Calibration? ☒ N NA	pH 4.00 ☒ N pH 7.00 ☒ N EC: 1,413µS/cm ☒ N 35,000	21.1	pH 4.00: 6.07 pH 7.00: 6.93 EC: 2,805 1,416	pH 4.00: (± pH 0.2) ☒ N pH 7.00: (± pH 0.2) ☒ N EC: (± 150µS/cm) ☒ N	N.I.		
11/4/23	0958	YSI #200101640	100% Saturation? ☒ N	0% Calibration? ☒ N NA	pH 4.00 ☒ N pH 7.00 ☒ N EC: 1,413µS/cm ☒ N 35,000	22.3	pH 4.00: 6.16 pH 7.00: 6.94 EC: 2,805 1,428	pH 4.00: (± pH 0.2) ☒ N pH 7.00: (± pH 0.2) ☒ N EC: (± 150µS/cm) ☒ N	N.I.		
11/6/23	0958	YSI #20M YSI	100% Saturation? ☒ N	0% Calibration? ☒ N NA	pH 4.00 ☒ N pH 7.00 ☒ N EC: 1,413µS/cm ☒ N	21.8	pH 4.00: 6.06 pH 7.00: 7.07 EC: 2,803 1,423	pH 4.00: (± pH 0.2) ☒ N pH 7.00: (± pH 0.2) ☒ N EC: (± 150µS/cm) ☒ N	N.I.		
12/4/23	0958	YSI #20M YSI	100% Saturation? ☒ N	0% Calibration? ☒ N NA	pH 4.00 ☒ N pH 7.00 ☒ N EC: 1,413µS/cm ☒ N 2,760	16.9	pH 4.00: 6.10 pH 7.00: 7.01 Temp: 1,802 EC: 2,762	pH 4.00: (± pH 0.2) ☒ N pH 7.00: (± pH 0.2) ☒ N EC: (± 150µS/cm) ☒ N	# PH probe replaced		
		YSI #	100% Saturation? ☒ N	0% Calibration? ☒ N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☒ N	0% Calibration? ☒ N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☒ N	0% Calibration? ☒ N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☒ N	0% Calibration? ☒ N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			

APPENDIX

E

DATA QUALITY REVIEW



now



Data Quality Review PFAS Ongoing Monitoring Plan Post-summer 2023 Monitoring Event

This appendix reviews the Quality Assurance (QA) and Quality Control (QC) documentation. Quality assurance encompasses the actions, procedures, checks and decisions undertaken to ensure sample integrity and representativeness, and the reliability and accuracy of analysis results. The QA documentation should also include an indication of the Data Quality Objectives sought in relation to each significant action, test or process involved in the assessment.

QC activities measure the effectiveness of the QA procedures by undertaking testing, and then comparing results to previously established objectives. QC work will include the internal laboratory testing as well as results of QC samples submitted such as trip blanks and duplicates. The quality of the information and/or data is deemed satisfactory when the QC results demonstrate that agreed objectives have been met.

QA/QC Aspects	Evidence & Evaluation
QA Documentation	
Project Quality Plan/Work Plan and Data Quality Objectives	<p>The field investigation was carried out on the 11th and 12th April 2023 and is generally in accordance with the proposed scope of work, as documented in the SAQP (PFAS OMP SAQP Gingin Satellite Airfield, Cardno, February 2023) issued to the client and in compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i>, NEPM “<i>National Environment Protection (Assessment of Site Contamination) Measure</i>” and PFAS NEMP 2.0.</p> <p>A quality control program was implemented during the Investigation and the quality assurance procedures used have been reiterated in the report (PFAS OMP Post-summer 2023 Factual Report). In addition, a safety, health and environment work method statement (SHEWMS) was also prepared.</p> <p>The Data Quality Objectives were expressed in terms of the purpose of the assessment and the relevant assessment criteria.</p>
Data Representativeness	
Use of Composites	No Composites were used during the investigation
Holding Times	Chain of custody and laboratory reports provide evidence of holding times. Holding times were in compliance with required timeframes.
Verification of field procedures	<p>The methodology conducted during this investigation is documented in the body of the report and was in general conformance with the SAQP.</p> <p>Non-disposable equipment was decontaminated between sample locations.</p>
Laboratory Reports	<p>The following laboratory reports were considered for this data quality review:</p> <ul style="list-style-type: none"> ▪ ALS report: EP2304514, EP2304516, EP2304599. ▪ Eurofins ARL report: 981667.

QA/QC Aspects

Evidence & Evaluation

Data Precision & Accuracy

QC sample Frequency

QC sample type	SAQP required frequency	Sample Collected
Blind duplicate	1 in 10 primary samples (10%)	6 for 54 groundwater samples (11.1%) 1 in 3 tap water samples (33%)
Interlab duplicate	1 in 10 primary samples (10%)	6 for 54 groundwater samples (11.1%) 1 in 3 tap water samples (33%)
Rinsate	1 per day per reusable equipment	4 for 2 days (100%)
Field Blank	1 per day per field team	4 for 2 days (100%)

The required QC frequency was achieved for all media sampled.

RPD Acceptance criteria

Magnitude of Results	Acceptable RPD range
< 10 x LOR	No limits
10 – 20 LOR	0% - 50%
> 20 x LOR	0% - 20%

QC Testing – Blind Duplicates (Primary Lab)

Groundwater

- Primary Groundwater Samples Analysed: 54
- Blind Duplicate Samples Analysed: 6

All RPDs were within acceptance criteria with the following exception:

- QC105 (PFOS – 22%).

This minor RPDs difference is likely due to the low concentrations of analytes under review. This is not considered to have impacted the validity of the interpretation drawn upon this dataset.

Tap water

- Primary tap water Samples Analysed: 3
- Blind Duplicate Sample Analysed: 1

All RPDs were within acceptance criteria.

QC Testing – Interlab Duplicates (Secondary Lab)

Groundwater

- Primary Groundwater Samples Analysed: 54
- Interlab Duplicate Samples Analysed: 6

All RPDs were within acceptance criteria with the following exceptions:

- QC202 (PFOS – 33%)
- QC203 (PFPeS – 48%, PFHxS – 21%, PFOS – 27%, PFOA – 28%)
- QC205 (PFHxS – 44%, PFOS – 44%)

These minor differences likely due to the low concentrations of analytes under review or the difference of methodologies between the primary and secondary

QA/QC Aspects	Evidence & Evaluation
	<p>laboratories. In all cases the primary sample recorded slightly higher concentrations so the results reported on are conservative.</p> <p>Tap water</p> <ul style="list-style-type: none"> Primary tap water Samples Analysed: 3 Interlab Duplicate Sample Analysed: 1 <p>All RPDs were within acceptance criteria with the following exception:</p> <ul style="list-style-type: none"> QC201 (PFOS – 23%). <p>This minor RPDs difference is likely due to the low concentrations of analytes under review or the difference of methodologies between the primary and secondary laboratories. This is not considered to have impacted the validity of the interpretation drawn upon this dataset.</p>
Field Blanks	<p>Field Blanks were collected at a rate of one per fieldwork team per day. All field blank samples tested reported analytes below the laboratory limit of reporting.</p>
Laboratory Internal QC	<p>Evidence of the laboratories internal QC testing is present and complete in the reports. ALS (Primary) performed internal QC with adequate testing and satisfactory results for method blank, matrix spikes, laboratory control samples and laboratory duplicates.</p> <p>All Method Blank results were within acceptable range.</p> <p>All Matrix Spikes reported recoveries within the acceptance range of 70% to 130% with exception of the following:</p> <ul style="list-style-type: none"> EP2304516, EP2304517: <ul style="list-style-type: none"> Samples ID: Anonymous, MW402: PFHxS and PFOS matrix spike recovery not determined due to the background concentrations exceeding 4x spike level. <p>The following quality control samples frequency outliers was reported:</p> <ul style="list-style-type: none"> EP2304514, EP2304599: <ul style="list-style-type: none"> Laboratory Duplicates: PFAS by LCMSMS, expected frequency 10% not achieved. Matrix Spikes: PFAS by LCMSMS, expected frequency 5% not achieved. EP2304517: <ul style="list-style-type: none"> Laboratory Duplicates: PFAS by LCMSMS, expected frequency 10% not achieved. <p>The above outliers/exceptions are not considered to affect the reliability of the dataset.</p>
Laboratory Method Detection Limit	<p>Laboratory reports indicate the method detection limits were lower than the respective assessment criteria.</p>
NATA endorsement of laboratory reports	<p>Laboratory reports were stamped with the NATA endorsement stamp and signature.</p> <p>ALS Accreditation No. 825</p> <p>Eurofins ARL Accreditation No. 1261</p>
Calibration of Field Equipment	<p>All equipment used during the investigation was calibrated prior to use and daily readings of reference solutions (bump tests) were completed.</p> <p>The equipment calibration certificate and daily field bump test records are provided in Appendix D.</p> <p>The pH probe of one water quality meter failed on 11/04/23 and was replaced before the next day.</p>
Decontamination and Equipment Blanks	<p>Rinsate blanks were collected at a rate of one per day per sampler when reusable equipment was used. All rinsate samples tested reported analytes concentrations below the laboratory LORs.</p>
Data Comparability	
Standard Procedures	<p>Fieldwork procedures are detailed in the SAQP and reports and are comparable for each phase of Investigation.</p>

QA/QC Aspects	Evidence & Evaluation
Qualified Personnel	Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.
Sample Integrity	Field Chain of Custody/Laboratory request forms can be found in Appendix C.
Data Completeness	
Completeness of test program	The scope of work undertaken was generally consistent with the SAQP.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection process and therefore, the data set used as the basis for groundwater and tap water investigation is considered valid and complete.

PFAS OMP Quarterly Monitoring Event Factual Report

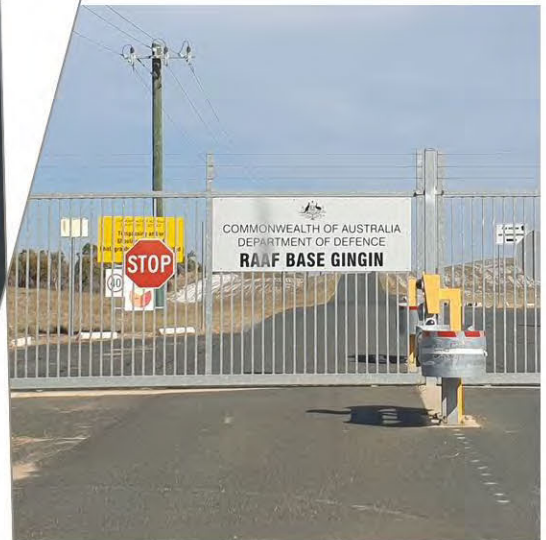
July 2023

Gingin Satellite Airfield

304700525

Prepared for
Department of Defence

8 September 2023



 **Cardno**

now

 **Stantec**

Contact Information

Stantec Australia Pty Ltd

Cardno, now Stantec
ABN 77 009 119 000

11 Harvest Terrace
West Perth WA 6005
Australia

www.cardno.com

Phone +61 8 9273 3888

Fax +61 8 9486 8664

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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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Technical Terms & Abbreviations

AFFF	Aqueous Film-Forming Foam
AHD	Australian Height Datum
AS	Australian Standard
BGL	Below Ground Level
COC	Chain of Custody
CSM	Conceptual Site Model
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
DWER	Department of Water and Environmental Regulation
EC	Electrical Conductivity
EPA	Environment Protection Authority
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
HEPA	Heads of Environmental Protection Authority
LOR	Limit of Reporting
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEMP	National Environmental Management Plan
NEPM	National Environmental Protection Measure
ORP	Oxidation Reduction Potential
PSI	Preliminary Site Investigation
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan
SWL	Standing Water Level
TOC	Top of Casing

Chemical Names

DO	Dissolved Oxygen
PFAS	Per- and Poly-fluoroalkyl Substances
PFHxS	Per-fluorohexane Sulphonate
PFOA	Per-fluorooctanoic Acid
PFOS	Per-fluorooctane Sulfonate
TDS	Total Dissolved Solids (salinity of water)

Units

ha	Hectares
mAHD	Metres relative to the AHD
mBGL	Metres Below Ground Level
mbTOC	Metres below Top of Casing
mg/L	Milligram per Litre
mV	millivolt
µS/cm	Micro Siemens per Centimetre (Electrical Conductivity – Water)
µg/L	Micrograms per Litre

Site Specific

OMP	Ongoing Monitoring Plan
PMAP	PFAS Management Area Plan
RAAF	Royal Australian Air Force

1 Introduction

1.1 Background

Cardno, now Stantec (“Cardno”) was engaged by the Australian Department of Defence (“Defence”) to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) at Royal Australian Air Force (RAAF) Gingin Satellite Airfield (“the site”). The site is located in Yeal, Western Australia and is displayed in Figure 1 of Appendix A.

The OMP was carried out in accordance with the scope and limitations presented in Cardno’s Sampling and Analysis Quality Plan (SAQP):

- > Cardno, July 2023, Reference: DEF19009, ‘PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Gingin Satellite Airfield’ Rev 7.

The SAQP was reviewed prior to the sampling event and no changes relevant to the quarterly monitoring event were required.

For the purposes of this report:

- > The Management Area was defined as Gingin Satellite Airfield (Figure 1, Appendix A).
- > The Monitoring Area was defined as comprising the site, plus the parcel of Crown Land that represents the Yeal Swamp Nature Reserve – an area that surrounds much of the southern, western and northern extent of the Base. The lateral extents of the Monitoring Area are aligned with the boundary of the adjoining Crown Lands property (Figure 1, Appendix A).

1.2 Purpose & Objectives

The objective of the OMP is to assess the changes in the nature and extent of PFAS within the environment, specifically where there is an identified potentially elevated risk to a receptor or a potential future risk to a receptor associated with Defence’s historical use of legacy Aqueous Film Forming Foam (AFFF).

The purpose of this PFAS OMP Factual Report is to provide an up-to-date status of the condition of the site as it is currently understood in relation to the most recent monitoring event.

The objectives of the report are:

- > To provide a succinct summary of the July 2023 (Q3) monitoring event and provision of analytical results with supporting tables and figures.
- > To provide confirmation of the current understanding of risk.
- > To provide supporting data for the assessment of management actions, where relevant.

1.3 Relevant Guidelines

This assessment has been undertaken in general accordance with applicable industry standards for a site investigation for the purpose, objectives and scope identified in this report. These standards are set out in:

- > National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended 2013) (ASC NEPM).
- > Heads of Environmental Protection Authority’s Australia and New Zealand (HEPA), January 2020, *PFAS National Environmental Management Plan* (NEMP) 2.0.
- > Standards Australia 1998. AS/NZ 5667:1998 *Water quality – sampling*.
- > Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

- > Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*¹.
- > Department of Defence (DoD), Department of Energy (DoE), 2019, *Consolidated Quality System Manual Schedule (QSM) for Environmental Laboratories*.
- > U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process* (EPA QA/G-4).
- > USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8).
- > National Health and Medical Research Council (NHMRC), August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.

2 Scope of Work

Cardno carried out the tasks detailed in the following sections in order to satisfy the purpose and objectives of this assessment.

2.1 Groundwater Monitoring

Sampling of selected groundwater bores was performed in general accordance with the SAQP (Cardno, 2023), applying methods set out in section 3.1 of this report. The groundwater bores monitored as part of the OMP quarterly monitoring event are presented in Table 2-1, and are shown on Figure 2, Appendix A.

Table 2-1 Groundwater Monitoring Locations

Monitoring Area	Location ID
On-site Abstraction wells	MW401; MW402
Off-site wells - South	MW141S, MW142S; MW143S; MW403
Off-site Abstraction wells ⁽¹⁾	Pinjar Production P140, Pinjar Production P145.
Note: (1) These are Water Corporation production wells being sampled by the Water Corporation.	

2.2 Tap water Monitoring

Water samples were collected from the tap water monitoring locations listed in Table 2-2 in accordance with the SAQP (Cardno, 2023) and sampling methodology detailed in section 3.2. The tap water monitoring locations are shown on Figure 2, Appendix A.

Table 2-2 Tap water Monitoring Locations

Monitoring Area	Location ID
On-site	POT102; POT103; POT104.

2.3 Data Management

All the data included in the report has been collected, uploaded and reviewed according to the data management requirements of the *Defence Contamination Management Manual* (DCMM Annex L), including:

- > The sample naming convention detailed in the DCMM Annex L was used in the field;
- > All field data collected was uploaded to the ESdat database;
- > Laboratory data was uploaded and approved; and
- > QA/QC data was reconciled.

¹ It is noted that the site is located on Commonwealth Land and is regulated under the Commonwealth environmental legislation, the State based DWER guidelines are relevant for the sampling of off-site private properties and waterways.

2.4 Deviations from the OMP SAQP

No deviation from the SAQP was reported during the Q3 2023 monitoring event.

3 Methodology

3.1 Groundwater Sampling Methodology

Groundwater monitoring was undertaken by no purge HydraSleeve® method as detailed in Table 3-1.

Table 3-1 Groundwater Sampling Method

Activity	Details
Well Gauging	Standing Water Level (SWL) was gauged in each well prior to sampling using an interface probe. All wells were measured against a surveyed mark at the top of the well casing.
Groundwater Field Parameters	<p>Groundwater field parameters were recorded prior to deployment of HydraSleeves® or pre-sample collection. The following field parameters were recorded using a water quality meter:</p> <ul style="list-style-type: none"> pH. electrical conductivity (EC). oxidation reduction potential (ORP). Dissolved oxygen (DO). Temperature. <p>Once field parameters have stabilised (as indicated by at least three consecutive measurements falling within +/- 10% of each other) measurement were recorded on field data records.</p> <p>All field instruments (e.g. water quality meter) were calibrated by the equipment supplier to optimise the accuracy of the measurements taken. Calibration certificates are provided in Appendix D.</p>
Deployment of HydraSleeve®	HydraSleeve® were deployed with top weight sample collection to begin at the lowest point.
Retrieval of HydraSleeve® (Sample Collection)	<p>HydraSleeve® sampling devices were left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment.</p> <p>Samples were collected via continuous pull method at a rate allowing the water to pass through the check valve into the sample sleeve.</p> <p>Samples were discharged immediately (minimise changes in chemistry) via discharge tube.</p> <p>Following sampling, HydraSleeve® were deployed in preparation for the next OMP monitoring event using the same string for consistency between event (same depth of sampling i.e. within screen).</p>
Decontamination procedure	<p>Dedicated HydraSleeve® were used at each groundwater bore thus removing the need for decontamination.</p> <p>All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.</p>
Sample identification, preservation transport and holding times	<p>Each sample bottle was pre-labelled by the laboratory with a unique barcode.</p> <p>Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under Chain of Custody (CoC) documentation.</p> <p>Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).</p>
Laboratory Testing	<p>Groundwater samples were submitted for the following analysis:</p> <ul style="list-style-type: none"> Full PFAS analytical suite (refer to the SAQP for full list of analytes). <p>The primary laboratory was ALS Global Laboratories (Perth), and the secondary laboratory (quality control) was Eurofins ARL (Perth). Both laboratories are NATA-accredited for the parameters tested. Copies of the NATA stamped laboratory reports and Chain of Custody documentation are included in Appendix C.</p>

3.2 Tap water Sampling Methodology

Water samples from abstraction wells and taps were collected via the 'first flush' sampling method. The primary objective of the 'first flush' sampling method is to collect water representative of the user, who may not purge the water line.

Field parameters (pH, temperature, EC, ORP and DO) were recorded post sampling collection via flow cell, and samples were analysed for the same analytical suite as the groundwater samples.

3.3 Quality Control / Quality Assurance

A critical aspect of site assessments is the demonstration of the quality of the data used as the basis for the assessment. This is achieved through a Data Validation process which includes a review of the following data quality indicators, as described in the SAQP:

- > QA documentation.
- > Bias.
- > Data Representativeness.
- > Data Precision & Accuracy.
- > Laboratory Performance.
- > Data Comparability.
- > Data Set Completeness.

A detailed review of these aspects has been undertaken, the results of which are presented in Appendix E. The review indicates no significant systematic errors in the data collection process for groundwater and tap water and therefore, the data set used as the basis for this assessment is considered valid and complete.

3.4 Assessment Criteria

3.4.1 Groundwater and Tap water

The adopted assessment criteria for groundwater and tap water are detailed in Table 3-2.

Table 3-2 Criteria for Groundwater and Tap water

Exposure Scenario	Adopted Assessment Criteria		
	PFHxS / PFOS µg/L	PFOA	Guidance
Human Health - Drinking Water Quality Guideline	0.07	0.56	HEPA 2020
Human Health – Recreational Use Guideline	2.0	10	HEPA 2020

4 Field Observations and Results

4.1 General Site Observations

No weather event or site activities that could have impacted the sampling or results were observed during the Q3 2023 monitoring event. The maximum temperature recorded on the day of monitoring was 20.7°C.

4.2 Groundwater

4.2.1 Summary of Field Observations

4.2.1.1 Physicochemical parameters

Stabilised physicochemical parameters, water colour and turbidity observations recorded during the groundwater and tap water sampling event are presented in field sampling records, included in Appendix D. No visual or olfactory evidence of contamination was recorded.

Groundwater condition was fresh [total dissolved solids (TDS) ranging from 115.7 mg/L (MW141S) to 288.6 mg/L (MW402)], and acidic to slightly acidic [pH ranging 3.83 (MW142S) to 5.66 (MW401)]. Groundwater temperature was on average 18.2°C, and DO readings mostly indicate aerobic groundwater condition [DO ranging from 0.68 mg/L (MW141S) to 5.62 mg/L (MW401)]. Field parameters were generally consistent with the previous monitoring events.

4.2.1.2 Groundwater gauging

Groundwater elevation was recorded from 57.3 mAHD (MW403) to 63.7 mAHD (MW141S) which is consistent with historical data. Gauging records are presented in Appendix D.

4.2.2 Groundwater Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria. A summary of results exceeding the adopted criteria is presented in Table 4-1. Laboratory results have also been compared to available historical data in order to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 2 in Appendix A presents the groundwater monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-1 Summary of Groundwater Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	0.56 ²	0.02 (MW402)	5	0
Sum of PFOS and PFHxS	MW402	0.07 ²	0.62 (MW402)	5	1

Notes:

1. Non-inclusive of quality control samples
2. PFAS NEMP guideline value for human health – drinking water

Findings are summarised as follows:

- > No new exceedances of guideline values or first-time detection of PFOA or Sum of PFOS and PFHxS were reported at any groundwater sampling locations during the July 2023 quarterly monitoring event.
- > One out of five groundwater samples (MW402) reported Sum of PFOS and PFHxS concentrations above the drinking water guideline value.
- > The Department of Defence has been advised that the Water Corporation will continue to sample for PFAS at production bores Pinjar bore 140 (Superficial aquifer) and Pinjar bore 145 (Leederville aquifer) on a quarterly basis.

4.3 Tap water

4.3.1 Summary of Field Observations

Stabilised physicochemical parameters and observations recorded during the tap water sampling event are presented in field sampling records, included in Appendix D. No visual or olfactory evidence of contamination was recorded.

Tap water was fresh [TDS ranging from 637 mg/L (POT104) to 663 mg/L (POT102)], and near neutral [pH ranging 6.74 to 6.97]. Tap water temperature was on average 16.6°C. Field parameters were generally consistent with the previous monitoring events.

4.3.2 Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria. A summary of results exceeding the adopted criteria is presented in Table 4-2. Laboratory results have also been compared to available historical data in order to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 2 in Appendix A presents the tap water monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-2 Summary of Tap Water Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	0.56 ²	0.04 (all locations)	3	0
Sum of PFOS and PFHxS	POT102, POT103, POT104	0.07 ²	0.97 (POT102)	3	3

Notes:

1. Non-inclusive of quality control samples
2. PFAS NEMP guideline value for human health – drinking water

Findings are summarised as follows:

- > No first-time detections of PFOA or Sum of PFOS and PFHxS were reported for the tap water locations during the July 2023 quarterly monitoring event.
- > All three tap water samples reported Sum of PFOS and PFHxS concentrations above the drinking water guideline value but below the recreational use value, which is similar to previous monitoring events.
- > All tap water samples reported a detectable concentration of PFOA (i.e. above laboratory LOR) but below the adopted assessment criteria.

4.4 Changes to the Monitoring Network Condition

No change to the monitoring network condition has occurred since the last monitoring event.

5 Summary and Conclusions

Cardno undertook the July 2023 quarterly groundwater and tap water monitoring event at Gingin Satellite Airfield as part of the PFAS OMP. Groundwater sampling and testing was undertaken at four monitoring wells off-site, two on-site abstraction wells and three on-site taps.

The groundwater laboratory results reported the following:

- > Of the six groundwater samples tested, Sum of PFOS and PFHxS (MW402) reported an exceedance of the HEPA (2020) drinking water guideline value.
- > No exceedances of the guideline values for PFOA were reported for the groundwater samples.
- > No first-time detections or new exceedances of guideline values were reported for the quarterly groundwater monitoring locations.

The tap water laboratory results reported the following:

- > All three samples tested reported Sum of PFOS and PFHxS concentrations above the drinking water criteria but below the recreational use criteria, which is similar to the previous monitoring events.
- > All samples reported PFOA concentrations above the laboratory LOR but below the adopted assessment criteria.
- > No first-time detections or new exceedances of guideline values were reported for the tap water monitoring locations.

The next OMP sampling event for Gingin Satellite Airfield will be the biannual monitoring event (post winter 2023), scheduled for September 2023. An Ongoing Monitoring Interpretive Report will be prepared for the August 2022 – July 2023 monitoring period.

6 References

General References

1. Australian Standard AS 4482-2005 *Guide to the investigation and sampling of sites with potentially contaminated soils, Part 1 – Non-volatile and semi-volatile compounds*.
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3. *Australian and New Zealand Guidelines (ANZG) for fresh and marine water quality*, 2018.
4. *Contaminated Sites Act 2003*, Western Australia.
5. Department of Defence, July 2018 amended June 2021, *Contamination Management Manual*, Annex L Guidance on Data Management.
6. Department of the Environment and Energy (2017) in the *National Greenhouse and Energy Reporting Scheme Measurement Technical Guidelines for the Estimation of Emissions by Facilities in Australia*.
7. Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*.
8. Department of Water and Environment Regulation (DWER), 2018, *Perth Groundwater Atlas*, (<https://maps.water.wa.gov.au/#/webmap/gwm>).
9. Environmental Protection Agency (United States EPA), November 2002, Reference: EPA/240/R-02/004, *Guidance on Environmental Data Verification and Data Validation*.
10. The Heads of EPAs Australia and New Zealand (HEPA; 2020) *PFAS National Environmental Management Plan (NEMP) 2.0*, January 2020.
11. National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended), registered May 2013.
12. National Health and Medical Research Council (NHMRC) (2011 – updated 2022) *National Water Quality Management Strategy Australian Drinking Water Guidelines 6*, September 2022.
13. NHMRC, August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.
14. Standards Australia/Standards New Zealand (1998) AS5667.1:1998 *Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*.
15. U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process* (EPA QA/G-4).
16. USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8).

Site Specific References

17. Cardno, July 2023, *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan*. Rev.9.
18. Cardno, April 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2020*.
19. Cardno, December 2020, *PFAS OMP, Quarterly Monitoring Factual Report - August 2020*.
20. Cardno, December 2020, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2020*.
21. Cardno, May 2021, *PFAS OMP Quarterly Monitoring Factual Report - January 2021*.
22. Cardno, April 2021, *PFAS OMP 2020 Annual Interpretive Report, Gingin Satellite Airfield*.
23. Cardno, August 2021, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2021*.
24. Cardno, August 2021, *PFAS OMP Quarterly Monitoring Factual Report – July 2021*.
25. Cardno, November 2021, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2021*.
26. Cardno, April 2022, *PFAS OMP Quarterly Monitoring Factual Report – January 2022*.
27. Cardno, August 2022, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2022*.
28. Cardno, October 2022, *PFAS OMP Quarterly Monitoring Factual Report – July 2022*.
29. Cardno, October 2022, draft *PFAS OMP 2021 Annual Interpretive Report, Gingin Satellite Airfield*.
30. Cardno, December 2022, *PFAS OMP, Biannual Monitoring Factual Report – post-winter 2022*.
31. Cardno, May 2023, *PFAS OMP, Biannual Monitoring Factual Report – post-summer 2023*.
32. Department of Defence, 2018a, *Gingin Satellite Airfield PFAS Ongoing Monitoring Plan*.
33. Department of Defence, 2018b, *Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan*.

34. Jacobs, 2018a, *Preliminary Conceptual Site Model - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0001).
35. Jacobs, 2018b, *Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0002).
36. Jacobs, 2018c, *Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-003).
37. Jacobs, 2018d, *Tier 2 Human Health Risk Assessment – Offsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0005).
38. Jacobs, 2018e, *Tier 3 Human Health Risk Assessment – Onsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations* (No. IS219200-0000- NP- RPT-0006).
39. Jacobs, 2019, *PFAS Ongoing Groundwater Monitoring Report* (No. IS219200-0000-NP-RPT-0008).

APPENDIX

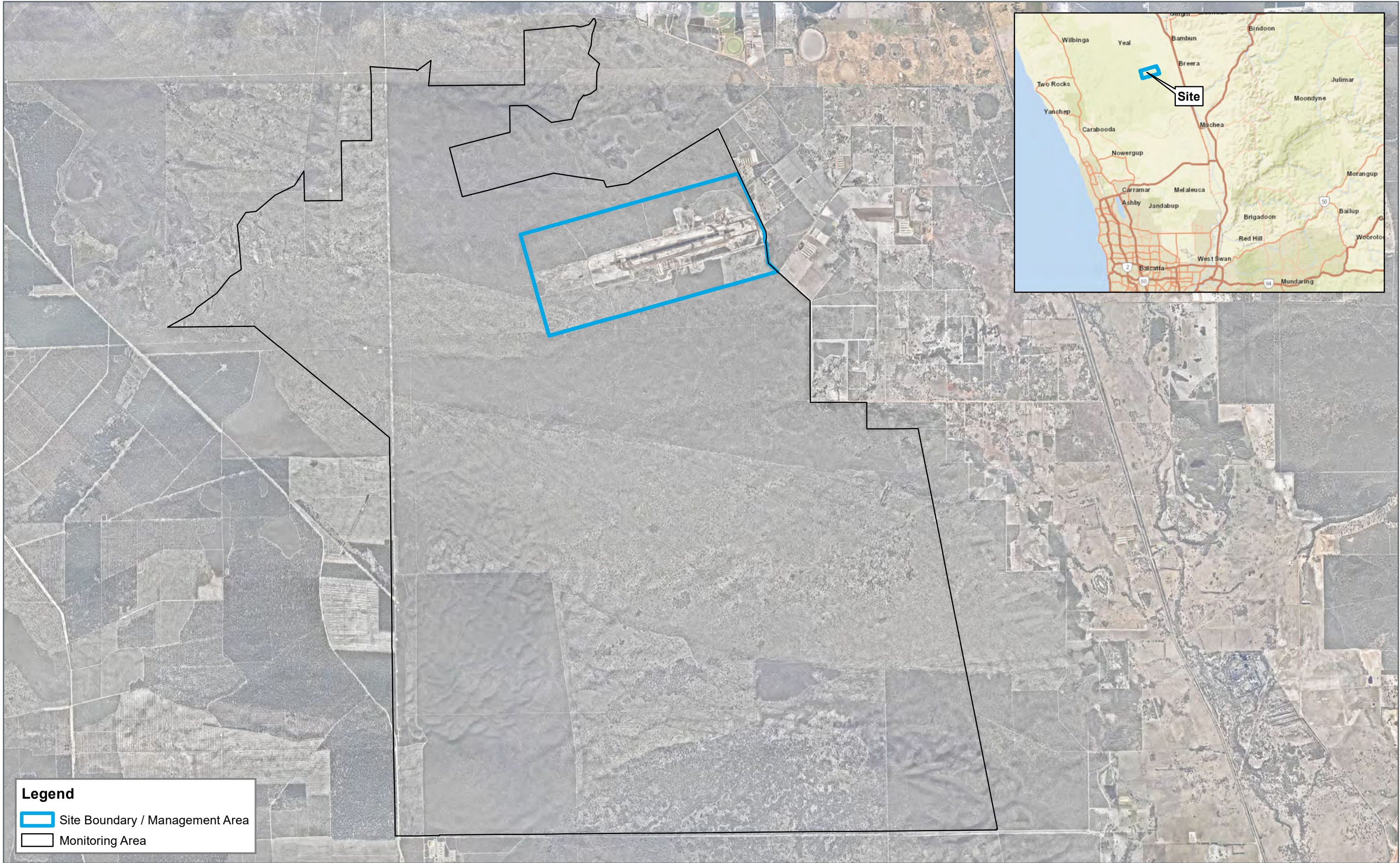
A

FIGURES



now





Legend

 Site Boundary / Management Area

 Monitoring Area

FIGURE 1
1:60,000 Scale at A3

Metres

0 1,000 2,000

Site Location

Q3 2023 QUARTERLY SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-08-08 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-001_RegionalLocation 02.mxd
Aerial Imagery Supplied by Nearmap

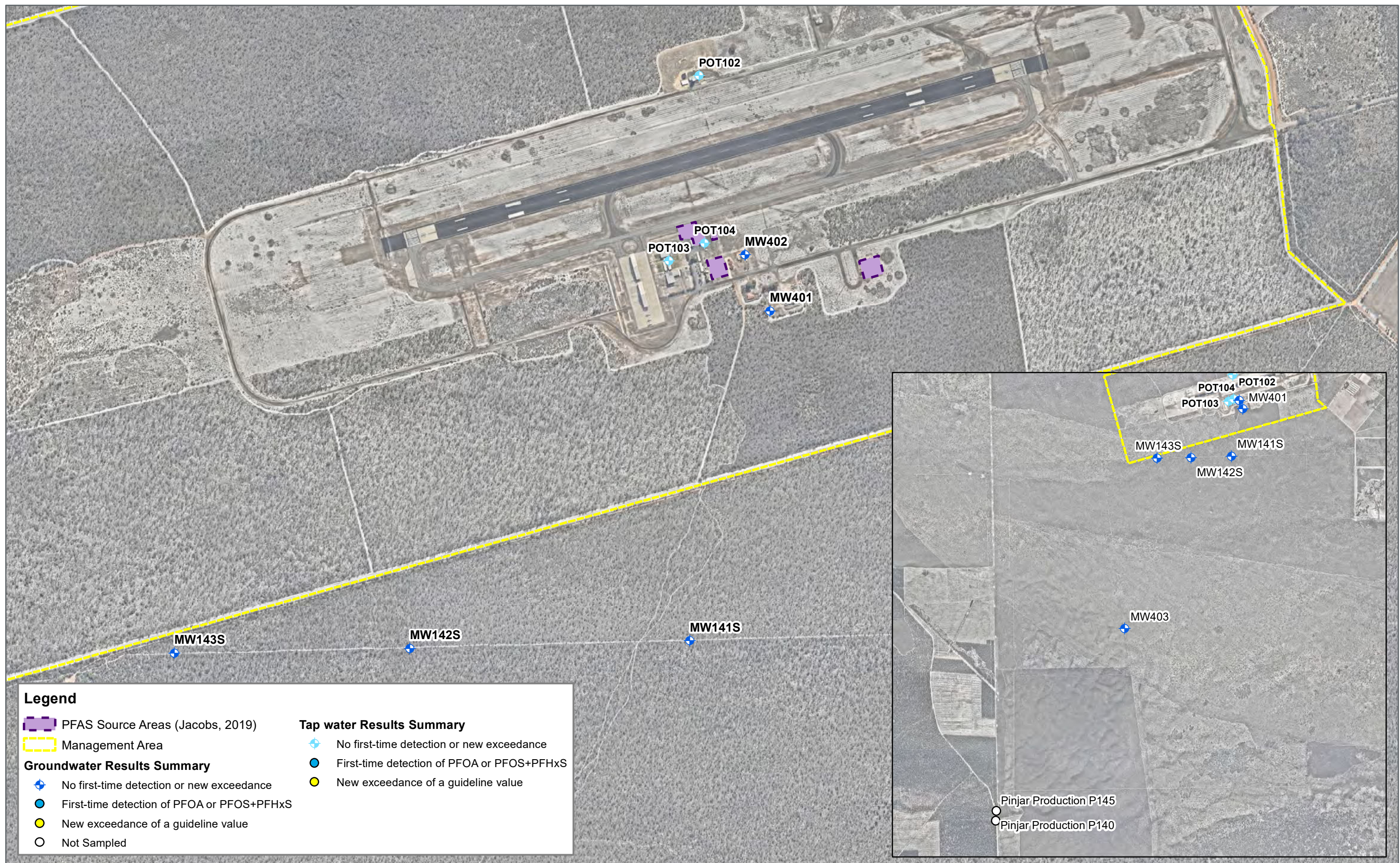


FIGURE 2
1:10,000 Scale at A3

Metres

0 200 400

Monitoring Locations & Results Summary

Q1 2023 QUARTERLY SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-08-09 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-002_2023Q3PFASResults 01.mxd
Aerial Imagery Supplied by Nearmap

APPENDIX

B

DATA ASSESSMENT TABLES



now



	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids										PFAS - (n:2) Fluorotelomer Sulfonic Acids				Perfluorooctane sulfonamide (FOSA)		
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)		10:2 Fluorotelomer sulfonic acid (10:2 FTS)	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		µg/L	
LOR - Limit of Reporting	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	0.01	0.05	0.01	0.01	0.02
PFAS NEMP 2020 Drinking Water											0.56												
PFAS NEMP 2020 Recreational Water											10												

Location Code	Date	Field ID	Sample Type	Lab Report Number																						
	18/07/2023	0958_QC301_230718	Rinsate	EP2309594	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
	18/07/2023	0958_QC401_230718	Field Blank	EP2309594	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
MW141S	18/07/2023	0958_MW141S_230718	Normal	EP2309594	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
MW142S	18/07/2023	0958_MW142S_230718	Normal	EP2309594	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
MW143S	18/07/2023	0958_MW143S_230718	Normal	EP2309594	<0.02	<0.02	0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
MW143S	18/07/2023	0958_QC103_230718	Field Duplicate	EP2309594	<0.02	<0.02	0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
MW143S	18/07/2023	0958_QC203_230718	Interlab Duplicate	1009478	<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	<0.01	<0.01	<0.01	<0.05
MW401	18/07/2023	0958_MW401_230718	Normal	EP2309594	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
MW401	18/07/2023	0958_QC101_230718	Field Duplicate	EP2309594	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
MW401	18/07/2023	0958_QC201_230718	Interlab Duplicate	1009478	<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	<0.01	<0.01	<0.01	<0.05
MW402	18/07/2023	0958_MW402_230718	Normal	EP2309594	0.04	0.05	0.34	0.03	0.28	<0.02	<0.1	<0.02	0.07	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
MW403	18/07/2023	0958_MW403_230718	Normal	EP2309594	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
POT102	18/07/2023	0958_POT102_230718	Normal	EP2309594	0.07	0.08	0.52	0.04	0.32	<0.02	<0.1	0.03	0.17	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
POT103	18/07/2023	0958_POT103_230718	Normal	EP2309594	0.07	0.09	0.58	0.06	0.36	<0.02	<0.1	0.03	0.18	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
POT103	18/07/2023	0958_QC102_230718	Field Duplicate	EP2309594	0.08	0.08	0.58	0.06	0.39	<0.02	<0.1	0.03	0.17	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02
POT103	18/07/2023	0958_QC202_230718	Interlab Duplicate	1009478	0.07	0.06	0.47	0.06	0.42	<0.01	<0.05	0.03	0.14	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05
POT104	18/07/2023	0958_POT104_230718	Normal	EP2309594	0.07	0.08	0.58	0.05	0.38	<0.02	<0.1	0.03	0.17	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02

Environmental Standards
HEPA, January 2020, PFAS NEMP 2020 Drinking Water
HEPA, January 2020, PFAS NEMP 2020 Recreational Water

Notes:
First-time detection of PFOA or PFOS+PFHxS
New Exceedance of guideline value

	PFAS - Perfluoroalkyl Sulfonamides							PFAS		
	Perfluorobutane sulfonic acid (PFBS)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS
LOR - Limit of Reporting	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	0.01	0.05	0.02	0.05	0.05	0.02	0.05	0.01	0.01	0.01
PFAS NEMP 2020 Drinking Water								0.07		
PFAS NEMP 2020 Recreational Water								2		

Location Code	Date	Field ID	Sample Type	Lab Report Number										
	18/07/2023	0958_QC301_230718	Rinsate	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
	18/07/2023	0958_QC401_230718	Field Blank	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW141S	18/07/2023	0958_MW141S_230718	Normal	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW142S	18/07/2023	0958_MW142S_230718	Normal	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW143S	18/07/2023	0958_MW143S_230718	Normal	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW143S	18/07/2023	0958_QC103_230718	Field Duplicate	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW143S	18/07/2023	0958_QC203_230718	Interlab Duplicate	1009478	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.01	<0.05	<0.1
MW401	18/07/2023	0958_MW401_230718	Normal	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW401	18/07/2023	0958_QC101_230718	Field Duplicate	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
MW401	18/07/2023	0958_QC201_230718	Interlab Duplicate	1009478	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.1
MW402	18/07/2023	0958_MW402_230718	Normal	EP2309594	0.04	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.62	0.75	0.83
MW403	18/07/2023	0958_MW403_230718	Normal	EP2309594	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01	<0.01
POT102	18/07/2023	0958_POT102_230718	Normal	EP2309594	0.07	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.84	1.17	1.29
POT103	18/07/2023	0958_POT103_230718	Normal	EP2309594	0.07	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.94	1.28	1.43
POT103	18/07/2023	0958_QC102_230718	Field Duplicate	EP2309594	0.08	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.97	1.31	1.45
POT103	18/07/2023	0958_QC202_230718	Interlab Duplicate	1009478	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.89	1.19	1.33
POT104	18/07/2023	0958_POT104_230718	Normal	EP2309594	0.07	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.96	1.29	1.42

Environmental Standards

HEPA, January 2020, PFAS NEMP 2020 Drinking Water
HEPA, January 2020, PFAS NEMP 2020 Recreational Water

Notes:

First-time detection of PFOA or PFOS+PFHxS

New Exceedance of guideline value

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

APPENDIX

C

LABORATORY CERTIFICATES OF ANALYSIS



now





Custody Document for Submissions via ALS Compass App

Environmental Division
Perth

Work Order Reference
EP2309594



Telephone : - 61-8-9406 1301

Project: WA_0958-REASOMP-23 Client: STANTEC

Project Manager:
Phone:

ALS Compass COC Reference: 54966 # Samples: 14

Sampler:
Phone:

Turnaround Requirements: Standard ☒ Urgent ☐

Special Instructions:

	ALS Use Only	
	Custody seal intact?	YES NO N/A
	Free ice / frozen ice bricks upon receipt?	YES NO N/A
	Random sample temperature on receipt?	°C

Custody:

Relinquished by:	Received by:	Relinquished by:	Received by:
<p>Date / Time: 18-7-2023</p>	<p>Date / Time: 18/7 1520</p>	<p>Date / Time:</p>	<p>Date / Time:</p>

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

CLIENT: MMHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSASCOMP_23

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY139/19 B

SAMPLER MOBILE:

/ ES2022MMHAUS0002

Other comments:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Free Ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Yes No N/A

Yes No N/A

°C

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MM402		18/07/2023 09:37 AM	WATER	ALS: 4 Non ALS: 0	No	X		Extra Lab QA/QC PFAS
002	0958_MM401		18/07/2023 09:57 AM	WATER	ALS: 2 Non ALS: 0	No	X		
003	0958_QC101		18/07/2023 09:58 AM	WATER	ALS: 2 Non ALS: 0	No	X		
004	0958_POT104		18/07/2023 10:05 AM	WATER	ALS: 4 Non ALS: 0	No	X		Extra Lab QA/QC PFAS
005	0958_POT103		18/07/2023 10:19 AM	WATER	ALS: 2 Non ALS: 0	No	X		
006	0958_QC102		18/07/2023 10:20 AM	WATER	ALS: 2 Non ALS: 0	No	X		
007	0958_POT102		18/07/2023 10:39 AM	WATER	ALS: 4 Non ALS: 0	No	X		Extra Lab QA/QC PFAS
008	0958_MM403		18/07/2023 11:01 AM	WATER	ALS: 4 Non ALS: 0	No	X		Extra Lab QA/QC PFAS
009	0958_MM143S		18/07/2023 11:04 AM	WATER	ALS: 2 Non ALS: 0	No	X		

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASCOMP_23

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

TURNAROUND REQUIREMENTS : 5 Days

LABORATORY USE ONLY (Circle)

PROJECT MANAGER:

PRIMARY SAMPLER:

CONTACT PH: /

QUOTE NO: SY139/19 B

ES2022MWHAUS0002

Other comments:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

Yes No N/A

Freeze / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Waters WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_QC103		18/07/2023 11:05 AM	WATER	ALS: 2 Non ALS: 0	No	X		
011	0958_MW142S		18/07/2023 11:07 AM	WATER	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
012	0958_MW141S		18/07/2023 11:09 AM	WATER	ALS: 4 Non ALS: 0	No	X		Extra Lab QAQC PFAS
013	0958_QC301		18/07/2023 01:20 PM	WATER	ALS: 2 Non ALS: 0	No	X		
014	0958_QC401		18/07/2023 01:22 PM	WATER	ALS: 2 Non ALS: 0	No	X		

CLIENT: MMHAUS - STANTEC AUSTRALIA PTY LTD
PROJECT: WA_0958_PFSAMP_23

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

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

CONTACT PH: QUOTE NO: SY/139/19 B

SAMPLER MOBILE: / ES2022MMHAUS0002

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MMW402	HDPE (no PTFE)	20 mL	00350822025000	Grey	No	
001	0958_MMW402	HDPE (no PTFE)	20 mL	00350822025316	Grey	No	
001	0958_MMW402	HDPE (no PTFE)	20 mL	00350822062645	Grey	No	
001	0958_MMW402	HDPE (no PTFE)	20 mL	00350822062504	Grey	No	
002	0958_MMW401	HDPE (no PTFE)	20 mL	00350822062526	Grey	No	
002	0958_MMW401	HDPE (no PTFE)	20 mL	00350822062401	Grey	No	
003	0958_QC101	HDPE (no PTFE)	20 mL	00350822062489	Grey	No	
003	0958_QC101	HDPE (no PTFE)	20 mL	00350822062541	Grey	No	
004	0958_POT104	HDPE (no PTFE)	20 mL	00350822025304	Grey	No	
004	0958_POT104	HDPE (no PTFE)	20 mL	00350822025437	Grey	No	
004	0958_POT104	HDPE (no PTFE)	20 mL	00350822049747	Grey	No	
004	0958_POT104	HDPE (no PTFE)	20 mL	00350822049765	Grey	No	
005	0958_POT103	HDPE (no PTFE)	20 mL	00350822062607	Grey	No	
005	0958_POT103	HDPE (no PTFE)	20 mL	00350822062656	Grey	No	
006	0958_QC102	HDPE (no PTFE)	20 mL	00350822062563	Grey	No	
006	0958_QC102	HDPE (no PTFE)	20 mL	00350822062486	Grey	No	
007	0958_POT102	HDPE (no PTFE)	20 mL	00350822025284	Grey	No	
007	0958_POT102	HDPE (no PTFE)	20 mL	00350822025020	Grey	No	
007	0958_POT102	HDPE (no PTFE)	20 mL	00350822062658	Grey	No	
008	0958_MMW403	HDPE (no PTFE)	20 mL	00350822062428	Grey	No	
008	0958_MMW403	HDPE (no PTFE)	20 mL	00350822024950	Grey	No	
008	0958_MMW403	HDPE (no PTFE)	20 mL	00350822049966	Grey	No	
008	0958_MMW403	HDPE (no PTFE)	20 mL	00350822050268	Grey	No	
009	0958_MMW43S	HDPE (no PTFE)	20 mL	00350822025504	Grey	No	
009	0958_MMW43S	HDPE (no PTFE)	20 mL	00350822062572	Grey	No	
009	0958_MMW43S	HDPE (no PTFE)	20 mL	00350822062666	Grey	No	

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFSOMP_23

SITE: Gingin GW - CG

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A
Yes No N/A
C

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

Total Bottle Count: ALS: 40, Non ALS: 0

010	0958_QC103	HDPE (no PTFE)	20 mL	00350822049889	Grey	No	
010	0958_QC103	HDPE (no PTFE)	20 mL	00350822050275	Grey	No	
011	0958_MW142S	HDPE (no PTFE)	20 mL	00350822024956	Grey	No	
011	0958_MW142S	HDPE (no PTFE)	20 mL	00350822025022	Grey	No	
011	0958_MW142S	HDPE (no PTFE)	20 mL	00350822049925	Grey	No	
012	0958_MW141S	HDPE (no PTFE)	20 mL	00350822049960	Grey	No	
012	0958_MW141S	HDPE (no PTFE)	20 mL	00350822025011	Grey	No	
012	0958_MW141S	HDPE (no PTFE)	20 mL	00350822025056	Grey	No	
012	0958_MW141S	HDPE (no PTFE)	20 mL	00350822062567	Grey	No	
013	0958_QC301	HDPE (no PTFE)	20 mL	00350822062631	Grey	No	
013	0958_QC301	HDPE (no PTFE)	20 mL	00350822062407	Grey	No	
014	0958_QC401	HDPE (no PTFE)	20 mL	00350822062598	Grey	No	
014	0958_QC401	HDPE (no PTFE)	20 mL	00350822049884	Grey	No	



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2309594**

Client : **STANTEC AUSTRALIA PTY LTD**
Contact : **[REDACTED]**
Address : **GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000**

Laboratory : **Environmental Division Perth**
Contact : **Customer Services EP**
Address : **26 Rigali Way Wangara WA Australia
6065**

E-mail : **[REDACTED]**
Telephone : **----**
Facsimile : **----**

E-mail : **ALSEnviro.Perth@alsglobal.com**
Telephone : **[REDACTED]**
Facsimile : **[REDACTED]**

Project : **WA_0958_PFASOMP_23**
Order number : **pfas-omp Gingin**
C-O-C number : **54966**
Site : **Gingin GW - CG**
Sampler : **[REDACTED] [REDACTED]**

Page : **1 of 3**
Quote number : **ES2022MWH AUS0002 (SY/139/19 B)**
QC Level : **NEPM 2013 B3 & ALS QC Standard**

Dates

Date Samples Received : **18-Jul-2023 15:20**
Client Requested Due : **27-Jul-2023**
Date :

Issue Date : **20-Jul-2023**
Scheduled Reporting Date : **27-Jul-2023**

Delivery Details

Mode of Delivery : **Client Drop Off**
No. of coolers/boxes : **1**
Receipt Detail :

Security Seal : **Intact.**
Temperature : **16.1 - Ice present**
No. of samples received / analysed : **14 / 14**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EP2309594-001	18-Jul-2023 09:37	0958_MW402_230718	✓
EP2309594-002	18-Jul-2023 09:57	0958_MW401_230718	✓
EP2309594-003	18-Jul-2023 09:58	0958_QC101_230718	✓
EP2309594-004	18-Jul-2023 10:05	0958_POT104_230718	✓
EP2309594-005	18-Jul-2023 10:19	0958_POT103_230718	✓
EP2309594-006	18-Jul-2023 10:20	0958_QC102_230718	✓
EP2309594-007	18-Jul-2023 10:39	0958_POT102_230718	✓
EP2309594-008	18-Jul-2023 11:01	0958_MW403_230718	✓
EP2309594-009	18-Jul-2023 11:04	0958_MW143S_230718	✓
EP2309594-010	18-Jul-2023 11:05	0958_QC103_230718	✓
EP2309594-011	18-Jul-2023 11:07	0958_MW142_230718	✓
EP2309594-012	18-Jul-2023 11:09	0958_MW141S_230718	✓
EP2309594-013	18-Jul-2023 13:20	0958_QC301_230718	✓
EP2309594-014	18-Jul-2023 13:22	0958_QC401_230718	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

[REDACTED]	- A4 - AU Tax Invoice (INV)	Email	[REDACTED]cardno.com.au
DERP LAB REPORTS			
[REDACTED]	- *AU Certificate of Analysis - NATA (COA)	Email	[REDACTED]
	- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	[REDACTED]
	- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	[REDACTED]
	- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	[REDACTED]
	- Chain of Custody (CoC) (COC)	Email	[REDACTED]
	- EDI Format - ESDAT (ESDAT)	Email	[REDACTED]
	- EDI Format - XTab (XTAB)	Email	[REDACTED]
	- *AU Certificate of Analysis - NATA (COA)	Email	[REDACTED]
	- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	[REDACTED]
	- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	[REDACTED]
	- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	[REDACTED]
	- Chain of Custody (CoC) (COC)	Email	[REDACTED]
	- EDI Format - ESDAT (ESDAT)	Email	[REDACTED]
	- EDI Format - XTab (XTAB)	Email	[REDACTED]

Issue Date : 20-Jul-2023
Page : 3 of 3
Work Order : EP2309594 Amendment 0
Client : STANTEC AUSTRALIA PTY LTD





CERTIFICATE OF ANALYSIS

Work Order	: EP2309594	Page	: 1 of 11
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 18-Jul-2023 15:20
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 24-Jul-2023
C-O-C number	: 54966	Issue Date	: 27-Jul-2023 15:06
Sampler	: [REDACTED] [REDACTED]		
Site	: Gingin GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 14		
No. of samples analysed	: 14		



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
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW402_230718	0958_MW401_230718	0958_QC101_230718	0958_MW403_230718	0958_MW143S_230718
Sampling date / time					18-Jul-2023 09:37	18-Jul-2023 09:57	18-Jul-2023 09:58	18-Jul-2023 11:01	18-Jul-2023 11:04
Compound	CAS Number	LOR	Unit	EP2309594-001	EP2309594-002	EP2309594-003	EP2309594-008	EP2309594-009	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.04	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.05	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.34	<0.01	<0.01	<0.01	0.02	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.03	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.28	<0.01	<0.01	<0.01	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.07	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	<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	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW402_230718	0958_MW401_230718	0958_QC101_230718	0958_MW403_230718	0958_MW143S_230718
Sampling date / time					18-Jul-2023 09:37	18-Jul-2023 09:57	18-Jul-2023 09:58	18-Jul-2023 11:01	18-Jul-2023 11:04
Compound	CAS Number	LOR	Unit	EP2309594-001	EP2309594-002	EP2309594-003	EP2309594-008	EP2309594-009	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.83	<0.01	<0.01	<0.01	0.02	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.62	<0.01	<0.01	<0.01	0.02	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.75	<0.01	<0.01	<0.01	0.02	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	92.0	97.5	102	100	104	
13C8-PFOA	----	0.02	%	97.6	97.8	99.7	102	100	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_QC103_230718	0958_MW142_230718	0958_MW141S_230718	----	----
Sampling date / time					18-Jul-2023 11:05	18-Jul-2023 11:07	18-Jul-2023 11:09	----	----
Compound	CAS Number	LOR	Unit	EP2309594-010	EP2309594-011	EP2309594-012	-----	-----	
				Result	Result	Result	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	<0.01	<0.01	----	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_QC103_230718	0958_MW142_230718	0958_MW141S_230718	----	----
Sampling date / time				18-Jul-2023 11:05	18-Jul-2023 11:07	18-Jul-2023 11:09	----	----
Compound	CAS Number	LOR	Unit	EP2309594-010	EP2309594-011	EP2309594-012	-----	-----
				Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<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	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.02	<0.01	<0.01	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	<0.01	<0.01	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.02	<0.01	<0.01	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	112	102	110	----	----
13C8-PFOA	----	0.02	%	102	96.9	98.8	----	----



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: POTABLE WATER (Matrix: WATER)				Sample ID	0958_POT104_23071 8	0958_POT103_23071 8	0958_QC102_230718	0958_POT102_23071 8	----
Sampling date / time				18-Jul-2023 10:05	18-Jul-2023 10:19	18-Jul-2023 10:20	18-Jul-2023 10:39	----	
Compound	CAS Number	LOR	Unit	EP2309594-004	EP2309594-005	EP2309594-006	EP2309594-007	-----	
				Result	Result	Result	Result	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.07	0.07	0.08	0.07	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.08	0.09	0.08	0.08	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.58	0.58	0.58	0.52	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.05	0.06	0.06	0.04	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.38	0.36	0.39	0.32	----	
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	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.03	0.03	0.03	0.03	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.17	0.18	0.17	0.17	----	
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	0.04	0.04	0.04	0.04	----	
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 (PFTTrDA)	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									
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	----	



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: POTABLE WATER (Matrix: WATER)				Sample ID	0958_POT104_23071 8	0958_POT103_23071 8	0958_QC102_230718	0958_POT102_23071 8	----
Sampling date / time					18-Jul-2023 10:05	18-Jul-2023 10:19	18-Jul-2023 10:20	18-Jul-2023 10:39	----
Compound	CAS Number	LOR	Unit	EP2309594-004	EP2309594-005	EP2309594-006	EP2309594-007	-----	
				Result	Result	Result	Result	----	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
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	1.42	1.43	1.45	1.29	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.96	0.94	0.97	0.84	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.29	1.28	1.31	1.17	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	94.6	98.6	103	92.0	----	
13C8-PFOA	----	0.02	%	98.8	103	99.3	100	----	



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_230718	0958_QC401_230718	----	----	----
Sampling date / time				18-Jul-2023 13:20	18-Jul-2023 13:22	----	----	----
Compound	CAS Number	LOR	Unit	EP2309594-013	EP2309594-014	-----	-----	-----
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_230718	0958_QC401_230718	----	----	----
Sampling date / time				18-Jul-2023 13:20	18-Jul-2023 13:22	----	----	----
Compound	CAS Number	LOR	Unit	EP2309594-013	EP2309594-014	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	98.1	91.7	----	----	----
13C8-PFOA	----	0.02	%	101	102	----	----	----



Surrogate Control Limits

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

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

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



QUALITY CONTROL REPORT

Work Order	: EP2309594	Page	: 1 of 10
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 18-Jul-2023
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 24-Jul-2023
C-O-C number	: 54966	Issue Date	: 27-Jul-2023
Sampler	: [REDACTED] [REDACTED]		
Site	: Gingin GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 14		
No. of samples analysed	: 14		



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
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5184974)									
EP2309594-001	0958_MW402_230718	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.34	0.39	14.7	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.28	0.29	5.4	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.05	0.05	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.03	0.04	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2309594-007	0958_POT102_230718	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.52	0.57	9.3	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.32	0.33	0.0	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.07	0.07	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.08	0.08	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	0.06	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5191096)									
EP2309594-011	0958_MW142_230718	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5184974)									
EP2309594-001	0958_MW402_230718	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	0.03	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.07	0.07	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5184974) - continued									
EP2309594-001	0958_MW402_230718	EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2309594-007	0958_POT102_230718	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.03	0.03	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.17	0.17	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5191096)									
EP2309594-011	0958_MW142_230718	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5184974)									
EP2309594-001	0958_MW402_230718	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5184974) - continued									
EP2309594-001	0958_MW402_230718	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2309594-007	0958_POT102_230718	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5191096)									
EP2309594-011	0958_MW142_230718	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5184974)									
EP2309594-001	0958_MW402_230718	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2309594
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP_23



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5184974) - continued									
EP2309594-007	0958_POT102_230718	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5191096)									
EP2309594-011	0958_MW142_230718	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5184974)									
EP2309594-001	0958_MW402_230718	EP231X: Sum of PFAS	----	0.01	µg/L	0.83	0.91	9.2	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.62	0.68	9.2	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.75	0.82	8.9	0% - 20%
EP2309594-007	0958_POT102_230718	EP231X: Sum of PFAS	----	0.01	µg/L	1.29	1.37	6.0	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.84	0.90	6.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	1.17	1.23	5.0	0% - 20%
EP231P: PFAS Sums (QC Lot: 5191096)									
EP2309594-011	0958_MW142_230718	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

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: 5184974)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	103	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	104	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	87.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	95.0	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	87.9	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.6	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5191096)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	106	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	103	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	92.3	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	98.9	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	91.6	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	104	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5184974)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	96.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	96.2	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	95.8	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.4	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	93.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	96.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	95.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	96.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	93.8	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	100	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5191096)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	97.8	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	97.4	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	95.2	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	99.8	72.0	130



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5191096) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	102	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	110	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	102	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	94.4	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	99.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	100	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5184974)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	92.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	96.2	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	91.6	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	96.3	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	97.0	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	91.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	109	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5191096)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	94.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	103	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	81.9	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	101	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	106	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	99.6	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	105	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5184974)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	104	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	98.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	114	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	102	64.2	133

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: 5184974)							
EP2309594-004	0958_POT104_230718	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	98.1	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	108	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	112	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	106	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	89.7	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	85.1	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5191096)							
EP2309594-012	0958_MW141S_230718	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	104	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	110	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	90.1	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	98.5	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	81.9	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	82.8	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5184974)							



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
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5184974) - continued							
EP2309594-004	0958_POT104_230718	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	97.3	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	92.9	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	98.2	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	98.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	93.9	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	96.4	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	89.8	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	89.0	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	92.4	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	93.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	95.0	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5191096)							
EP2309594-012	0958_MW141S_230718	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	96.6	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	99.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	95.2	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	103	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	100	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	102	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	88.2	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	77.4	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	78.4	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	72.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	75.8	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5184974)							
EP2309594-004	0958_POT104_230718	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	97.8	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	103	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	98.4	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	95.4	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	104	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	108	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	113	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5191096)							
EP2309594-012	0958_MW141S_230718	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	77.0	59.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5191096) - continued							
EP2309594-012	0958_MW141S_230718	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	73.8	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	71.6	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	75.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	75.0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	80.0	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	94.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5184974)							
EP2309594-004	0958_POT104_230718	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	102	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	116	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	99.8	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5191096)							
EP2309594-012	0958_MW141S_230718	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	104	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	100	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	112	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	91.1	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2309594	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP_23	Date Samples Received	: 18-Jul-2023
Site	: Gingin GW - CG	Issue Date	: 27-Jul-2023
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 14
Order number	: pfas-omp Gingin	No. of samples analysed	: 14

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



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	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW143S_230718, 0958_MW142_230718,	0958_QC103_230718, 0958_MW141S_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	25-Jul-2023	14-Jan-2024	✔
HDPE (no PTFE) (EP231X) 0958_MW402_230718, 0958_QC101_230718, 0958_POT103_230718, 0958_POT102_230718, 0958_QC301_230718,	0958_MW401_230718, 0958_POT104_230718, 0958_QC102_230718, 0958_MW403_230718, 0958_QC401_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	26-Jul-2023	14-Jan-2024	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0958_MW143S_230718, 0958_MW142_230718,	0958_QC103_230718, 0958_MW141S_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	25-Jul-2023	14-Jan-2024	✔
HDPE (no PTFE) (EP231X) 0958_MW402_230718, 0958_QC101_230718, 0958_POT103_230718, 0958_POT102_230718, 0958_QC301_230718,	0958_MW401_230718, 0958_POT104_230718, 0958_QC102_230718, 0958_MW403_230718, 0958_QC401_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	26-Jul-2023	14-Jan-2024	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW143S_230718, 0958_MW142_230718,	0958_QC103_230718, 0958_MW141S_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	25-Jul-2023	14-Jan-2024	✔
HDPE (no PTFE) (EP231X) 0958_MW402_230718, 0958_QC101_230718, 0958_POT103_230718, 0958_POT102_230718, 0958_QC301_230718,	0958_MW401_230718, 0958_POT104_230718, 0958_QC102_230718, 0958_MW403_230718, 0958_QC401_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	26-Jul-2023	14-Jan-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	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW143S_230718, 0958_MW142_230718,	0958_QC103_230718, 0958_MW141S_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	25-Jul-2023	14-Jan-2024	✔
HDPE (no PTFE) (EP231X) 0958_MW402_230718, 0958_QC101_230718, 0958_POT103_230718, 0958_POT102_230718, 0958_QC301_230718,	0958_MW401_230718, 0958_POT104_230718, 0958_QC102_230718, 0958_MW403_230718, 0958_QC401_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	26-Jul-2023	14-Jan-2024	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW143S_230718, 0958_MW142_230718,	0958_QC103_230718, 0958_MW141S_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	25-Jul-2023	14-Jan-2024	✔
HDPE (no PTFE) (EP231X) 0958_MW402_230718, 0958_QC101_230718, 0958_POT103_230718, 0958_POT102_230718, 0958_QC301_230718,	0958_MW401_230718, 0958_POT104_230718, 0958_QC102_230718, 0958_MW403_230718, 0958_QC401_230718	18-Jul-2023	24-Jul-2023	14-Jan-2024	✔	26-Jul-2023	14-Jan-2024	✔



Quality Control Parameter Frequency Compliance

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

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

Quality Control Sample Type		Count		Rate (%)		Evaluation	Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected		
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	18	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	18	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	18	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	18	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

☐ **Sydney**
Unit F3 - 6 Building F, 16 Mars Road, Lane Cove
Phone: +612 9900 8400
Email: enviro.syd@mgtlabmark.com.au

☐ **Brisbane**
Unit 1-21 Smallwood Place, Murrarie
Phone: +617 3902 4600
Email: enviro.bris@mqtlabmark.com.au

☐ **Melbourne**
2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mgtlabmark.com.au

Page 1 of 1

CLIENT DETAILS

Company Name : Stantec Australia

Contact Name : Maelle Bourdals

Purchase Order :	304700525
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COC Number :	304700525 -01
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Office Address : 226 Adelaide Tce, Perth, WA 6000

PROJECT Number :	WA 0958 PFASOMP 23
------------------	--------------------

Eurofins | mgt quote ID :

Email for COC/SRN/Results :

PROJECT Name :	WA_0958_PFASOMP_23
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Data output format: PDF; ESDAT

Special Directions & Comments :

Please send ESdat files to [REDACTED] with the project No in the header file

Please send invoice to

Eurofins | mgt DI water batch number:

Analytes

Some common holding times (with correct preservation).
For further information contact the lab

Waters

Soils

BTEX, MAH, VOC	14 days	BTEX, MAH, VOC	14 days
TRH, PAH, Phenols, Pesticides	7 days	TRH, PAH, Phenols, Pesticides	14 days
Heavy Metals	6 months	Heavy Metals	6 months
Mercury, CrVI	28 days	Mercury, CrVI	28 days
Microbiological testing	24 hours	Microbiological testing	72 hours
BOD, Nitrate, Nitrite, Total N	2 days	Anions	28 days
Solids - TSS, TDS etc	7 days	SPOCAS, pH Field and FOX, CrS	24 hours
Ferrous iron	7 days	ASLP, TCLP	7 days

Containers:

Sample comments:

1LP	250P	125P	1LA	40ml. vial	125ml. A	jar
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Laboratory Staff		Turn around time		Method Of Shipment		Temperature on arrival:
Relinquished By: Stantec	Received By: [REDACTED]	1 DAY ☐ 2 DAY ☐ 3 DAY ☐		☒ Courier ☐ Hand Delivered ☐ Postal		Report number:
Date & Time : 18/07/2023	Date & Time : 2017123 10:40	STANDARD ☒ Other:		Courier Consignment # :		
Signature:	Signature: [REDACTED] 5.8°C					

1009478

Eurofins ARL Pty Ltd
Eurofins Environment Testing Australia Pty Ltd
Eurofins Environment Testing NZ Ltd

ABN: 91 05 0159 898

ABN: 50 005 085 521

NZBN: 9429046024954

Perth	Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370	6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Auckland	Christchurch
35 O'Rourke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290

Sample Receipt Advice

Company name:	Stantec Australia Pty Ltd (WA)
Contact name:	[REDACTED]
Project name:	WA_0958_PFASOMP_23
Project ID:	WA_0958_PFASOMP_23
Turnaround time:	5 Day
Date/Time received	Jul 20, 2023 10:40 AM
Eurofins reference	1009478

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.
- N/A 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:

[REDACTED] on phone : or by email: [REDACTED]

Results will be delivered electronically via email to [REDACTED] - [REDACTED]

Note: A copy of these results will also be delivered to the general Stantec Australia Pty Ltd (WA) email address.



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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091
NATA# 1261 Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 4551
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: WA_0958_PFASOMP_23
Project ID: WA_0958_PFASOMP_23

Order No.: 304700525
Report #: 1009478
Phone: [REDACTED]
Fax: [REDACTED]

Received: Jul 20, 2023 10:40 AM
Due: Jul 27, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_230718	Jul 18, 2023		Water	L23-JI0042217	X
2	0958_QC202_230718	Jul 18, 2023		Water	L23-JI0042218	X
3	0958_QC203_230718	Jul 18, 2023		Water	L23-JI0042219	X

Test Counts

3

Stantec Australia Pty Limited
6F 226, Adelaide Terrace
Perth
WA 6000



NATA Accredited
Accreditation Number 2377
Site Number 2370

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:

Report **1009478-W**
Project name **WA_0958_PFASOMP_23**
Project ID **WA_0958_PFASOMP_23**
Received Date **Jul 20, 2023**

Client Sample ID			0958_QC201_2 30718	0958_QC202_2 30718	0958_QC203_2 30718
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L23-JI0042217	L23-JI0042218	L23-JI0042219
Date Sampled			Jul 18, 2023	Jul 18, 2023	Jul 18, 2023
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01	0.03	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	< 0.01	0.14	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.02	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.04	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	76	30	57
13C5-PFPeA (surr.)	1	%	81	72	65
13C5-PFHxA (surr.)	1	%	100	84	84
13C4-PFHpA (surr.)	1	%	100	91	82
13C8-PFOA (surr.)	1	%	103	88	80
13C5-PFNA (surr.)	1	%	138	139	119
13C6-PFDA (surr.)	1	%	78	67	62
13C2-PFUnDA (surr.)	1	%	56	52	69
13C2-PFDoDA (surr.)	1	%	55	52	52
13C2-PFTeDA (surr.)	1	%	35	31	71
Perfluoroalkyl sulfonamido substances					
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	105	108	87
D3-N-MeFOSA (surr.)	1	%	126	111	96

Client Sample ID			0958_QC201_2 30718	0958_QC202_2 30718	0958_QC203_2 30718
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L23-JI0042217	L23-JI0042218	L23-JI0042219
Date Sampled			Jul 18, 2023	Jul 18, 2023	Jul 18, 2023
Test/Reference	LOR	Unit			
Perfluoroalkyl sulfonamido substances					
D5-N-EtFOSA (surr.)	1	%	133	112	111
D7-N-MeFOSE (surr.)	1	%	95	79	74
D9-N-EtFOSE (surr.)	1	%	94	86	78
D5-N-EtFOSAA (surr.)	1	%	53	57	49
D3-N-MeFOSAA (surr.)	1	%	61	65	53
Perfluoroalkyl sulfonic acids (PFASs)					
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.07	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01	0.02	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 0.06	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.47	^{N09} 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 0.06	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.42	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	110	99	94
18O2-PFHxS (surr.)	1	%	121	100	105
13C8-PFOS (surr.)	1	%	90	81	75
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	151	78	110
13C2-6:2 FTSA (surr.)	1	%	141	81	95
13C2-8:2 FTSA (surr.)	1	%	90	77	70
13C2-10:2 FTSA (surr.)	1	%	70	64	64
PFASs Summations					
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	0.89	0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	0.46	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	0.93	0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	1.19	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	1.33	< 0.1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Jul 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Jul 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Jul 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Jul 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Jul 20, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

**Eurofins ARL Pty Ltd**

ABN: 91 05 0159 898

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South
VIC 3175
Tel: +61 3 8564 5000
NATA# 1261 Site# 1254

Geelong
19/8 Lewalan Street
Grovedale
VIC 3216
Tel: +61 3 8564 5000
NATA# 1261 Site# 25403

Sydney
179 Magowar Road
Girraween
NSW 2145
Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

Canberra
Unit 1,2 Dacre Street
Mitchell
ACT 2911
Tel: +61 2 6113 8091
NATA# 1261 Site# 25466

Brisbane
1/21 Smallwood Place
Murarrie
QLD 4172
Tel: +61 7 3902 4600
NATA# 1261 Site# 20794

Newcastle
1/2 Frost Drive
Mayfield West NSW 2304
Tel: +61 2 4968 8448
NATA# 1261
Site# 25079 & 25289

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose,
Auckland 1061
Tel: +64 9 526 4551
IANZ# 1327

Christchurch
43 Detroit Drive
Rolleston,
Christchurch 7675
Tel: +64 3 343 5201
IANZ# 1290

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

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226, Adelaide Terrace
Perth
WA 6000
Project Name: WA_0958_PFASOMP_23
Project ID: WA_0958_PFASOMP_23

Order No.: 304700525
Report #: 1009478
Phone: [REDACTED]
Fax: [REDACTED]

Received: Jul 20, 2023 10:40 AM
Due: Jul 27, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_230718	Jul 18, 2023		Water	L23-JI0042217	X
2	0958_QC202_230718	Jul 18, 2023		Water	L23-JI0042218	X
3	0958_QC203_230718	Jul 18, 2023		Water	L23-JI0042219	X

Test Counts

3

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to '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 prior to sample receipt deadlines as stated on the SRA.

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

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

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
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 a moisture has been determined on a solid sample the result is expressed on a dry 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 is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA)s							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)s							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	98			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	104			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	111			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	104			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	108			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	102			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	95			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	106			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	103			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	136			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	100			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	99			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	101			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	100			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	120			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	111			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	145			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	110			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)									
Perfluorobutanesulfonic acid (PFBS)			%	108			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	116			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	91			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	90			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	97			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	136			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	110			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	85			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	95			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	116			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	113			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	101			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)									
				Result 1					
Perfluorobutanoic acid (PFBA)	M23-JI0046320	NCP	%	88			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M23-JI0046320	NCP	%	97			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M23-JI0046320	NCP	%	108			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-JI0046320	NCP	%	98			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M23-JI0046320	NCP	%	102			50-150	Pass	
Perfluorononanoic acid (PFNA)	M23-JI0046320	NCP	%	95			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M23-JI0046320	NCP	%	92			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-JI0046320	NCP	%	96			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-JI0046320	NCP	%	98			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-JI0046320	NCP	%	94			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	M23-JI0046320	NCP	%	93			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-JI0046320	NCP	%	103			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-JI0046320	NCP	%	97			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-JI0046320	NCP	%	114			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-JI0046320	NCP	%	106			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-JI0046320	NCP	%	114			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-JI0046320	NCP	%	91			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M23-JI0046320	NCP	%	103			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-JI0046320	NCP	%	100			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-JI0046320	NCP	%	86			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-JI0046320	NCP	%	80			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-JI0046320	NCP	%	89			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-JI0046320	NCP	%	130			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-JI0046320	NCP	%	99			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-JI0046320	NCP	%	77			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-JI0046320	NCP	%	89			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-JI0046320	NCP	%	103			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-JI0046320	NCP	%	102			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-JI0046320	NCP	%	91			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M23-JI0046318	NCP	ug/L	0.01	0.01	3.7	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-JI0046318	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-JI0046318	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Sample Integrity

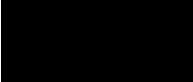
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	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:

 Analytical Services Manager
 Senior Analyst-PFAS



General Manager

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request

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APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES



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Monitoring																		
Date	Area	Monitoring Location	Sample ID	Screen Interval	Choose TOC	Well Depth (m)	SWL (mbTOC)	RWL (mAHD)	Sampling Method	Temp (°C)	DO (mg/L)	EC (us/Cm)	TDS (mg/L)	pH	Eh (mV)	QC Dup	Sample #	Odour Comments
7/18/2023	Base Water Supply Infrastructure	MW402	0958_MW402_230718	NA	NA	NA			Tap	14.6	1.44	442.4	288.6	5.41	-111			None
7/18/2023	Base Fire Water Supply Infrastructure	MW401	0958_MW401_230718	NA	NA	NA			Tap	18.8	5.62	179.6	117	5.66	-61.8	QC101/201		None
7/18/2023	Base Water Supply Infrastructure	POT104	0958_POT104_230718	NA	NA	NA			Tap	15.6	7.04	978	637	6.74	406			None
7/18/2023	Base Water Supply Infrastructure	POT103	0958_POT103_230718	NA	NA	NA			Tap	18.4	5.91	1000	650	6.97	165	QC102/202		None
7/18/2023	Base Water Supply Infrastructure	POT102	0958_POT102_230718	NA	NA	NA			Tap	15.8	8.69	1016	663	6.92	137.6			None
7/18/2023	Off-Site Monitoring Well	MW403	0958_MW403_230718	14-26	73.84	26.0	16.542	57.298	HydraSleeve	18.4	0.7	340.7	221.65	5.39	156.6			None
7/18/2023	Off-Site Monitoring Well	MW141S	0958_MW141S_230718	13.5-16.5	74.36	16.5	10.701	63.659	HydraSleeve	19	0.68	178.2	115.7	3.87	133.9			None
7/18/2023	Off-Site Monitoring Well	MW143S	0958_MW143S_230718	14-18.5	75.81	18.5	18.082	57.728	HydraSleeve	19.2	2.36	247	161.2	4.57	176.8	QC103/203		None
7/18/2023	Off-Site Monitoring Well	MW142S	0958_MW142S_230718	12.4-15.4	76.34	15.5	13.459	62.881	HydraSleeve	19.4	2.89	321.2	208.65	3.83	157.4			None



Calibration Report

Multi-Parameter Water Quality Instrument

Customer:

Contact:

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 20D101040

Cable length: 1m 20B140029

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	170.70 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 57.84
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 4 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA – max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (20A100065)	Check Temp NATA	Room Temp	17	-0.2	°C	NA	16.8	°C
pH (22M)	pH 7.00	392512	7.01	-2.00	mV	6.98	7.01	pH
pH (22M)	pH 4.00	394799	4.00	168.70	mV	3.94	4.00	pH
Conductivity (20A100065)	2764 µS/cm at 25°C	23/0402	2764	GLP	4.91	2849	2764	µS/cm
ORP (23A)	Zobell A & B	23/2504	247	247	mV	255.1	242.7	mV
Zero DO (20C100608)	NaSO3 in distilled water	10175	0.0	NA	NA	-0.9	0.0	%
100% DO (20C100608)	100% Air Saturation	Air	100.0	4.45	uA	92.7	100.0	%

Calibrated by:

Calibration Date: 14-Jul-23

Next Due: 10-Jan-24

APPENDIX

E

DATA QUALITY REVIEW



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Data Quality Review PFAS Ongoing Monitoring Plan Q3 2023 Monitoring Event

This appendix reviews the Quality Assurance (QA) and Quality Control (QC) documentation. Quality assurance encompasses the actions, procedures, checks and decisions undertaken to ensure sample integrity and representativeness, and the reliability and accuracy of analysis results. The QA documentation should also include an indication of the Data Quality Objectives sought in relation to each significant action, test or process involved in the assessment.

QC activities measure the effectiveness of the QA procedures by undertaking testing, and then comparing results to previously established objectives. QC work will include the internal laboratory testing as well as results of QC samples submitted such as trip blanks and duplicates. The quality of the information and/or data is deemed satisfactory when the QC results demonstrate that agreed objectives have been met.

QA/QC Aspects	Evidence & Evaluation
QA Documentation	
Project Quality Plan/Work Plan and Data Quality Objectives	<p>The field investigation was carried out on the 18th July 2023 and is generally in accordance with the proposed scope of work, as documented in the SAQP (PFAS OMP SAQP Gingin Satellite Airfield, Cardno, July 2023) issued to the client and in compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i>, NEPM “National Environment Protection (Assessment of Site Contamination) Measure” and PFAS NEMP 2.0.</p> <p>A quality control program was implemented during the Investigation and the quality assurance procedures used have been reiterated in the report (PFAS OMP July 2023 Factual Report). In addition, a safety, health and environment work method statement (SHEWMS) was also prepared.</p> <p>The Data Quality Objectives were expressed in terms of the purpose of the assessment and the relevant assessment criteria.</p>
Data Representativeness	
Use of Composites	No Composites were used during the investigation
Holding Times	Chain of custody and laboratory reports provide evidence of holding times. Holding times were in compliance with required timeframes.
Verification of field procedures	<p>The methodology conducted during this investigation is documented in the body of the report, and was in general conformance with the SAQP.</p> <p>Non-disposable equipment was decontaminated between sample locations.</p>
Laboratory Reports	<p>The following laboratory reports were considered for this data quality review:</p> <ul style="list-style-type: none"> ▪ ALS report: EP2309594. ▪ Eurofins ARL report: 1009478.

QA/QC Aspects

Evidence & Evaluation

Data Precision & Accuracy

QC sample Frequency

QC sample type	SAQP required frequency	Sample Collected
Blind duplicate	1 in 10 primary samples (10%)	2 for 5 groundwater samples (40%) 1 in 3 tap water samples (33%)
Interlab duplicate	1 in 10 primary samples (10%)	2 for 5 groundwater samples (40%) 1 in 3 tap water samples (33%)
Rinsate	1 per day	1 for 1 day (100%)
Field Blank	1 per day	1 for 1 day (100%)

The required QC frequency was achieved for all media sampled.

RPD Acceptance criteria

Magnitude of Results	Acceptable RPD range
< 10 x LOR	No limits
10 – 20 LOR	0% - 50%
> 20 x LOR	0% - 20%

QC Testing – Blind Duplicates (Primary Lab)

- Groundwater**
- Primary Groundwater Samples Analysed: 5
 - Blind Duplicate Samples Analysed: 2
- All RPDs were within acceptance criteria.

Tap water

- Primary tap water Samples Analysed: 3
 - Blind Duplicate Samples Analysed: 1
- All RPDs were within acceptance criteria.

QC Testing – Interlab Duplicates (Secondary Lab)

- Groundwater**
- Primary Groundwater Samples Analysed: 5
 - Interlab Duplicate Samples Analysed: 2
- All RPDs were within acceptance criteria.
- Tap water**
- Primary tap water Samples Analysed: 3
 - Interlab Duplicate Samples Analysed: 1
- All RPDs were within acceptance criteria with the exception of QC202 (PFHxS – 21%). This minor RPD exceedance is probably due to the low concentration of the analyte under review or the difference of methodology between the primary and secondary laboratories. The primary samples reported a concentration slightly higher, therefore the results reported on are conservatory.

Field Blanks

Field Blanks were collected at a rate of one per fieldwork team per day. All field blank samples tested reported analytes below the laboratory limit of reporting.

QA/QC Aspects	Evidence & Evaluation
Laboratory Internal QC	<p>Evidence of the laboratories internal QC testing is present and complete in the reports. ALS (Primary) performed internal QC with adequate testing and satisfactory results for method blank, matrix spikes, laboratory control samples and laboratory duplicates.</p> <p>All Method Blank results were within acceptable range.</p> <p>All Matrix Spikes reported recoveries within the acceptance range of 70% to 130%.</p> <p>No quality control samples frequency outliers was reported.</p>
Laboratory Method Detection Limit	Laboratory reports indicate the method detection limits were generally lower than the respective assessment criteria.
NATA endorsement of laboratory reports	<p>Laboratory reports were stamped with the NATA endorsement stamp and signature.</p> <p>ALS Accreditation No. 825</p> <p>Eurofins ARL Accreditation No. 1261</p>
Calibration of Field Equipment	<p>All equipment used during the investigation was calibrated by the equipment provider prior to use.</p> <p>The equipment calibration certificate is provided in Appendix D.</p>
Decontamination and Equipment Blanks	Rinsate blanks were collected at a rate of one per day per sampler when reusable equipment was used. All rinsate samples tested reported analytes concentrations below the laboratory LORs.
Data Comparability	
Standard Procedures	Fieldwork procedures are detailed in the SAQP and reports and are comparable for each phase of Investigation.
Qualified Personnel	Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.
Sample Integrity	Field Chain of Custody/Laboratory request forms can be found in Appendix C.
Data Completeness	
Completeness of test program	The scope of work undertaken was generally consistent with the SAQP.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection process and therefore, the data set used as the basis for groundwater and tap water investigation is considered valid and complete.

APPENDIX

D

DATA ASSESSMENT



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		Field				
		DO (Field)	Temperature (Field)	Redox Potential (Field)	Electrical Conductivity (field)	pH (Field)
		mg/L	°C	mV	µS/cm	pH Units
Location Code	Date					
MW101I	23 Oct 2019	2.7	22.8	52.3	125.1	5.72
MW101I	04 May 2020	1.38	21.3	-200.5	247.6	8
MW101I	28 Apr 2021	0.89	21	-62	119.1	6.39
MW101I	11 Apr 2022	0.56	20.2	-55.6	91.8	5.5
MW101I	28 Sep 2022	3.8	24.1	-108.9	122.7	5.38
MW101I	20 Mar 2023	1	22	-116.2	98.7	5.27
MW101I	11 Apr 2023	2.3	21.4	-4.4	414.6	5.69
MW102D	04 May 2020	0.8	22.6	-199.8	136.7	5.76
MW102D	21 Oct 2020	14.02	20.8	-61.1	141.9	6.28
MW102D	28 Apr 2021	1.05	21	107	523.3	7.96
MW102D	11 Apr 2022	1.65	20.1	-144.6	230.8	6.27
MW102D	28 Sep 2022	2.25	22.7	-144.4	217.5	5.22
MW102D	20 Mar 2023	2.92	21.8	-77.8	411.8	6.07
MW102D	11 Apr 2023	0.8	21.8	-42.5	205.8	5.93
MW104I	25 Oct 2019		24.1	-51.2	2,923	12.1
MW104I	07 May 2020	1.95	22.5	2.8	133.4	6.35
MW104I	21 Oct 2020	2.19	21	78.7	221.5	5.43
MW104I	28 Apr 2021	1.17	24.8	5.8	125.7	8.02
MW104I	11 Apr 2022	0.82	21.4	38.4	106.3	5.66
MW104I	28 Sep 2022	0.54	22.5	54	117.8	5.55
MW104I	20 Mar 2023	1.05	23.3	-155.5	117.1	5.57
MW104I	11 Apr 2023	0.76	22.7	15.1	101.9	5.59
MW105D	25 Oct 2019	1.77	24.1	121.4	219.8	8.02
MW105D	07 May 2020	2.19	20.8	14.9	341.9	5.04
MW105D	21 Oct 2020	4.47	22.1	14.9	121.2	4.82
MW105D	28 Apr 2021	1.72	23.2	-1.2	240.5	9.62
MW105D	11 Apr 2022	1.32	20.6	-16.8	185.4	5.82
MW105D	28 Sep 2022	1.27	22.4	73.1	192	5.86
MW105D	20 Mar 2023	3.97	23.2	-4.8	151.9	6.68
MW105D	11 Apr 2023	2.07	23.2	71.1	106.5	5.93
MW106S	25 Oct 2019	0.99	21	294.1	222.8	2.86
MW106S	07 May 2020	1.55	20.1	43.2	328.9	3.77
MW106S	23 Oct 2020	4.51	20.6	211.8	256.8	2.79
MW106S	27 Apr 2021	1.81	21.6	329.7	272	3.41
MW106S	13 Apr 2022	1.38	21.8	164.3	200.5	3.98
MW106S	28 Sep 2022	2.76	19.5	142.1	280.3	3.1
MW106S	12 Oct 2022	3.06	18.7	125.1	259.7	3.19
MW106S	20 Mar 2023	3.87	19.9	87	219.3	3.6
MW106S	11 Apr 2023	1.11	20	40.9	316.2	3.28
MW108S	27 Oct 2021	0.91	19.6	-9.7	283.2	4.25
MW109S	25 Oct 2019	2.43	22.9	367.7	163.8	3.7
MW109S	05 May 2020	1.29	20.4	27.8	114.4	5.21
MW109S	21 Oct 2020	1.01	20.4	277.2	143.6	3.51
MW109S	28 Apr 2021	1.3	22.9	163.9	127.6	4.68
MW109S	27 Oct 2021	5.2	19.3	9	177.6	5.63
MW109S	11 Apr 2022	1.4	20.8	195.8	113.3	4.34
MW109S	28 Sep 2022	2.23	22.4	-95.1	154.3	4.01
MW109S	12 Oct 2022	0.88	21	79.9	135.1	3.61
MW109S	20 Mar 2023	2.27	21	-21.9	132.9	3.9
MW109S	11 Apr 2023	1.07	20.9	31	128.6	4
MW110S	25 Oct 2019	3.8	23.1	234.4	112.3	3.79
MW110S	05 May 2020	1.63	20.1	8.2	108.1	4.79
MW110S	21 Oct 2020	2.07	20.5	248	126.5	3.68
MW110S	28 Apr 2021	2.3	22	219.2	109.2	4.66
MW110S	11 Apr 2022	1.73	20.2	157.6	159.2	4.88
MW110S	28 Sep 2022	3.99	20.8	-58.7	140.1	4.29
MW110S	20 Mar 2023	3.75	22.5	-9.1	129.7	4.7
MW110S	11 Apr 2023	1.56	20.1	29.4	140.3	4.28
MW111S	28 Sep 2022	1.26	21.5	103.6	146.8	5.46
MW112S	24 Oct 2019	3.19	23.7	324.5	113.2	3.65
MW112S	04 May 2020	2.89	20.6	-125	125.1	6.94
MW112S	21 Oct 2020	6.22	20.5	267.2	137.4	3.24
MW112S	28 Apr 2021	9.39	22.9	319.3	177.5	3.83
MW112S	11 Apr 2022	3.77	20.6	143.6	130.5	3.91
MW112S	28 Sep 2022	4.67	21	-37.8	100.2	3.8
MW112S	20 Mar 2023	3.64	21	-10.3	154.6	3.73
MW112S	11 Apr 2023	4.13	21.4	342.2	130.9	6.93
MW113S	24 Oct 2019	1.98	26.5	343.6	165.8	3.62
MW113S	04 May 2020	2.98	20.4	-141.1	147.3	4.44
MW113S	21 Oct 2020	2.55	20.1	276.1	161.7	3.22
MW113S	28 Apr 2021	1.35	22.1	303.9	133.5	4.03
MW113S	11 Apr 2022	3.34	20.3	119	136.5	4.26
MW113S	28 Sep 2022	3.74	21.3	-26.9	150.4	3.79
MW113S	20 Mar 2023	2.13	21.1	-6.6	161.9	3.96

		Field				
		DO (Field)	Temperature (Field)	Redox Potential (Field)	Electrical Conductivity (field)	pH (Field)
		mg/L	°C	mV	µS/cm	pH Units
Location Code	Date					
MW101I	23 Oct 2019	2.7	22.8	52.3	125.1	5.72
MW113S	11 Apr 2023	3.52	21.3	340.7	173	3.8
MW114S	14 Oct 2020	5.11	22.9	2,325	180	6.15
MW114S	11 Apr 2022	4.45	22	112.9	203.2	5.56
MW114S	28 Sep 2022	4.05	20	116.8	269.5	5.9
MW114S	20 Mar 2023	4.5	21.7	-43.5	310.6	6.43
MW115S	25 Oct 2019	1.35	25.1	237.2	187.7	3.12
MW115S	05 May 2020	1.58	22.5	21.1	142.1	4.11
MW115S	21 Oct 2020	2.19	21.3	255.1	196.5	3.36
MW115S	28 Apr 2021	1.11	23.7	272.7	136.2	4.03
MW115S	27 Oct 2021	1.34	19.3	-124.7	222.2	5.79
MW115S	13 Apr 2022	1.36	22.3	177.3	156.5	3.88
MW115S	28 Sep 2022	2.08	19.5	76.3	209.2	3.84
MW115S	12 Oct 2022	1.94	18	115.8	197.6	3.45
MW115S	20 Mar 2023	2.53	20.7	-58	173.9	3.72
MW115S	11 Apr 2023	1.1	22.4	51.4	1,729	3.66
MW116S	25 Oct 2019	2.78	21.3	187.8	130.2	3.34
MW116S	06 May 2020	3.25	18.7	-29.2	147.6	4.2
MW116S	21 Oct 2020	2.08	19.7	175.9	146.3	3.35
MW116S	28 Apr 2021	2.26	21	273.3	150.4	3.99
MW116S	13 Apr 2022	3.45	20.9	134.2	167.6	4
MW116S	28 Sep 2022	4.9	19.4	154.9	187.2	3.66
MW116S	12 Oct 2022	4.86	20	128.8	146.1	3.78
MW116S	20 Mar 2023	4.01	20.4	-12.3	179.7	4
MW116S	11 Apr 2023	3.09	20	86.2	188.3	3.74
MW117I	06 May 2020	1.5	18.6	-7	110.1	4.85
MW117I	21 Oct 2020	1.17	20.4	50.6	124.1	4.87
MW117I	28 Apr 2021	1.83	21	33.7	129.1	5.18
MW117I	13 Apr 2022	1.12	20.9	102.4	118	5.73
MW117I	28 Sep 2022	1.19	19.5	98.8	127	5.52
MW117I	20 Mar 2023	1.66	20.2	-51.5	122.6	5.25
MW117I	11 Apr 2023	1.14	20.2	64.8	120.4	5.24
MW118D	25 Oct 2019	0.6	21.7	85.7	190.6	5.01
MW118D	06 May 2020	1.24	18.7	13.3	200.6	5.03
MW118D	21 Oct 2020	1.99	20.8	51	200.1	4.97
MW118D	28 Apr 2021	1.3	21.3	4.8	212.5	5.01
MW118D	13 Apr 2022	2.38	22	-134.8	199	5.62
MW118D	28 Sep 2022	2.44	19.3	111.7	208.1	5.43
MW118D	20 Mar 2023	2.06	20	-75.5	205.7	5.24
MW118D	11 Apr 2023	1.3	20.4	-39.8	204.3	5.44
MW119S	24 Oct 2019	2.8	21	157.6	94.5	3.51
MW119S	06 May 2020	2.18	18	-3.6	141.9	3.9
MW119S	28 Apr 2021	2.55	22.2	320.2	126.2	4.1
MW119S	13 Apr 2022	3.61	20.4	141	132.5	3.99
MW119S	29 Sep 2022	2.92	18.7	99.3	137.2	3.86
MW119S	12 Oct 2022	2.63	19.7	108.5	125.6	3.66
MW119S	20 Mar 2023	4.26	20	12.9	149.3	4.05
MW119S	11 Apr 2023	6.15	20.3	111.4	130.4	3.89
MW120I	24 Oct 2019	0.78	22.8	139.1	93.9	4.02
MW120I	06 May 2020	0.97	15.8	-54	76.2	4.29
MW120I	21 Oct 2020	2.68	21	94.1	92.2	4.36
MW120I	28 Apr 2021	2.86	23	108.4	100	5.22
MW120I	13 Apr 2022	1.3	20.3	-71	90.7	5.06
MW120I	29 Sep 2022	2.97	19.5	62.8	119.8	5.25
MW120I	20 Mar 2023	3.28	20.3	-41.9	92.7	4.82
MW120I	11 Apr 2023	1.46	20.1	77	91.1	5.02
MW121D	24 Oct 2019	0.77	23.1	-43.9	321	6.06
MW121D	06 May 2020	1.94	17.5	-21.8	255.9	5.03
MW121D	21 Oct 2020	0.83	21.3	-9.9	295.6	5.52
MW121D	28 Apr 2021	3.1	22.9	-44.8	162	5.94
MW121D	13 Apr 2022	0.92	20.6	156	165	5.63
MW121D	29 Sep 2022	0.99	18.7	60.9	214.9	5.64
MW121D	20 Mar 2023	1.14	20.8	-118.4	188.3	5.66
MW121D	11 Apr 2023	0.81	20.3	48.6	150.5	5.47
MW122S	25 Oct 2019	3.13	21.4	209.5	124.4	3.56
MW122S	05 May 2020	1.76	20.1	50.1	155.7	4.3
MW122S	21 Oct 2020	7.01	22.5	247.7	143.8	3.45
MW122S	28 Apr 2021	4.78	4.44	293.5	158.9	4.42
MW122S	13 Apr 2022	5.16	20.4	143.7	273.9	3.8
MW122S	28 Sep 2022	7.09	22.5	-76	73.6	3.86
MW122S	20 Mar 2023	4.65	21	-53.7	152.2	3.86
MW122S	11 Apr 2023	5.19	20.1	117.8	185.2	3.86
MW123I	25 Oct 2019	0.86	20.3	63.7	132.3	4.44
MW123I	05 May 2020	0.72	20.4	16.7	150.2	5.15

Location Code	Date	Field				
		DO (Field)	Temperature (Field)	Redox Potential (Field)	Electrical Conductivity (field)	pH (Field)
		mg/L	°C	mV	µS/cm	pH Units
MW101I	23 Oct 2019	2.7	22.8	52.3	125.1	5.72
MW123I	14 Oct 2020	4.08	21.1	-134	199.8	5.75
MW123I	28 Apr 2021	1.7	22	-41.5	188.2	5.47
MW123I	13 Apr 2022	0.86	20.7	-12.2	130.7	5.33
MW123I	28 Sep 2022	5.7	17.5	-125.9	161.3	5.36
MW123I	20 Mar 2023	0.78	21.5	-94.4	166.6	5.21
MW123I	11 Apr 2023	2.63	20.8	110.1	135.5	5.13
MW124D	25 Oct 2019	0.53	20.1	91.3	180	5.25
MW124D	21 Oct 2020	0.86	21.4	167.5	190.8	4.67
MW124D	28 Apr 2021	0.52	20.9	47.3	413.1	6.02
MW124D	13 Apr 2022	1.36	20.5	91.6	231.5	5.92
MW124D	28 Sep 2022	3.37	20.6	-123.9	279.7	5.89
MW124D	20 Mar 2023	1.65	21	-74.2	220.9	5.73
MW124D	11 Apr 2023	1.34	20	108.6	274.3	6.38
MW125S	24 Oct 2019	1.23	21.4	46.1	93.2	5.08
MW125S	07 May 2020	1.59	19	2.9	92.3	5.21
MW125S	23 Oct 2020	0.79	19.9	55.2	111.6	4.54
MW125S	27 Apr 2021	1.38	21	37.2	126.2	4.99
MW125S	12 Apr 2022	1.19	20.1	-134.5	140.7	5.66
MW125S	29 Sep 2022	2.2	21.8	24.1	177.2	5.69
MW125S	12 Oct 2022	1.03	25.1	-34.6	138.9	4.86
MW125S	20 Mar 2023	1.02	20.9	-106.4	161.8	5.63
MW125S	11 Apr 2023	0.59	19.3	-44.1	125.6	5.17
MW126I	24 Oct 2019	1.3	20.2	26.3	166.3	5.65
MW126I	07 May 2020	1.15	19.2	-4.2	174.7	5.28
MW126I	23 Oct 2020	0.83	20.2	46.3	180.3	4.82
MW126I	27 Apr 2021	1.41	22.4	-2.5	203.7	5.3
MW126I	12 Apr 2022	0.7	20.4	-232.6	176.4	5.53
MW126I	29 Sep 2022	1.93	22.5	52.9	194.7	5.26
MW126I	20 Mar 2023	1.15	19.6	-119.2	192.4	5.61
MW126I	11 Apr 2023	0.99	19.5	-25.9	190.1	5.42
MW128D	24 Oct 2019	0.52	21.2	-55.3	158.9	5.13
MW128D	07 May 2020	2.53	19.1	-8.8	169.3	5.18
MW128D	23 Oct 2020	1.01	19.6	109.6	198.7	4.51
MW128D	27 Apr 2021	0.56	21.4	129.5	214.5	4.82
MW128D	12 Apr 2022	0.61	21	122.1	205.4	5.6
MW128D	29 Sep 2022	1.08	19.8	50.8	226.2	5.53
MW128D	20 Mar 2023	1.24	19.4	-109.6	217.7	5.58
MW128D	11 Apr 2023	0.73	19.6	9.1	235.7	4.91
MW129S	24 Oct 2019	0.46	24	-36.5	177.8	5.14
MW129S	07 May 2020	1.11	18.9	-3.9	166.6	5.19
MW129S	23 Oct 2020	2.73	19.8	35.3	189.1	4.53
MW129S	27 Apr 2021	1.96	24.1	-23.7	115	5.44
MW129S	12 Apr 2022	0.42	20.1	-132.9	171.1	5.35
MW129S	29 Sep 2022	1.74	20.4	53.7	191.9	5.36
MW129S	20 Mar 2023	2.02	21	-121.6	191	5.3
MW129S	11 Apr 2023	0.88	19.4	-52.4	188.7	5.16
MW130D	24 Oct 2019	1.65	19.8	-51.2	191.4	7.77
MW130D	07 May 2020	1	18.4	-4.6	198.8	5.61
MW130D	23 Oct 2020	0.92	19.8	18.2	198.3	5.28
MW130D	27 Apr 2021	1.21	21.8	-48.9	229.3	5.73
MW130D	12 Apr 2022	0.99	21.4	-182.1	201.9	6.11
MW130D	29 Sep 2022	1.4	21.8	80.3	213.1	6
MW130D	20 Mar 2023	2.17	20.3	-144	219.2	6.08
MW130D	11 Apr 2023	1.28	20	-70.4	205.7	5.81
MW131D	24 Oct 2019	1.26	19.4	59.1	140.4	5.02
MW131D	06 May 2020	1.28	18.5	-86.4	176.3	5.46
MW131D	23 Oct 2020	1.61	20.1	40.2	156.3	4.93
MW131D	27 Apr 2021	1.19	23.3	-26.9	203.5	5.48
MW131D	27 Oct 2021	4.74	17.5	25.2	351.8	6.76
MW131D	12 Apr 2022	1.35	20.1	-74.4	141.3	5.68
MW131D	29 Sep 2022	1.68	20.5	99.3	157.8	5.65
MW131D	20 Mar 2023	1.84	19.8	-123.4	173.8	5.72
MW131D	11 Apr 2023	1.16	19.6	-63.4	149.4	5.37
MW132I	24 Oct 2019	1.45	19.9	5.8	95.1	4.61
MW132I	06 May 2020	2.52	17.5	-106.2	177.1	5.31
MW132I	23 Oct 2020	0.91	20	9.7	205.5	4.95
MW132I	27 Apr 2021	0.73	21.5	27.7	164.6	5.05
MW132I	12 Apr 2022	2.9	21.2	-124.7	115.6	5.82
MW132I	29 Sep 2022	2.24	21.2	97.4	121.6	5.58
MW132I	12 Oct 2022	1.34	21.6	-55.3	119.7	4.99
MW132I	20 Mar 2023	0.89	19.7	-156.3	144.5	5.87
MW132I	11 Apr 2023	1.91	19.6	-74.9	129.1	5.61
MW133D	24 Oct 2019	1.12	19.2	-3.8	166.3	4.92

		Field				
		DO (Field)	Temperature (Field)	Redox Potential (Field)	Electrical Conductivity (field)	pH (Field)
		mg/L	°C	mV	µS/cm	pH Units
Location Code	Date					
MW101I	23 Oct 2019	2.7	22.8	52.3	125.1	5.72
MW133D	06 May 2020	2.63	18.4	-60.4	102.1	5.34
MW133D	23 Oct 2020	2.42	19.7	19.5	107.3	4.79
MW133D	27 Apr 2021	1.51	25.3	-5	160.8	5.54
MW133D	12 Apr 2022	0.83	20.1	-104	175.1	5.53
MW133D	29 Sep 2022	1.67	20.4	125.2	191.2	5.37
MW133D	20 Mar 2023	4.08	19.9	-99	198.2	4.68
MW133D	11 Apr 2023	1.38	19.9	-14.1	217.7	5.55
MW134D	24 Oct 2019	1	19.1	-24.6	167.9	5.13
MW134D	07 May 2020	2.89	18	3.1	168.6	5.13
MW134D	23 Oct 2020	1.49	19.6	24.8	171.8	4.96
MW134D	12 Apr 2023	2.65	22.5	44	326.1	6
MW135I	24 Oct 2019	1.83	19.8	158.9	165.2	4.64
MW135I	07 May 2020	2	18	-25.9	177.2	4.99
MW135I	23 Oct 2020	2.53	18.9	52.7	193.4	4.93
MW135I	27 Apr 2021	1.71	20.2	35.8	226.7	4.98
MW135I	27 Oct 2021	3.71	19.6	63	103.8	5.58
MW135I	12 Apr 2022	1.39	19	-127.9	205.2	6.54
MW135I	29 Sep 2022	2.57	21	-157.4	237.5	5.24
MW135I	20 Mar 2023	1.47	18.6	-106.3	232.6	6.33
MW135I	11 Apr 2023	0.73	18.9	38.9	227.8	5.45
MW135S	12 Oct 2022	2.48	22.7	-16.5	231.2	5.05
MW136D	24 Oct 2019	1.77	18.8	-10.4	138.3	4.67
MW136D	07 May 2020	1.91	17.8	-15.9	153.1	5.13
MW136D	23 Oct 2020	0.8	19.1	21.1	158.3	5.11
MW136D	27 Apr 2021	3.37	21.2	-17.9	190.9	5.51
MW136D	12 Apr 2022	0.78	18.8	-177	163	5.89
MW136D	29 Sep 2022	2.81	20.2	-194.3	198.8	5.46
MW136D	20 Mar 2023	1.8	18.4	-133.3	187.8	6.03
MW136D	11 Apr 2023	0.86	19.2	17.6	162.7	5.63
MW137S	08 May 2020	8.15	20.5	64.7	190.5	4.5
MW137S	23 Oct 2020	10.88	22.2	236.5	233.9	3.43
MW137S	28 Apr 2021	3.25	24.1	172.7	216.6	4.59
MW137S	12 Apr 2022	2.65	22.4	-46.1	296	3.57
MW137S	28 Sep 2022	2.07	21.9	-79.1	260.2	3.77
MW137S	20 Mar 2023	2.69	21.2	-45.2	379.4	3.53
MW137S	11 Apr 2023	1.99	20.1	84.9	258.2	5
MW138S	24 Oct 2019	0.78	23	183.9	244.7	3.44
MW138S	07 May 2020	1.35	18.6	-23.8	271.2	4.33
MW138S	23 Oct 2020	0.99	18.9	170.2	322	3.74
MW138S	27 Apr 2021	1.44	22.6	231.9	323.5	4.47
MW138S	27 Oct 2021	6	19.2	32.6	50.7	6.33
MW138S	12 Apr 2022	1.61	19	102.3	230.7	4.75
MW138S	28 Sep 2022	2.46	17.5	-94	242.4	3.84
MW138S	12 Oct 2022	0.52	21.1	-2.1	290.8	3.89
MW138S	20 Mar 2023	1.24	18	-140.9	289.1	6.52
MW138S	11 Apr 2023	1.5	19.8	127.1	167.6	3.97
MW139I	24 Oct 2019	0.59	22.8	72.5	180.5	4.91
MW139I	07 May 2020	1.14	18.4	-45.4	183.4	5.41
MW139I	23 Oct 2020	2.04	18.6	-42	206.6	5.73
MW139I	27 Apr 2021	0.92	22.5	36	226.9	6.33
MW139I	12 Apr 2022	0.83	18.9	-151.5	174.6	5.51
MW139I	28 Sep 2022	1.93	20.5	-175.2	215	5.87
MW139I	20 Mar 2023	1.07	18.6	-144	211.7	6.24
MW139I	11 Apr 2023	1.07	19.2	89.2	186.6	5.86
MW140D	24 Oct 2019	2.66	21.4	-43.1	391.5	6.47
MW140D	07 May 2020	1.89	17.5	-31.1	376.9	5.88
MW140D	23 Oct 2020	6.14	19.1	-13.7	410	5.42
MW140D	27 Apr 2021	0.79	20.4	-46.4	676	6.99
MW140D	12 Apr 2022	0.65	20.1	-57.5	409.7	6.89
MW140D	28 Sep 2022	2.59	22.8	-152	465.1	6.84
MW140D	20 Mar 2023	1.03	18.2	-145.1	457.9	7.25
MW140D	11 Apr 2023	3.02	19.7	122.5	398	7.29
MW141S	25 Oct 2019	1.01	20.7	96.8	186.4	3.76
MW141S	10 Mar 2020	3.49	32.2	170.6	237.4	5.04
MW141S	07 May 2020	1.34	18.9	24.7	195.4	5
MW141S	19 Aug 2020	2.13	18.6	130.2	193.5	5.17
MW141S	23 Oct 2020	1.55	20.1	19.3	177.2	4.03
MW141S	28 Jan 2021	2.61	21.5	245.6	147.6	5.53
MW141S	28 Apr 2021	1.69	22.2	67.4	188.4	4.01
MW141S	15 Jul 2021	2.76	18.3	20.5	263.4	4.45
MW141S	20 Jan 2022	1.03	23.6	-103.2	270.4	4.28
MW141S	12 Apr 2022	1.05	20.1	-36	240	4.04
MW141S	15 Jul 2022	2.53	18.5	-48.6	220	4.13

		Field				
		DO (Field)	Temperature (Field)	Redox Potential (Field)	Electrical Conductivity (field)	pH (Field)
Location Code		Date				
MW101I	23 Oct 2019	2.7	22.8	52.3	125.1	5.72
MW141S	29 Sep 2022	2.87	19	-39.5	281.6	3.66
MW141S	11 Jan 2023	1.85	20.7	76.9	557	6.39
MW141S	20 Mar 2023	1.1	20.6	-157.3	237.7	4.22
MW141S	11 Apr 2023	0.89	18.2	128.4	203.8	4.15
MW141S	18 Jul 2023	0.68	19	133.9	178.2	3.87
MW142S	25 Oct 2019	3.21	21.8	259.1	221.4	3.68
MW142S	10 Mar 2020	4.26	30.9	168.2	291.3	4.21
MW142S	07 May 2020	2.61	18.7	33	238.3	4.39
MW142S	19 Aug 2020	4.58	18.2	324	279.3	4.65
MW142S	29 Oct 2020	21.11	20.4	84.5	285	4.73
MW142S	28 Jan 2021	2.2	20.7	302.1	274.7	3.91
MW142S	28 Apr 2021	4.02	26.5	337	289	3.64
MW142S	15 Jul 2021	3.5	18.2	262.6	232.4	4.12
MW142S	20 Jan 2022	2.6	24.8	128.1	323.7	4.32
MW142S	12 Apr 2022	4.04	22	106.1	302.9	4.25
MW142S	15 Jul 2022	3.76	18.8	141.9	298	4.42
MW142S	29 Sep 2022	4.22	20.2	-44.3	311.4	4.14
MW142S	11 Jan 2023	4.5	20.7	143.6	378.3	6.5
MW142S	20 Mar 2023	4.34	20.1	-54.3	185.5	4.12
MW142S	11 Apr 2023	2.14	18.6	117.2	274.7	3.97
MW142S	18 Jul 2023	2.89	19.4	157.4	321.2	3.83
MW143S	10 Mar 2020	2.65	29.8	211.9	294.9	4.58
MW143S	29 Sep 2022	4.6	20.9	-123.9	245.7	4.86
MW143S	11 Apr 2023	2.7	19.7	110.9	214	4.91
MW143S	18 Jul 2023	2.36	19.2	176.8	247	4.57
MW301	24 Oct 2019	3.66	24.5	295.1	137.1	3.68
MW301	04 May 2020	2.62	22.5	-47.4	183.7	4.12
MW301	21 Oct 2020	2.65	20.6	265.1	208.1	3.04
MW301	28 Apr 2021	4.46	22.2	302.6	227.7	3.61
MW301	11 Apr 2022	5.42	21.2	163.2	192.8	3.73
MW301	28 Sep 2022	4.04	21.4	-20	225.4	3.41
MW301	20 Mar 2023	4.37	21.3	-54.9	158.3	3.92
MW301	11 Apr 2023	5.53	21.7	383.5	185.3	6.61
MW302	24 Oct 2019	5.36	23.4	365.7	174.4	3.46
MW302	04 May 2020	5.14	25.3	-25.6	251.1	4.86
MW302	21 Oct 2020	4.36	20.8	193.8	141.3	3.55
MW302	28 Apr 2021	4.76	22.3	194.4	141	4.02
MW302	11 Apr 2022	5.57	21.7	200.6	159.6	3.63
MW302	28 Sep 2022	4.41	23.1	-31.1	124.7	3.74
MW302	20 Mar 2023	4.46	21.6	-52	155.9	3.8
MW302	11 Apr 2023	5.04	21.9	337.2	141.5	5.78
MW303	24 Oct 2019	6.26	21.4	284.8	146.7	4.02
MW303	04 May 2020	3.48	24	-34.6	142.4	4.38
MW303	21 Oct 2020	4.47	20.9	250.6	148.8	3.29
MW303	28 Apr 2021	4.06	22.3	268.5	149.5	3.94
MW303	11 Apr 2022	5.41	21.5	172	152.9	3.69
MW303	28 Sep 2022	6.75	22.5	-15.2	141.4	3.62
MW303	20 Mar 2023	5.16	21.6	-54.2	138.1	3.84
MW303	11 Apr 2023	5.63	22.4	348.1	118.1	6.84
MW304	25 Oct 2019	1.88	24.2	238.6	255.3	4.76
MW304	05 May 2020	2.12	22.3	41.9	286.5	5.51
MW304	15 Oct 2020	4.17	20.9	201.7	217.6	4.98
MW304	11 Apr 2022	1.39	22.5	129.8	324.3	5.7
MW304	28 Sep 2022	3.12	22.5	154.2	365.3	5
MW304	20 Mar 2023	3.53	22.9	44.7	307	5.15
MW304	11 Apr 2023	1.29	23.9	229.3	209.5	5.5
MW305	25 Oct 2019	2.41	22.3	244.9	157.9	4.44
MW305	15 Oct 2020	2.43	21.5	188.1	164	4.69
MW305	11 Apr 2022	1.57	22.5	-92.2	179.7	4.46
MW305	28 Sep 2022	1.45	22.1	137.3	288.3	4.05
MW305	20 Mar 2023	2.19	23	-4.7	206.9	4.7
MW305	11 Apr 2023	4.05	22.3	45.6	110.3	6.89
MW306	25 Oct 2019	0.51	22.6	278.1	215.1	3.87
MW306	15 Oct 2020	3.8	20.9	183.6	160.9	4.98
MW306	11 Apr 2022	2.25	23.1	155	291.7	4.07
MW306	28 Sep 2022	0.85	21.9	145.6	183.5	3.82
MW306	20 Mar 2023	2.97	21.7	-16	221.2	5.39
MW306	11 Apr 2023	1.44	23.1	328	232	4.06
MW307	25 Oct 2019		28	329.8	131.8	4.28
MW307	15 Oct 2020	4.79	20.5	104.2	123.3	5.92
MW307	28 Apr 2021	2.5	24.4	179.5	158.4	5.13
MW308	25 Oct 2019	3.23	25.6	335.5	134.5	4.08
MW308	15 Oct 2020	4.3	20.6	161.5	391.3	6.89

		Field				
		DO (Field)	Temperature (Field)	Redox Potential (Field)	Electrical Conductivity (field)	pH (Field)
		mg/L	°C	mV	µS/cm	pH Units
Location Code	Date					
MW101I	23 Oct 2019	2.7	22.8	52.3	125.1	5.72
MW308	27 Oct 2021	2.73	19.5	129	169.1	3.85
MW308	11 Apr 2022	3.64	23.2	146.2	125.4	5.21
MW308	28 Sep 2022	3.5	22.4	115.4	129.5	4.84
MW308	12 Oct 2022	3.72	20.8	98.1	112	4.51
MW308	20 Mar 2023	3.47	22.7	0.2	234.9	6.37
MW308	11 Apr 2023	3.63	23.3	177.7	190.1	6.39
MW309	25 Oct 2019	4.22	27	379.5	143.4	5.13
MW309	15 Oct 2020	1.94	21.8	196.6	144.7	4.95
MW309	27 Oct 2021	1.16	22.1	-123.1	168.5	5.78
MW309	11 Apr 2022	2.31	22.3	183.3	141.7	5.37
MW309	28 Sep 2022	2.83	22.7	116.1	173.6	4.66
MW309	12 Oct 2022	2.69	21.9	100	159.9	4.63
MW309	20 Mar 2023	3.88	23.2	13.4	152.8	4.74
MW309	11 Apr 2023	2.73	22.1	170	125	5.47
MW310	25 Oct 2019	1	28.1	308.9	241.7	4.68
MW310	05 May 2020	2.72	25.3	-41.6	396.4	6.92
MW310	15 Oct 2020	4.36	21.7	71	258.4	6.85
MW310	28 Apr 2021	2.11	25.9	113	154.2	6.85
MW310	27 Oct 2021	2.09	19.4	187.6	145.1	4.02
MW310	28 Sep 2022	2.24	23.4	91.2	141.4	4.94
MW310	12 Oct 2022	3.48	21.7	108.1	133.5	4.53
MW310	20 Mar 2023	3.13	22.9	-15.4	254.9	5.73
MW310	11 Apr 2023	2.28	23.3	163.5	93.3	6.2
MW312	24 Oct 2019		26.6	192.6	173.8	5.36
MW312	05 May 2020	1.61	22.2	-53.4	193.5	5.29
MW312	21 Oct 2020	1.94	20.9	258.1	162.1	4.52
MW312	28 Apr 2021	1.07	24.4	116.8	165.4	5.76
MW312	27 Oct 2021	6.71	18.2	112.9	177.1	4.27
MW312	11 Apr 2022	2.72	21.3	65.2	193.7	5.69
MW312	28 Sep 2022	1.36	20.5	114.6	229	5.21
MW312	12 Oct 2022	1.46	20.2	107.1	207.4	4.6
MW312	20 Mar 2023	4.32	20.7	24.3	205.6	5.8
MW312	11 Apr 2023	2.75	23.1	177.9	208.7	5.61
MW313	24 Oct 2019	2.53	27.8	188.4	163.8	5.93
MW313	05 May 2020	1.81	22.1	-62.9	181.5	5.73
MW313	15 Oct 2020	5.23	21	140.4	190.9	6.37
MW313	28 Apr 2021	1.42	24.3	139.4	162.2	5.52
MW313	27 Oct 2021	4.3	17.4	45.3	152.9	6.01
MW313	11 Apr 2022	6.01	21.3	110	180.8	4.26
MW313	28 Sep 2022	3.61	21	102.8	181.1	4.64
MW313	12 Oct 2022	4.01	19.1	197.6	135.3	4.34
MW313	20 Mar 2023	5.97	20.8	61.9	175.9	4.55
MW313	11 Apr 2023	3.2	22.3	178.5	147.9	5.73
MW401	24 Oct 2019	0.87	26.7	17.8	380.4	6.49
MW401	18 Mar 2020	2.94	26.2	171.6	125.9	6.45
MW401	04 May 2020	1.8	20	-178.1	399	5.89
MW401	19 Aug 2020	2.75	20.6	-186	493.3	7.43
MW401	15 Oct 2020	2.78	23.8	-46.6	251.2	6.43
MW401	28 Jan 2021	2.9	25.1	-12	256.6	6.32
MW401	15 Jul 2021	5.21	19.2	43.3	155	5.65
MW401	19 Jan 2022	2.04	36.1	0.2	266.4	6.21
MW401	11 Apr 2022	2.96	20.3	-73.3	415.5	6.66
MW401	15 Jul 2022	4.8	21.1	-9.8	238.3	5.75
MW401	28 Sep 2022	2.69	30.5	-149.6	197.7	5.47
MW401	11 Jan 2023	2.35	30.1	-105.2	380.9	7.44
MW401	11 Apr 2023	0.73	24	90.1	173.6	5.85
MW401	18 Jul 2023	5.62	18.8	-61.8	179.6	5.66
MW402	07 Nov 2019	0.85	28.5	-78.7	409.7	5.57
MW402	18 Mar 2020	2.19	23.2	-104	200.6	6.5
MW402	06 May 2020	2.16	18.6	-7.8	651	5.17
MW402	19 Aug 2020	1.43	23.6	-71	533	7.7
MW402	29 Oct 2020	1.22	29.7	148	611	5.99
MW402	19 Jan 2022	1.81	27.5	-82	597	5.87
MW402	11 Apr 2022	4.29	20.6	225.8	688	4.06
MW402	15 Jul 2022	2.34	18.5	-112.7	908	5.38
MW402	28 Sep 2022	0.53	24	84.8	654	5.21
MW402	11 Jan 2023	1.47	30.5	-166.7	1,016	6.17
MW402	20 Mar 2023	2.57	21	34	897	7.04
MW402	11 Apr 2023	0.89	21	-120.6	890	5.15
MW402	18 Jul 2023	1.44	14.6	-111	442.4	5.41
MW403	18 Nov 2019	1.15	24.9	92.8	361.2	5.88
MW403	10 Mar 2020	8.12	36.9	173.5	451.7	5.02
MW403	08 May 2020	8.91	19.7	57.3	341.9	5.03

		Field				
		DO (Field)	Temperature (Field)	Redox Potential (Field)	Electrical Conductivity (field)	pH (Field)
		mg/L	°C	mV	µS/cm	pH Units
Location Code	Date					
MW101I	23 Oct 2019	2.7	22.8	52.3	125.1	5.72
MW403	19 Aug 2020	2.17	18.3	-157	302.1	5.74
MW403	29 Oct 2020	1.25	19.7	127.2	366.2	4.36
MW403	28 Jan 2021	2	20.6	225.7	373.8	5.13
MW403	05 May 2021	1.63	18	83.8	422.7	7.2
MW403	15 Jul 2021	1.66	18.1	218.3	346.1	5.05
MW403	20 Jan 2022	1.78	23.5	121.3	410.5	5.72
MW403	12 Apr 2022	3.1	21	-59.5	323.7	5.65
MW403	15 Jul 2022	1.34	18.5	-118.6	363	6.18
MW403	06 Oct 2022	2.43	17.1	-25.3	324.4	6.8
MW403	11 Jan 2023	1.98	20.4	25	328	7.09
MW403	20 Mar 2023	1.61	19.9	-56.2	342.5	4.84
MW403	11 Apr 2023	1.05	19.8	92.3	294.7	5.48
MW403	18 Jul 2023	0.7	18.4	156.6	340.7	5.39
MW504	21 Oct 2020	1.5	22.3	133.1	125.1	5
MW504	28 Apr 2021	1.27	23.8	130.1	61	5.8
MW504	27 Oct 2021	4.42	22.2	161.4	258.2	3.61
MW504	11 Apr 2022	1.51	22.5	48.1	123.5	5.15
MW504	28 Sep 2022	4.66	20.6	115.6	154.3	5.5
MW504	12 Oct 2022	3.45	19	108.1	117.9	4.81
MW504	20 Mar 2023	4.37	22.4	27.9	145.1	5.33
MW504	11 Apr 2023	2.65	24.3	161.9	115.3	
MW505	21 Oct 2020	1.24	21.3	205.4	118.6	4.53
MW505	28 Apr 2021	0.81	24.5	218.2	158.4	5.65
MW505	11 Apr 2022	0.71	21.7	-54.3	160.5	5.93
MW505	28 Sep 2022	4.04	21.1	111.1	228.7	5.85
MW505	20 Mar 2023	2.13	23.9	-0.2	152.3	6.31
MW505	11 Apr 2023	1.92	24	195.6	102.6	5.89

		Field				
		DO (Field)	Temperature (Field)	Redox Potential (Field)	Electrical Conductivity (field)	pH (Field)
		mg/L	°C	mV	µS/cm	pH Units
Location Code	Date					
POT102	28 Sep 2022	4.37	22	142.6	1046	5.97
POT102	11 Jan 2023	4.64	29.6	12.2	1237	9.95
POT102	11 Apr 2023	2	22	132.5	995	6.29
POT102	18 Jul 2023	8.69	15.8	137.6	1061	6.92
POT103	28 Sep 2022	4.55	19	57.6	1050	6.44
POT103	11 Jan 2023	2.53	36.2	126.6	1295	6.75
POT103	11 Apr 2023	2.46	29.9	-9.1	1067	8.37
POT103	18 Jul 2023	5.91	18.4	165	1000	5.91
POT104	28 Sep 2022	5.29	21.1	116.9	1017	6.05
POT104	11 Jan 2023	5.01	29	33.8	1240	6.49
POT104	11 Apr 2023	4.81	23.8	200.5	1032	6.65
POT104	18 Jul 2023	7.04	15.6	406	978	7.04

Monitoring Area	Location Code	Date	Field ID	Sample Type	Lab Report Number	PFAS - Perfluoroalkyl Sulfonic Acids										PFAS - Perfluoroalkyl Carboxylic Acids										PFAS - (n-2) Fluorotelomer Sulfonic Acids						PFAS - Perfluoroalkyl Sulfonamides						Sum of PFAS and PDS	Sum of PFAS (NA DIB)	Sum of PFAS
						Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorododecanoic acid (PFDA)	Perfluorotetradecanoic acid (PFTeA)	Perfluorohexanoic acid (PFHxA)	Perfluorooctanoic acid (PFOA)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDDA)	Perfluorotetradecanoic acid (PFTeDA)	2,2-Fluorotetramer sulfonic acid (B2 FS)	2,2-Fluoropentamer sulfonic acid (B2 FS)	2,2-Fluorohexamer sulfonic acid (B2 FS)	2,2-Fluorooctamer sulfonic acid (B2 FS)	Perfluorooctane sulfonamide (PFOSA)	Perfluorodecane sulfonamide (PFDSA)	Perfluorododecane sulfonamide (PFDDSA)	Perfluorotetradecane sulfonamide (PFTeDSA)	Perfluorooctane sulfonamide (PFOSA)	Perfluorodecane sulfonamide (PFDSA)	Perfluorododecane sulfonamide (PFDDSA)	Perfluorotetradecane sulfonamide (PFTeDSA)											
LOD - Limit of Reporting						0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01							
PFAS NEMP 2020 Drinking Water																																								
PFAS NEMP 2020 Recreational Water																																								
						0.56																																		
						10																																		
Former Fuel Farm	MW101	20/03/2018	0958_MW101_1_180320	Normal	208378	0.05	0.08	0.4	0.03	0.11	<0.02	<0.02	<0.02	0.03	<0.01	0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.1	<0.1	<0.01	<0.1	<0.01	<0.1	<0.01	<0.1	<0.01	<0.1	0.6	0.58	0.78						
	MW101	25/02/2019	0958_MW101_1_190225	Normal	222957	0.05	0.05	0.41	0.02	0.19	<0.01	<0.01	<0.01	0.04	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	<0.1	<0.01	<0.1	<0.01	<0.1	<0.01	<0.1	0.6	0.69	0.78						
	MW101	23/10/2019	0958_MW101_191023	Normal	EP1910901	0.05	0.06	0.4	0.03	0.18	<0.01	<0.01	<0.01	0.04	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.01	<0.1	<0.01	<0.1	<0.01	<0.1	<0.01	<0.1	0.38	0.35	0.35						
	MW101	4/05/2020	0958_MW101_200504	Normal	EP2004453	<0.01	<0.01	0.12	<0.01	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01							
	MW101	28/04/2021	0958_MW101_210428	Normal	EP2104666	<0.04	<0.04	0.16	<0.04	0.09	<0.04	<0.2	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.10	<0.05	<0.05	<0.05	<0.04	<0.10	<0.04	<0.10	<0.10	<0.04	<0.10	0.25	0.25	0.25					
	MW101	7/09/2021	0958_MW101_210907	Normal	EP2110442	0.04	0.06	0.35	<0.02	0.18	<0.02	<0.01	<0.02	0.03	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.02	<0.05	<0.02	<0.05	<0.02	<0.05	0.53	0.61	0.67							
	MW101	11/04/2022	0958_MW101_220411	Normal	EP2204288	0.07	0.06	0.38	<0.01	0.2	<0.01	<0.01	<0.02	0.05	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.58	0.72	0.78							
	MW101	28/09/2022	0958_MW101_220928	Normal	EP2212584	<0.1	0.06	0.1	0.02	0.16	<0.02	<0.1	<0.02	0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.46	0.50	0.58							
	MW101	28/09/2022	0958_GC103_220928	Field Duplicate	EP2212584	0.04	0.06	0.46	0.02	0.24	<0.01	<0.01	<0.02	0.04	<0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.7	0.80	0.88							
	MW101	28/09/2022	0958_GC203_220928	Interlab Duplicate	927653	0.04	0.04	0.28	0.02	0.18	<0.01	<0.01	<0.01	0.03	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.46	0.54	0.6							
MW101	11/04/2023	0958_MW101_230411	Normal	EP2304516	0.03	0.04	0.28	<0.02	0.17	<0.01	<0.01	<0.02	0.03	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02	<0.1	<0.02	<0.1	0.45	0.52	0.56							
Former Fuel Farm	MW102	13/03/2019	0958_MW102_D_180319	Normal	208344	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01							
	MW102	6/03/2019	0958_MW102_D_190306	Normal	223277	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.02	<0.01	<0.02	<0.01	<0.02	<0.01	<0.02	<0.01	0.04	0.04	0.04						
	MW102	4/05/2020	0958_MW102_D_200504	Normal	EP2004453	0.03	0.04	0.31	<0.02	0.16	<0.03	<0.02	0.03	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.47	0.74	0.78							
	MW102	21/10/2020	0958_MW102_201021	Normal	EP2011490	0.04	0.05	0.34	0.02	0.15	<0.01	<0.01	<0.02	0.03	<0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.49	0.57	0.64							
	MW102	28/04/2021	0958_MW102_210428	Normal	EP2104666	0.13	<0.02	0.04	<0.02	0.04	<0.13	<0.02	<0.02	0.03	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.48	1.14	1.29							
	MW102	28/04/2021	0958_GC104_210428	Field Duplicate	EP2104666	0.14	<0.02	0.23	0.04	0.31	<0.02	<0.01	<0.02	0.02	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.54	0.71	0.75							
	MW102	28/04/2021	0958_GC204_210428	Interlab Duplicate	791819	0.01	0.02	0.2	0.02	0.33	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.53	0.58	0.62							
	MW102	8/09/2021	0958_MW102_210908	Normal	EP2110531	0.10	<0.01	0.12	<0.02	0.14	<0.01	<0.01	<0.02	<0.02	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.26	0.36	0.36							
	MW102	11/04/2022	0958_MW102_220411	Normal	EP2204288	<0.01	<0.02	0.04	<0.02	0.04	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.08	0.08	0.08							
	MW102	28/09/2022	0958_MW102_220928	Normal	EP2212584	<0.02	<0.02	0.02	<0.02	0.03	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	0.05	0.05							
Fire House and Refueling Area	MW102	28/09/2022	0958_GC105_220928	Field Duplicate	EP2212584	<0.02	<0.02	0.02	<0.02	0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02														

Table 3 - Groundwater Analytical Results

						PFAS - Perfluoroalkyl Sulfonic Acids										PFAS - Perfluoroalkyl Carboxylic Acids										PFAS - (n-2) Fluorotelomer Sulfonic Acids				PFAS - Perfluoroalkyl Sulfonamides										PFAS	
						Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorononane sulfonic acid (PFNS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrA)	Perfluorotetradecanoic acid (PFTeA)	Perfluoropentadecanoic acid (PFPeA)	Perfluoroheptadecanoic acid (PFHpA)	Perfluorooctadecanoic acid (PFODa)	Perfluorooctadecanoic acid (PFODa)	Perfluorooctadecanoic acid (PFODa)	Perfluorooctadecanoic acid (PFODa)	2,2-Fluorotelsomer sulfonic acid (B2 FS)	2,2-Fluorotelsomer sulfonic acid (B2 FS)	2,2-Fluorotelsomer sulfonic acid (B2 FS)	2,2-Fluorotelsomer sulfonic acid (B2 FS)	Perfluorooctane sulfonamide (FOSuA)	N-Methyl perfluorooctane sulfonamide (MeFOSuA)	N-Ethyl perfluorooctane sulfonamide (EtFOSuA)	N-Propyl perfluorooctane sulfonamide (PrFOSuA)	N-Butyl perfluorooctane sulfonamide (BuFOSuA)	N-Pentyl perfluorooctane sulfonamide (PeFOSuA)	N-Hexyl perfluorooctane sulfonamide (HxFOSeA)	Sum of PFAS and PDS	Sum of PFAS (WA DBR [u])	Sum of PFAS					
Off-site	MW1415	12/03/2019	0958_MW141_5_190312	Normal	23397	0.05	0.06	0.54	0.03	0.25	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.11	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.73	0.94	1.04
	MW1415	25/10/2019	0958_MW141_191025	Normal	EP191007	0.06	0.06	0.52	0.04	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.72	0.92	1.04
	MW1415	28/10/2020	0958_QC202_210128	Interlab Duplicate	770820	0.06	0.08	0.61	0.05	0.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.14	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.92	1.22	1.37
	MW1415	10/03/2020	0958_MW141_5_200310	Normal	EP2002549	0.07	0.10	0.64	0.06	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.15	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.85	1.19	1.35
	MW1415	10/03/2020	0958_QC101_200310	Field Duplicate	EP2002549	0.06	0.09	0.6	0.05	0.22	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.15	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.82	1.13	1.27
	MW1415	10/03/2020	0958_QC201_200310	Interlab Duplicate	707212	0.05	0.06	0.41	0.03	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.1	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.61	0.81	0.92	
	MW1415	7/05/2020	0958_MW141_5_20200507	Normal	EP2004672	0.07	0.08	0.69	0.05	0.33	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.16	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.02	1.32	1.45
	MW1415	19/04/2020	0958_MW141_200419	Normal	EP2008767	0.10	0.11	0.87	0.07	0.45	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.2	0.03	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.32	1.74	1.93
	MW1415	23/10/2020	0958_MW141_201023	Normal	EP2011633	0.04	0.03	0.34	<0.01	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.42	0.56	0.59
	MW1415	28/01/2021	0958_MW141_210128	Normal	EP2100912	0.06	0.07	0.62	0.04	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.15	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.83	1.12	1.23
	MW1415	28/01/2021	0958_QC102_210128	Field Duplicate	EP2100912	0.06	0.07	0.61	0.04	0.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.15	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.82	1.11	1.22
	MW1415	28/04/2021	0958_MW1415_210428	Normal	EP2106219	0.07	0.09	0.66	0.04	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.16	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.93	1.24	1.37
	MW1415	15/07/2021	0958_MW1415_210715	Normal	EP2108063	0.10	0.10	0.8	0.05	0.41	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.19	0.03	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.21	1.60	1.75
	MW1415	15/07/2021	0958_QC101_210715	Field Duplicate	EP2108063	0.09	0.09	0.74	0.06	0.44	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.19	0.03	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.18	1.55	1.70
	MW1415	15/07/2021	0958_QC201_210715	Interlab Duplicate	812060	0.07	0.10	0.78	0.06	0.39	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.15	0.02	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.17	1.49	1.68
	MW1415	8/09/2021	0958_MW1415_210908	Normal	EP2110531	0.07	0.09	0.65	0.06	0.41	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.15	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.06	1.37	1.52
	MW1415	20/01/2022	0958_MW1415_220120	Normal	EP2200662	0.11	0.10	0.94	0.07	0.58	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.25	0.03	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.52	2.00	2.17
	MW1415	12/04/2022	0958_MW141_220412	Normal	EP2204301	0.06	0.08	0.52	0.05	0.4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.12	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.92	1.16	1.29
	MW1415	15/07/2022	0958_MW1415_220715	Normal	EP2208860	0.04	0.05	0.4	0.03	0.32	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.72	0.88	0.96
	MW1415	15/07/2022	0958_QC102_220715	Field Duplicate	EP2208860	0.04	0.05	0.43	0.04	0.34	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.11	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.77	0.93	1.01
	MW1415	15/07/2022	0958_QC202_220715	Interlab Duplicate	906764	0.04	0.04	0.35	0.04																																

Ingin Satellite Airfield

Environmental Standards
 HEPA, January 2020, PFAS NEMP 2020 Drinking Water
 HEPA, January 2020, PFAS NEMP 2020 Recreational Water

First time detection of PFOA or PFHxS+PFOS
New exceedance of guideline value

First time detection of PFOA or PFHxS+PFOS
New exceedance of guideline value

Location Code	Date Time	Water Depth bTOC	Elevation	Comments
MW101I	10/23/2019	11.839	61.661	
MW101I	5/4/2020	12.264	61.236	
MW101I	10/21/2020	23.5	50	Dry
MW101I	4/28/2021	12.401	61.099	
MW101I	4/11/2022	12.18	61.32	
MW101I	9/28/2022	11.964	61.536	
MW101I	3/20/2023	12.09	61.41	
MW101I	4/11/2023	12.12	61.38	
MW101I	9/26/2023	12.278	61.222	
MW102D	5/4/2020	12.148	61.262	
MW102D	10/21/2020	12.183	61.227	
MW102D	4/28/2021	12.47	60.94	
MW102D	4/11/2022	12.25	61.16	
MW102D	9/28/2022	11.987	61.423	
MW102D	3/20/2023	12.14	61.27	
MW102D	4/11/2023	12.18	61.23	
MW102D	9/26/2023	11.095	62.315	
MW104I	10/25/2019	11.86	61.88	
MW104I	5/7/2020	12.238	61.502	
MW104I	10/21/2020	12.322	61.418	
MW104I	4/28/2021	12.45	61.29	
MW104I	4/11/2022	12.26	61.48	
MW104I	9/28/2022	12.073	61.667	
MW104I	3/20/2023	12.21	61.53	
MW104I	4/11/2023	12.2	61.54	
MW104I	9/27/2023	12.279	61.461	
MW105D	10/25/2019	11.98	61.81	
MW105D	5/7/2020	12.392	61.398	
MW105D	10/21/2020	12.205	61.585	
MW105D	4/28/2021	12.543	61.247	
MW105D	4/11/2022	12.45	61.34	
MW105D	9/28/2022	12.195	61.595	
MW105D	3/20/2023	12.3	61.49	
MW105D	4/11/2023	12.27	61.52	
MW105D	9/27/2023	12.48	61.31	
MW106S	10/25/2019	6.52	65.02	
MW106S	5/7/2020	6.87	64.67	
MW106S	10/23/2020	6.948	64.592	
MW106S	4/27/2021	7.18	64.36	
MW106S	10/27/2021	6.452	65.088	Hydrasleeve intake at 9.2m
MW106S	4/13/2022	6.78	64.76	
MW106S	9/28/2022	6.417	65.123	
MW106S	10/12/2022	6.403	65.137	
MW106S	3/20/2023	6.55	64.99	
MW106S	4/11/2023	6.725	64.815	
MW106S	9/27/2023	7.089	64.451	
MW106S	9/29/2023	6.958	64.582	
MW107S	10/23/2019	9.5	62.1	
MW107S	5/6/2020	9.5	62.1	Dry
MW107S	10/23/2020	9.5	62.1	Dry
MW107S	4/28/2021	9.5	62.1	
MW107S	10/27/2021	9.5	62.1	Blocked, attempted to use steel bailer to clear. Unsuccessful
MW107S	4/13/2022	9.5	62.1	
MW107S	9/28/2022	9.5	62.1	Dry
MW107S	10/12/2022	9.5	62.1	Blocked at 5.969 (above water column). Unblocked to 6.545 with steel bailer. No roots or water present. Potential root blockage (dense veg).
MW107S	3/20/2023	9.5	62.1	BORE DRY
MW107S	4/11/2023	9.5	62.1	
MW107S	9/27/2023	9.5	62.1	Dry - no water or sample
MW108S	10/23/2019	9	61.9	
MW108S	5/6/2020	9	61.9	Dry

MW108S	10/23/2020	9	61.9 Dry
MW108S	4/28/2021	5.05	65.85
			Dry, blocked with roots, used steel bailer to clear.
MW108S	10/27/2021	9	61.9 Unsuccessful
MW108S	4/13/2022	9	61.9
MW108S	9/28/2022	9	61.9 Dry
			Blocked at 6.20 (above water column). Unblocked to 6.506 with steel bailer. Depth to water at 6.217 after attempt to unblock. Thick roots present, unable to reach historical total depth of 9 m.
MW108S	10/12/2022	6.217	64.683
MW108S	3/20/2023	9	61.9 BORE DRY
MW108S	4/11/2023	9	61.9
MW108S	9/27/2023	9	61.9 Dry - no water or sample
MW108S	9/29/2023	6.74	64.16
MW109S	10/25/2019	7.625	65.825
MW109S	5/5/2020	8.206	65.244
MW109S	10/21/2020	7.966	65.484
MW109S	4/28/2021	9.15	64.3
MW109S	10/27/2021	7.432	66.018 Hydrasleeve intake at 9m
MW109S	4/11/2022	7.97	65.48
MW109S	9/28/2022	7.314	66.136
MW109S	10/12/2022	7.355	66.095
MW109S	3/20/2023	7.34	66.11
MW109S	4/11/2023	7.72	65.73
MW109S	9/26/2023	8.106	65.344
MW109S	9/29/2023	7.962	65.488
MW110S	10/25/2019	8.07	65.67
MW110S	5/5/2020	8.592	65.148
MW110S	10/21/2020	8.411	65.329
MW110S	4/28/2021	9.15	64.59
MW110S	4/11/2022	8.37	65.37
MW110S	9/28/2022	7.757	65.983
MW110S	3/20/2023	7.8	65.94
MW110S	4/11/2023	8.29	65.45
MW110S	9/26/2023	8.372	65.368
MW111S	10/24/2019	9.5	64.37
MW111S	5/5/2020	9.5	64.37 Dry
MW111S	10/15/2020	9.5	64.37 Dry
MW111S	4/28/2021	9.5	64.37
MW111S	4/11/2022	9.5	64.37
MW111S	9/28/2022	7.881	65.989
MW111S	3/20/2023	9.5	64.37 Dry
MW111S	4/11/2023	9.5	64.37
MW111S	9/26/2023	9.5	64.37 Dry - no sample
MW112S	10/24/2019	8.28	65.41
MW112S	5/4/2020	8.809	64.881
MW112S	10/21/2020	11.006	62.684
MW112S	4/28/2021	8.79	64.9
MW112S	4/11/2022	8.6	65.09
MW112S	9/28/2022	8.083	65.607
MW112S	3/20/2023	8.16	65.53
MW112S	4/11/2023	8.54	65.15
MW112S	9/26/2023	8.746	64.944
MW113S	10/24/2019	8.464	65.326
MW113S	5/4/2020	8.942	64.848
MW113S	10/21/2020	8.884	64.906
MW113S	4/28/2021	9.185	64.605
MW113S	4/11/2022	8.75	65.04
MW113S	9/28/2022	8.288	65.502
MW113S	3/20/2023	8.41	65.38
MW113S	4/11/2023	8.65	65.14
MW113S	9/26/2023	8.991	64.799
MW114S	10/25/2019	8	65.68
MW114S	5/5/2020	8	65.68 Dry

MW114S	10/14/2020	7.45	66.23
MW114S	4/28/2021	8	65.68
MW114S	4/11/2022	7.4	66.28
MW114S	9/28/2022	6.664	67.016
MW114S	3/20/2023	6.66	67.02
MW114S	4/11/2023	7.39	66.29
MW114S	9/27/2023	7.344	66.336
MW115S	10/25/2019	5.17	65.62
MW115S	5/5/2020	5.776	65.014
MW115S	10/21/2020	5.668	65.122
MW115S	4/28/2021	6.17	64.62
MW115S	10/27/2021	5.152	65.638 Hydrasleeve intake at 7m
MW115S	4/13/2022	5.62	65.17
MW115S	9/28/2022	4.942	65.848
MW115S	10/12/2022	4.982	65.808
MW115S	3/20/2023	5.07	65.72
MW115S	4/11/2023	5.58	65.21
MW115S	9/26/2023	5.759	65.031
MW115S	9/29/2023	5.639	65.151
MW116S	10/25/2019	9.46	64.97
MW116S	5/6/2020	9.998	64.432
MW116S	10/21/2020	9.826	64.604
MW116S	4/28/2021	10.18	64.25
MW116S	4/13/2022	9.65	64.78
MW116S	9/28/2022	9.17	65.26
MW116S	10/12/2022	9.149	65.281
MW116S	3/20/2023	9.26	65.17
MW116S	4/11/2023	9.625	64.805
MW116S	9/26/2023	10.122	64.308
MW116S	9/29/2023	9.91	64.52
MW117I	10/25/2019	13.68	60.51 Unable to sample
MW117I	5/6/2020	13.886	60.304
MW117I	10/21/2020	13.926	60.264
MW117I	4/28/2021	14.1	60.09
MW117I	4/13/2022	14	60.19
MW117I	9/28/2022	13.84	60.35
MW117I	3/20/2023	13.98	60.21
MW117I	4/11/2023	13.915	60.275
MW117I	9/26/2023	14	60.19
MW118D	10/25/2019	13.76	60.43
MW118D	5/6/2020	13.962	60.228
MW118D	10/21/2020	13.988	60.202
MW118D	4/28/2021	14.17	60.02
MW118D	4/13/2022	14.07	60.12
MW118D	9/28/2022	13.905	60.285
MW118D	3/20/2023	14.04	60.15
MW118D	4/11/2023	13.615	60.575
MW118D	9/26/2023	14.298	59.892
MW119S	10/24/2019	13.1	60.96
MW119S	5/6/2020	12.732	61.328
MW119S	10/21/2020	13.1	60.96 Dry
MW119S	4/28/2021	12.49	61.57
MW119S	4/13/2022	12.14	61.92
MW119S	9/29/2022	11.745	62.315
MW119S	10/12/2022	11.74	62.32
MW119S	3/20/2023	11.62	62.44
MW119S	4/11/2023	12.195	61.865
MW119S	9/26/2023	12.678	61.382
MW119S	9/29/2023	12.528	61.532
MW120I	10/24/2019	14.82	59.02
MW120I	5/6/2020	15.014	58.826
MW120I	10/21/2020	15.051	58.789
MW120I	4/28/2021	15.19	58.65
MW120I	4/13/2022	15.16	58.68

MW120I	9/29/2022	15.16	58.68
MW120I	3/20/2023	15.17	58.67
MW120I	4/11/2023	15.114	58.726
MW120I	9/26/2023	15.349	58.491
MW121D	10/24/2019	14.965	58.995
MW121D	5/6/2020	15.033	58.927
MW121D	10/21/2020	15.185	58.775
MW121D	4/28/2021	15.34	58.62
MW121D	4/13/2022	15.3	58.66
MW121D	9/29/2022	15.295	58.665
MW121D	3/20/2023	15.32	58.64
MW121D	4/11/2023	15.243	58.717
MW121D	9/26/2023	15.45	58.51
MW122S	10/25/2019	13.53	62.31
MW122S	5/5/2020	13.722	62.118
MW122S	10/21/2020	13.568	62.272
MW122S	4/28/2021	13.72	62.12
MW122S	4/13/2022	12.57	63.27
MW122S	9/28/2022	12.434	63.406
MW122S	3/20/2023	12.43	63.41
MW122S	4/11/2023	12.621	63.219
MW122S	9/26/2023	13.468	62.372
MW123I	10/25/2019	19.13	56.9
MW123I	5/5/2020	15.808	60.222
MW123I	10/14/2020	16.1	59.93
MW123I	4/28/2021	16.36	59.67
MW123I	4/13/2022	15.23	60.8
MW123I	9/28/2022	15.505	60.525
MW123I	3/20/2023	16.06	59.97
MW123I	4/11/2023	16.901	59.129
MW123I	9/26/2023	16.719	59.311
MW124D	10/25/2019	16.59	59.28
MW124D	5/5/2020	42.5	33.37 Damaged
MW124D	10/21/2020	16.721	59.149
MW124D	4/28/2021	16.83	59.04
MW124D	4/13/2022	16.8	59.07
MW124D	9/28/2022	16.739	59.131
MW124D	3/20/2023	16.8	59.07
MW124D	4/11/2023	16.747	59.123
MW124D	9/26/2023	16.93	58.94
MW125S	10/24/2019	14.567	60.313
MW125S	5/7/2020	14.771	60.109
MW125S	10/23/2020	14.425	60.455
MW125S	4/27/2021	15.03	59.85
MW125S	4/12/2022	14.91	59.97
MW125S	9/29/2022	14.8	60.08
MW125S	10/12/2022	14.805	60.075
MW125S	3/20/2023	14.91	59.97
MW125S	4/11/2023	14.84	60.04
MW125S	9/28/2023	14.953	59.927
MW125S	10/2/2023	14.96	59.92
MW126I	10/24/2019	13	60.5
MW126I	5/7/2020	13.213	60.287
MW126I	10/23/2020	13.284	60.216
MW126I	4/27/2021	13.45	60.05
MW126I	4/12/2022	13.36	60.14
MW126I	9/29/2022	13.245	60.255
MW126I	3/20/2023	13.34	60.16
MW126I	4/11/2023	13.29	60.21
MW126I	9/28/2023	13.415	60.085
MW128D	10/24/2019	16.688	57.712
MW128D	5/7/2020	16.793	57.607
MW128D	10/23/2020	16.897	57.503
MW128D	4/27/2021	17.02	57.38

MW128D	4/12/2022	17.06	57.34
MW128D	9/29/2022	17.08	57.32
MW128D	3/20/2023	17.1	57.3
MW128D	4/11/2023	16.97	57.43
MW128D	9/28/2023	17.09	57.31 Marked as MW128_S - well depth doesn't match borelog
MW129S	10/24/2019	15.65	57.86
MW129S	5/7/2020	15.892	57.618
MW129S	10/23/2020	15.99	57.52
MW129S	4/27/2021	16.1	57.41
MW129S	4/12/2022	16.17	57.34
MW129S	9/29/2022	16.18	57.33
MW129S	3/20/2023	16.2	57.31
MW129S	4/11/2023	16.065	57.445
MW129S	9/28/2023	16.17	57.34 Marked as MW129_D
MW130D	10/24/2019	15.335	57.435
MW130D	5/7/2020	15.442	57.328
MW130D	10/23/2020	16.534	56.236
MW130D	4/27/2021	15.65	57.12
MW130D	4/12/2022	15.71	57.06
MW130D	9/29/2022	15.742	57.028
MW130D	3/20/2023	15.74	57.03
MW130D	4/11/2023	15.62	57.15
MW130D	9/28/2023	15.77	57
MW131D	10/24/2019	19.52	57.07
MW131D	5/6/2020	19.068	57.522
MW131D	10/23/2020	19.658	56.932
MW131D	4/27/2021	19.56	57.03
MW131D	10/27/2021	19.852	56.738 Hydrasleeve intake at 21m
MW131D	4/12/2022	19.83	56.76
MW131D	9/29/2022	19.67	56.92
MW131D	3/20/2023	19.87	56.72
MW131D	4/11/2023	19.77	56.82
MW131D	9/28/2023	19.941	56.649
MW132I	10/24/2019	19.4	57.03
MW132I	5/6/2020	19.39	57.04
MW132I	10/23/2020	19.278	57.152
MW132I	4/27/2021	19.25	57.18
MW132I	4/12/2022	19.73	56.7
MW132I	9/29/2022	18.755	57.675
MW132I	10/12/2022	19.755	56.675 Unable to determine well depth due to insufficient dipper length
MW132I	3/20/2023	19.75	56.68
MW132I	4/11/2023	19.655	56.775
MW132I	9/28/2023	19.912	56.518
MW132I	10/2/2023	19.902	56.528
MW133D	10/24/2019	19.3	57.19
MW133D	5/6/2020	19.543	56.947
MW133D	10/23/2020	19.54	56.95
MW133D	4/27/2021	19.65	56.84
MW133D	4/12/2022	19.6	56.89
MW133D	9/29/2022	19.65	56.84
MW133D	3/20/2023	19.65	56.84
MW133D	4/11/2023	19.55	56.94
MW133D	9/28/2023	19.629	56.861
MW134D	10/24/2019	21.56	56.92
MW134D	5/7/2020	21.585	56.895
MW134D	10/23/2020	21.681	56.799
MW134D	4/27/2021	56	22.48
MW134D	4/12/2022	56	22.48
MW134D	9/29/2022	56	22.48 Blocked
MW134D	3/20/2023	56	22.48 BORE DRY
MW134D	4/11/2023	56	22.48 blocked
MW134D	4/12/2023	21.83	56.65
MW134D	9/28/2023	21.899	56.581

MW135I	10/24/2019	20.85	56.82
MW135I	5/7/2020	20.953	56.717
MW135I	10/23/2020	20.96	56.71
MW135I	4/27/2021	21.05	56.62
MW135I	10/27/2021	21.145	56.525 Hydrasleeve intake at 23m
MW135I	4/12/2022	21.16	56.51
MW135I	9/29/2022	21.175	56.495
MW135I	3/20/2023	21.17	56.5
MW135I	4/11/2023	21.154	56.516
MW135I	9/28/2023	21.23	56.44
MW137S	10/25/2019	8.7	64.42
MW137S	5/8/2020	8.649	64.471
MW137S	10/23/2020	8.489	64.631
MW137S	4/28/2021	8.82	64.3
MW137S	4/12/2022	8.35	64.77
MW137S	9/28/2022	7.826	65.294
MW137S	3/20/2023	7.86	65.26
MW137S	4/11/2023	8.354	64.766
MW137S	9/22/2023	8.7	64.42 Dry
MW138S	10/24/2019	7.89	66.28
MW138S	5/7/2020	9.039	65.131
MW138S	10/23/2020	9.069	65.101
MW138S	4/27/2021	9.2	64.97
MW138S	10/27/2021	8.685	65.485 Hydrasleeve intake at 14m
MW138S	4/12/2022	9	65.17
MW138S	9/28/2022	8.683	65.487
MW138S	10/12/2022	8.629	65.541
MW138S	3/20/2023	8.6	65.57
MW138S	4/11/2023	9.273	64.897
MW138S	9/28/2023	6.61	67.56
MW138S	10/2/2023	9.552	64.618
MW139I	10/24/2019	13.77	60.22
MW139I	5/7/2020	30	43.99
MW139I	10/23/2020	13.986	60.004
MW139I	4/27/2021	14.1	59.89
MW139I	4/12/2022	14.05	59.94
MW139I	9/28/2022	13.942	60.048
MW139I	3/20/2023	14.09	59.9
MW139I	4/11/2023	13.97	60.02
MW139I	9/28/2023	14.045	59.945
MW140D	10/24/2019	13.58	60.32
MW140D	5/7/2020	16.02	57.88
MW140D	10/23/2020	13.816	60.084
MW140D	4/27/2021	13.95	59.95
MW140D	4/12/2022	13.89	60.01
MW140D	9/28/2022	13.765	60.135
MW140D	3/20/2023	13.91	59.99
MW140D	4/11/2023	13.82	60.08
MW140D	9/28/2023	13.872	60.028
MW141S	10/25/2019	10.9	63.46
MW141S	3/10/2020	10.92	63.44
MW141S	5/7/2020	10.97	63.39
MW141S	8/19/2020	16.5	57.86 No SWL recorded
MW141S	10/23/2020	11.09	63.27
MW141S	1/28/2021	11.15	63.21
MW141S	4/28/2021	11.2	63.16
MW141S	7/15/2021	11.32	63.04
MW141S	1/20/2022	10.78	63.58
MW141S	4/12/2022	10.87	63.49
MW141S	7/15/2022	10.98	63.38
MW141S	9/29/2022	10.879	63.481
MW141S	1/11/2023	10.565	63.795
MW141S	3/20/2023	11.1	63.26
MW141S	4/11/2023	10.701	63.659

MW141S	7/18/2023	10.701	63.659
MW141S	9/22/2023	10.91	63.45
MW142S	10/25/2019	13.62	62.72
MW142S	3/10/2020	13.67	62.67
MW142S	5/7/2020	13.721	62.619
MW142S	8/19/2020	15.5	60.84 No SWL recorded
MW142S	10/29/2020	13.804	62.536
MW142S	1/28/2021	13.82	62.52
MW142S	4/28/2021	14.35	61.99
MW142S	7/15/2021	13.86	62.48
MW142S	1/20/2022	13.1	63.24
MW142S	4/12/2022	13.48	62.86
MW142S	7/15/2022	13.572	62.768
MW142S	9/29/2022	13.6	62.74
MW142S	1/11/2023	13.27	63.07
MW142S	3/20/2023	13.52	62.82
MW142S	4/11/2023	13.459	62.881
MW142S	7/18/2023	13.459	62.881
MW142S	9/22/2023	13.64	62.7
MW143S	10/25/2019	18.5	57.31
MW143S	3/10/2020	17.89	57.92
MW143S	5/7/2020	18.5	57.31 Dry
MW143S	8/19/2020	18.5	57.31 No SWL recorded
MW143S	10/29/2020	18.5	57.31 Dry
MW143S	1/28/2021	18.5	57.31
MW143S	4/28/2021	18.5	57.31
MW143S	7/15/2021	18.5	57.31
MW143S	1/20/2022	18.5	57.31
MW143S	4/12/2022	18.5	57.31
MW143S	7/15/2022	18.5	57.31
MW143S	9/29/2022	18.139	57.671
MW143S	1/11/2023	18.5	57.31 Dry
MW143S	3/20/2023	18.5	57.31 Bore Dry
MW143S	4/11/2023	18.082	57.728
MW143S	7/18/2023	18.082	57.728
MW143S	9/22/2023	18.5	57.31 Dry
MW301	10/3/2012	8.486	66.061
MW301	9/18/2015	8.868	65.679
MW301	11/11/2016	8.543	66.004
MW301	10/24/2019	8.59	65.957
MW301	5/4/2020	9.083	65.464
MW301	10/21/2020	9.003	65.544
MW301	4/28/2021	9.31	65.237
MW301	4/11/2022	8.9	65.647
MW301	9/28/2022	8.435	66.112
MW301	3/20/2023	8.52	66.027
MW301	4/11/2023	8.8	65.747
MW301	9/26/2023	9.019	65.528
MW302	10/3/2012	8.656	66.056
MW302	9/18/2015	8.475	66.237
MW302	11/11/2016	8.71	66.001
MW302	10/24/2019	8.762	65.95
MW302	5/4/2020	9.252	65.46
MW302	10/21/2020	9.173	65.538
MW302	4/28/2021	9.48	65.231
MW302	4/11/2022	9.07	65.642
MW302	9/28/2022	8.585	66.126
MW302	3/20/2023	8.7	66.011
MW302	4/11/2023	8.18	66.531
MW302	9/26/2023	9.225	65.487
MW303	10/3/2012	8.518	66.056
MW303	9/18/2015	8.175	66.399
MW303	11/11/2016	8.57	66.004
MW303	10/24/2019	8.625	65.949

MW303	5/4/2020	10.505	64.069
MW303	10/21/2020	9.046	65.528
MW303	4/28/2021	9.34	65.234
MW303	4/11/2022	8.92	65.654
MW303	9/28/2022	8.441	66.133
MW303	3/20/2023	8.54	66.034
MW303	4/11/2023	8.84	65.734
MW303	9/26/2023	8.84	65.734
MW304	10/3/2012	7.645	66.449
MW304	9/16/2015	7.785	66.309
MW304	11/15/2016	7.717	66.377
MW304	10/25/2019	7.76	66.334
MW304	5/5/2020	8.385	65.709
MW304	10/15/2020	8.08	66.014
MW304	4/28/2021	9.5	64.594
MW304	4/11/2022	8.13	65.964
MW304	9/28/2022	7.402	66.692
MW304	3/20/2023	7.39	66.704
MW304	4/11/2023	8.12	65.974
MW304	9/27/2023	8.065	66.029
MW305	10/3/2012	7.425	66.46
MW305	9/10/2015	7.56	66.325
MW305	11/15/2016	7.48	66.405
MW305	10/25/2019	7.525	66.36
MW305	5/5/2020	9	64.885 Dry
MW305	10/15/2020	7.94	65.945
MW305	4/28/2021	9	64.885
MW305	4/11/2022	7.83	66.055
MW305	9/28/2022	7.16	66.725
MW305	3/20/2023	7.1	66.785
MW305	4/11/2023	7.9	65.985
MW305	9/27/2023	7.995	65.89
MW306	10/3/2012	7.508	66.457
MW306	9/17/2015	7.66	66.305
MW306	11/15/2016	7.57	66.394
MW306	10/25/2019	7.613	66.352
MW306	5/5/2020	9	64.965 Dry
MW306	10/15/2020	7.93	66.035
MW306	4/28/2021	9	64.965
MW306	4/11/2022	7.98	65.984
MW306	9/28/2022	7.265	66.7
MW306	3/20/2023	7.28	66.684
MW306	4/11/2023	7.95	66.014
MW306	9/27/2023	8.035	65.93
MW307	10/3/2012	7.209	66.426
MW307	9/17/2015	7.375	66.26
MW307	11/15/2016	7.328	66.306
MW307	10/25/2019	7.365	66.27
MW307	5/5/2020	8.5	65.135 Dry
MW307	10/15/2020	6.67	66.965
MW307	4/28/2021	8.125	65.51
MW307	4/11/2022	8.5	65.135 Well destroyed
MW307	9/28/2022	8.5	65.135 Bore was driven over. destroyed.
MW307	10/12/2022	8.5	65.135 Well has been damaged. Sand in top of well. Not able to sample.
MW307	3/20/2023	8.5	65.135 Well damaged cannot sample
MW307	9/27/2023	8.5	65.135 Bore headworks damaged. No SWL
MW308	10/3/2012	7.255	66.436
MW308	9/21/2015	7.4	66.291
MW308	11/15/2016	7.35	66.341
MW308	10/25/2019	7.39	66.301
MW308	5/5/2020	9	64.691 Damaged - filled in with bitumen
MW308	10/15/2020	7.64	66.051
MW308	4/28/2021	9	64.691

MW308	10/27/2021	7.115	66.576 Hydrasleeve intake at 8m
MW308	4/11/2022	7.8	65.891
MW308	9/28/2022	6.98	66.711
MW308	10/12/2022	7.085	66.606
MW308	3/20/2023	6.98	66.711
MW308	4/11/2023	7.69	66.001
MW308	9/27/2023	7.728	65.963
MW308	9/28/2023	7.65	66.041
MW309	10/3/2012	7.469	66.43
MW309	9/21/2015	7.63	66.269
MW309	11/15/2016	7.581	66.318
MW309	10/25/2019	7.6	66.299
MW309	5/5/2020	9.5	64.399 Dry
MW309	10/15/2020	7.94	65.959
MW309	4/28/2021	9.5	64.399
MW309	10/27/2021	7.391	66.508 Hydrasleeve intake at 8.5m
MW309	4/11/2022	7.97	65.929
MW309	9/28/2022	7.265	66.634
MW309	10/12/2022	7.334	66.565
MW309	3/20/2023	7.27	66.629
MW309	4/11/2023	7.96	65.939
MW309	9/27/2023	7.962	65.937
MW309	9/29/2023	7.941	65.958
MW310	10/3/2012	7.366	66.44
MW310	9/21/2015	7.62	66.186
MW310	11/15/2016	7.458	66.348
MW310	10/25/2019	7.505	66.301
MW310	5/5/2020	8.087	65.719
MW310	10/15/2020	7.77	66.036
MW310	4/28/2021	8.25	65.556
MW310	10/27/2021	7.242	66.564 Hydrasleeve intake at 8m
MW310	4/11/2022	7.82	65.986
MW310	9/28/2022	7.113	66.693
MW310	10/12/2022	7.18	66.626
MW310	3/20/2023	7.11	66.696
MW310	4/11/2023	7.82	65.986
MW310	9/27/2023	7.603	66.203
MW310	9/29/2023	7.795	66.011
MW312	10/3/2012	8.134	66.407
MW312	9/18/2015	8.34	66.201
MW312	11/11/2016	8.24	66.301
MW312	10/24/2019	8.303	66.238
MW312	5/5/2020	8.837	65.704
MW312	10/21/2020	8.627	65.914
MW312	4/28/2021	9.035	65.506
MW312	10/27/2021	8.115	66.426 Hydrasleeve intake at 9m
MW312	4/11/2022	8.63	65.911
MW312	9/28/2022	7.995	66.546
MW312	10/12/2022	8.049	66.492
MW312	3/20/2023	8.01	66.531
MW312	4/11/2023	8.62	65.921
MW312	9/26/2023	8.729	65.812
MW312	9/29/2023	8.636	65.905
MW313	10/3/2012	8.294	66.394
MW313	9/19/2015	9.49	65.198
MW313	11/11/2016	8.396	66.292
MW313	10/24/2019	8.455	66.233
MW313	5/5/2020	8.984	65.704
MW313	10/15/2020	8.73	65.958
MW313	4/28/2021	9.18	65.508
MW313	10/27/2021	8.279	66.409 Hydrasleeve intake at 9.9m
MW313	4/11/2022	8.8	65.888
MW313	9/28/2022	8.15	66.538
MW313	10/12/2022	8.205	66.483

MW313	3/20/2023	8.16	66.528
MW313	4/11/2023	8.78	65.908
MW313	9/26/2023	8.903	65.785
MW313	9/29/2023	8.795	65.893
MW401	10/24/2019		Abstraction bore - not dipped
MW401	3/18/2020		Abstraction Bore, no SWL reading
MW401	5/4/2020		Sampled from bore pump
MW401	8/19/2020		Abstraction Bore, no SWL reading
MW401	10/15/2020		Abstraction bore
MW401	1/28/2021		Abstraction bore, no SWL recorded
MW401	7/15/2021		Abstraction bore, no SWL
MW401	1/19/2022		abstraction bore
MW401	4/11/2022		Tap
MW401	7/15/2022		abstraction bore
MW401	9/28/2022		Abstraction Bore
MW401	1/11/2023		Abstraction Bore
MW401	3/20/2023		Well damaged cannot sample
MW402	11/7/2019		Abstraction bore - not dipped
MW402	3/18/2020		Abstraction Bore, no SWL reading
MW402	5/6/2020		Sampled from bore pump
MW402	8/19/2020		Abstraction Bore, no SWL reading
MW402	10/29/2020		Abstraction bore
MW402	1/28/2021		Access denied
MW402	7/15/2021		Unable to sample
MW402	1/19/2022		abstraction bore
MW402	4/11/2022		Tap
MW402	7/15/2022		abstraction bore
MW402	9/28/2022		Abstraction Bore
MW402	1/11/2023		Abstraction Bore
MW402	3/20/2023		
MW403	11/18/2019	21.8	52.04
MW403	3/10/2020	21.07	52.77
MW403	5/8/2020	26	47.84
MW403	8/19/2020	26	47.84 No SWL recorded
MW403	10/29/2020	21.144	52.696
MW403	1/28/2021	21.16	52.68
MW403	5/5/2021	26	47.84 Dipper not working
MW403	7/15/2021	21.26	52.58
MW403	1/20/2022	21.37	52.47
MW403	4/12/2022	21.42	52.42
MW403	7/15/2022	21.412	52.428
MW403	10/6/2022	21.435	52.405
MW403	1/11/2023	21.49	52.35
MW403	3/20/2023	21.32	52.52
MW403	4/11/2023	21.503	52.337
MW403	7/18/2023	16.542	57.298
MW403	9/22/2023	21.525	52.315
MW504	10/21/2020	8.159	64.661
MW504	4/28/2021	7.908	64.912
MW504	10/27/2021	6.862	65.958 Hydrasleeve intake at 11.5m
MW504	4/11/2022	7.47	65.35
MW504	9/28/2022	6.697	66.123
MW504	10/12/2022	7.001	65.819
MW504	3/20/2023	6.48	66.34
MW504	4/11/2023	7.7	65.12
MW504	9/27/2023	8.049	64.771
MW504	9/29/2023	7.8	65.02
MW505	10/21/2020	8.497	65.333
MW505	4/28/2021	8.915	64.915
MW505	4/11/2022	8.51	65.32
MW505	9/28/2022	7.84	65.99
MW505	3/20/2023	7.84	65.99
MW505	4/11/2023	8.49	65.34
MW505	9/26/2023	7.869	65.961

Trend Report

Report Date & Time: 2024-08-01 06:25:53

Data File Name: PFOA_MKA_240731.csv

Report Title: Groundwater PFOA Trend Data

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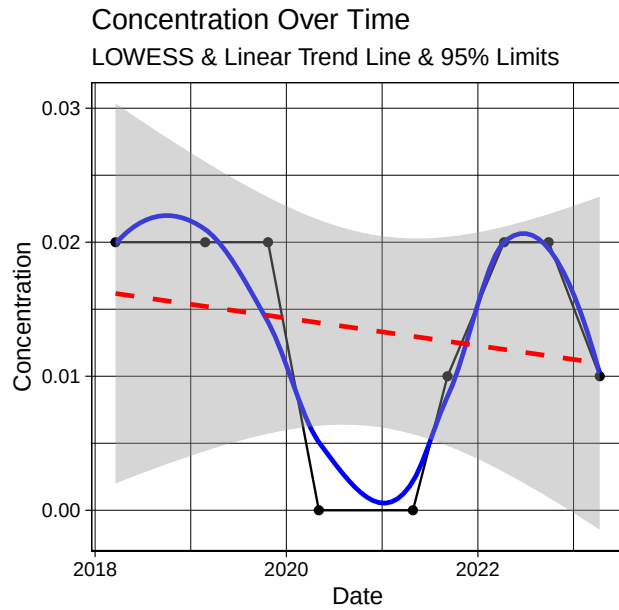
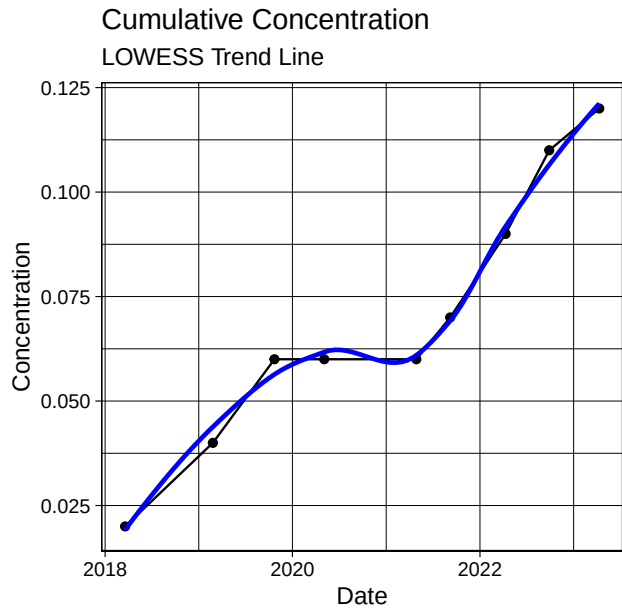
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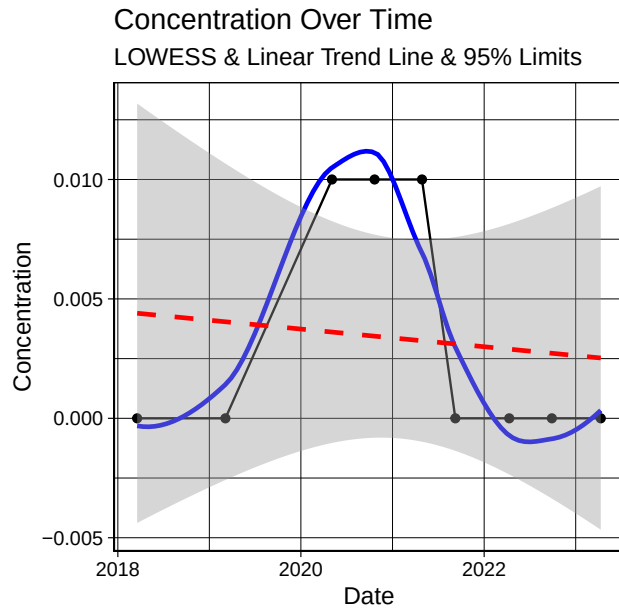
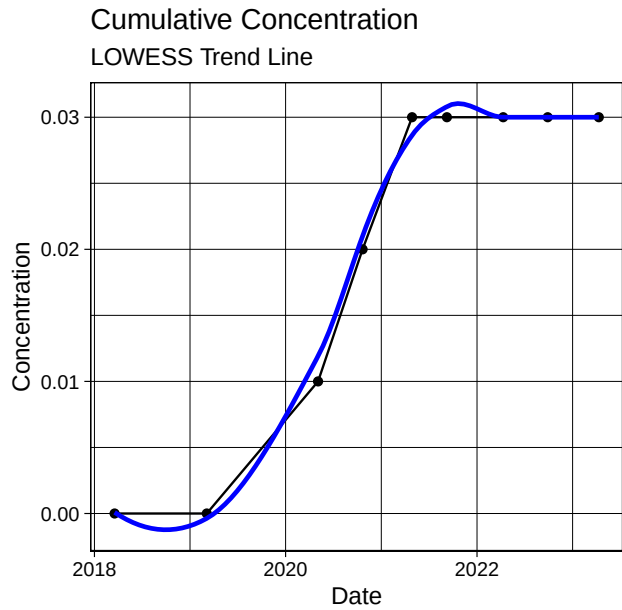
Kendall Trend Test Results Continuous	
n	9
z	-0.35
p	0.73
S	-4
varS	73.33
tau	-0.14
mean	0.01
sd	0.01
cov	0.65
results	STABLE

Report for ID : MW101I and Analyte : PFOA



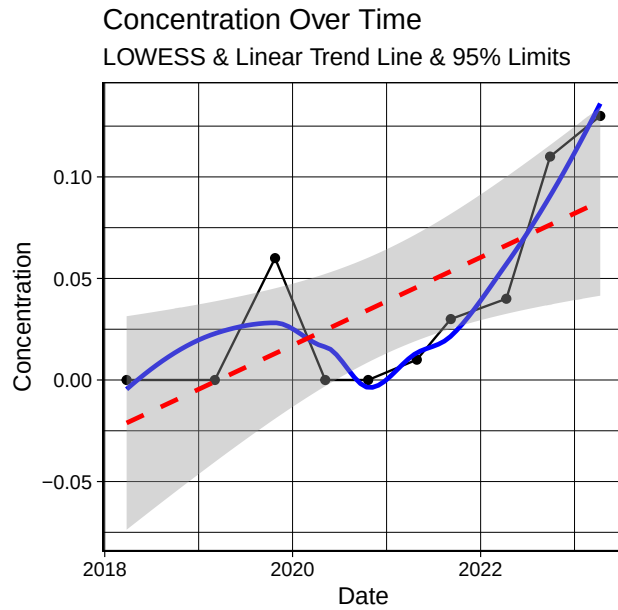
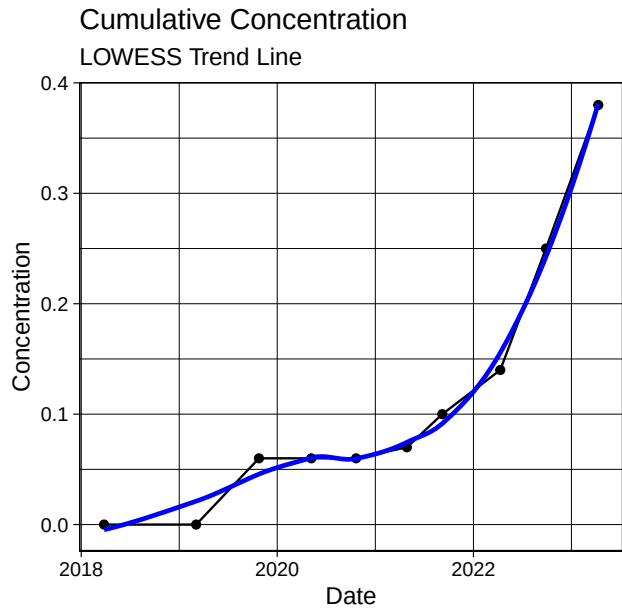
Kendall Trend Test Results Continuous	
n	9
z	-0.65
p	0.52
S	-6
varS	60
tau	-0.24
mean	0
sd	0
cov	1.5
results	NO CLEAR TREND

Report for ID : MW102D and Analyte : PFOA



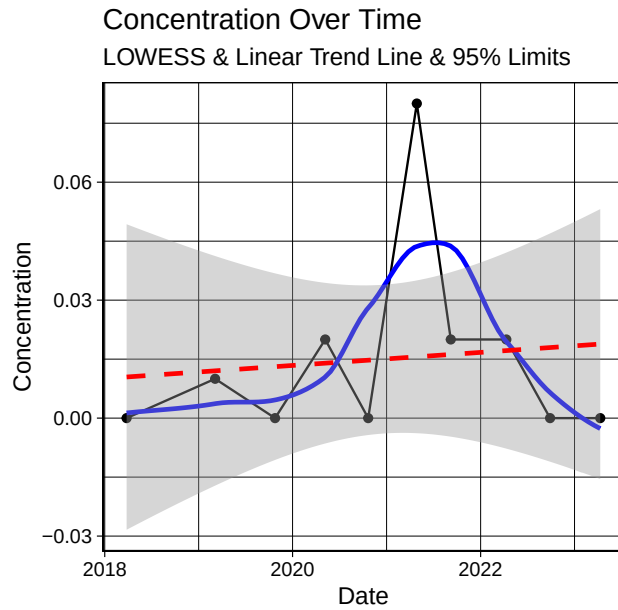
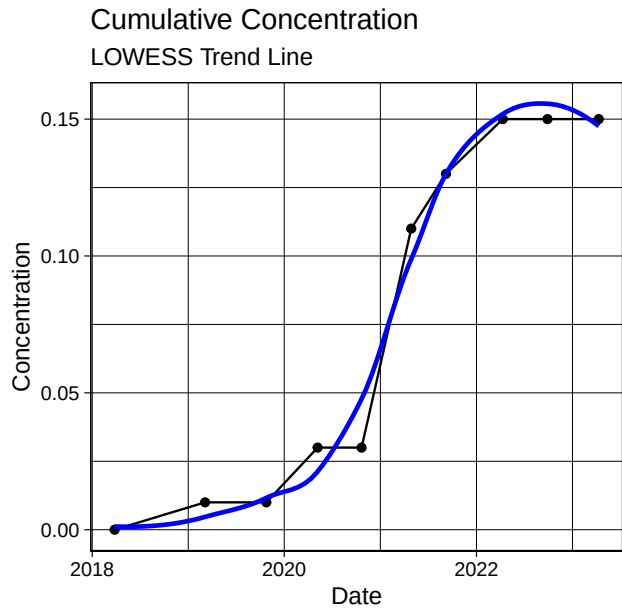
Kendall Trend Test Results Continuous	
n	10
z	2.6
p	0.01
S	29
varS	116.33
tau	0.69
mean	0.04
sd	0.05
cov	1.26
results	INCREASING

Report for ID : MW104I and Analyte : PFOA



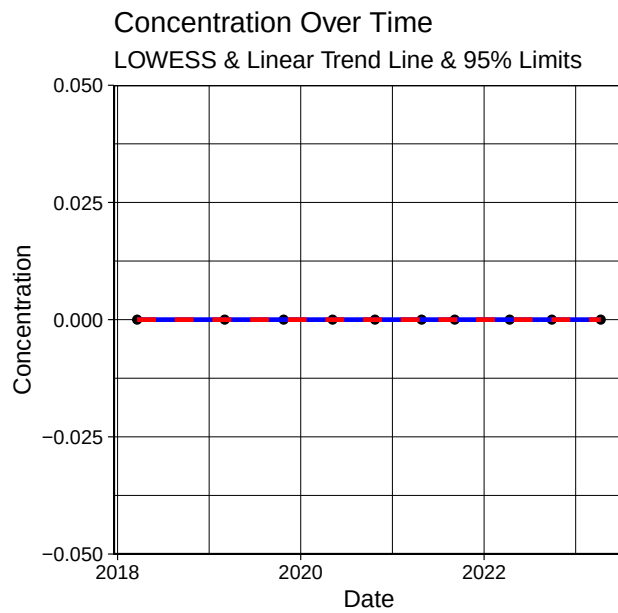
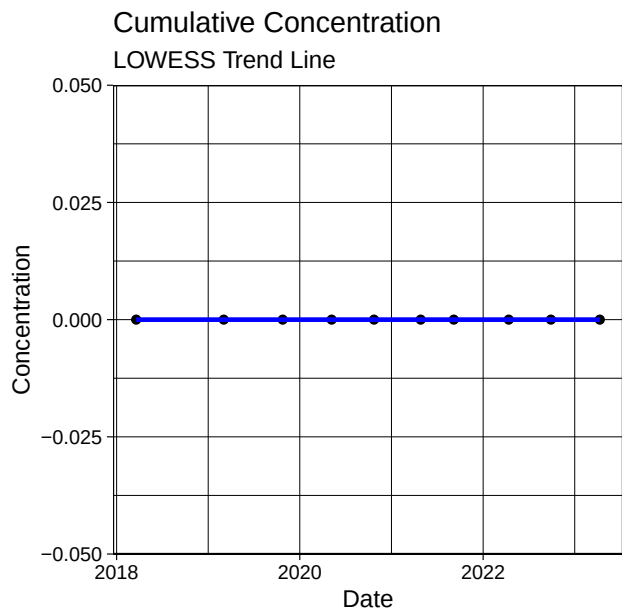
Kendall Trend Test Results Continuous	
n	10
z	0.1
p	0.92
S	2
varS	104.67
tau	0.05
mean	0.01
sd	0.02
cov	1.64
results	NO CLEAR TREND

Report for ID : MW105D and Analyte : PFOA



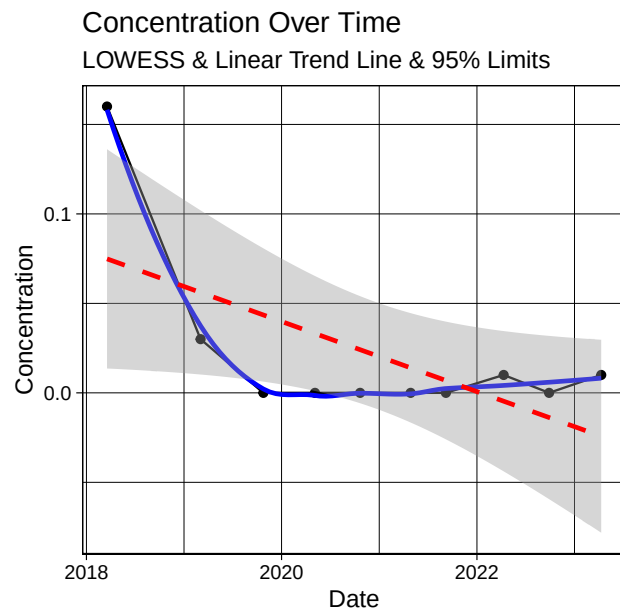
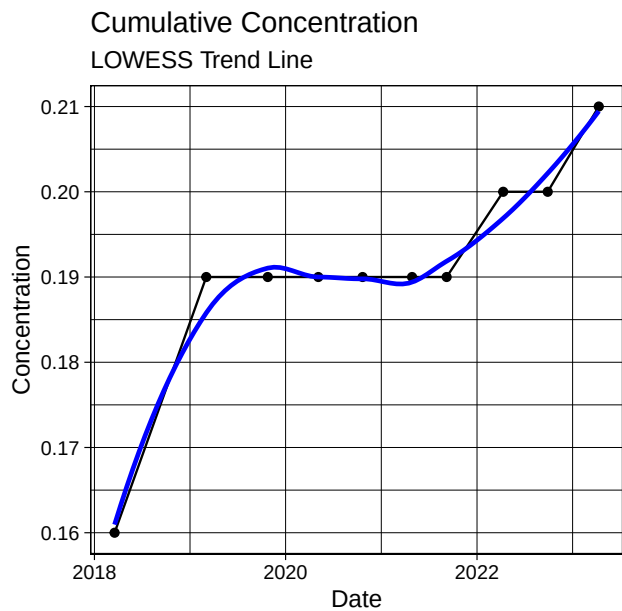
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW106S and Analyte : PFOA



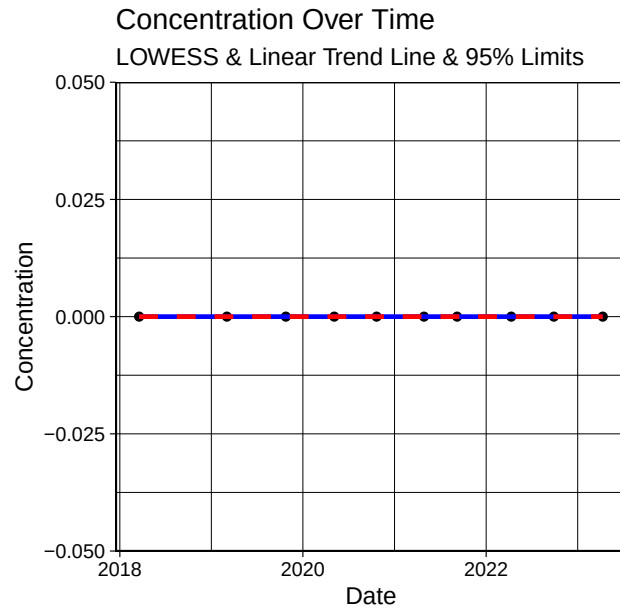
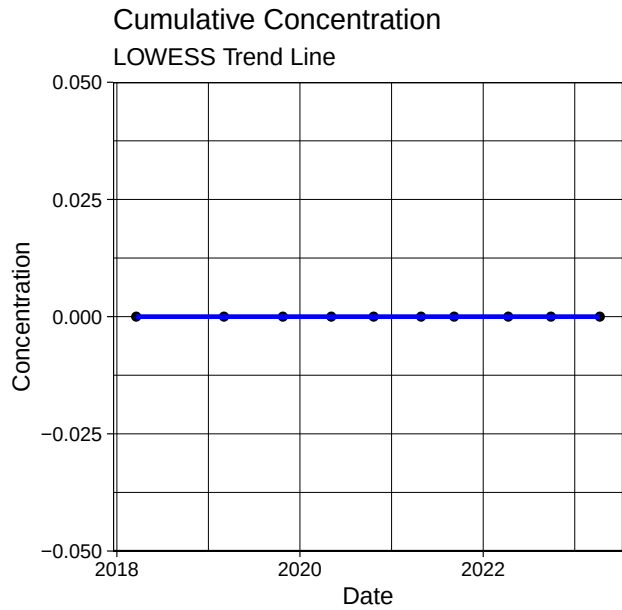
Kendall Trend Test Results Continuous	
n	10
z	-0.61
p	0.54
S	-7
varS	95.67
tau	-0.19
mean	0.02
sd	0.05
cov	2.37
results	NO CLEAR TREND

Report for ID : MW109S and Analyte : PFOA



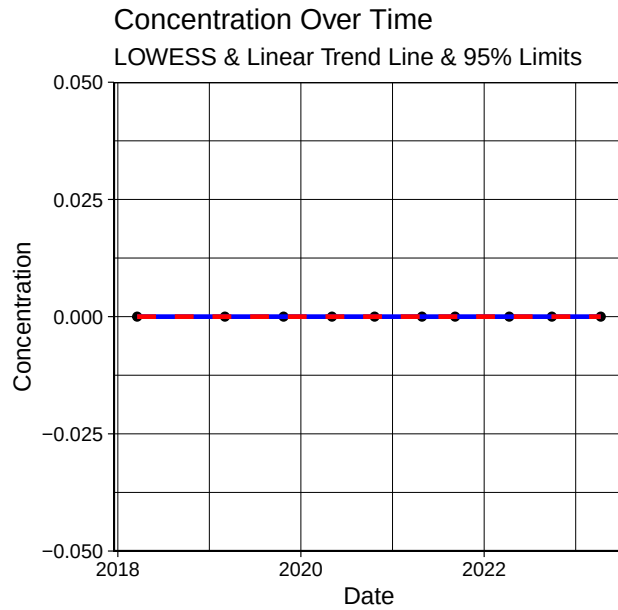
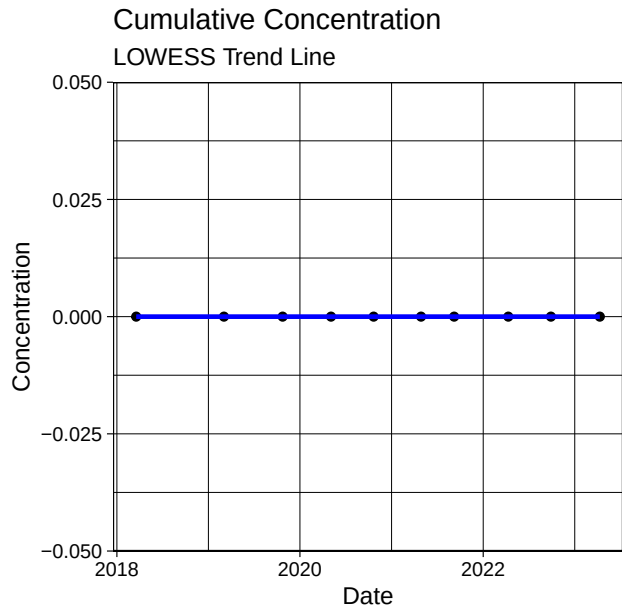
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW110S and Analyte : PFOA



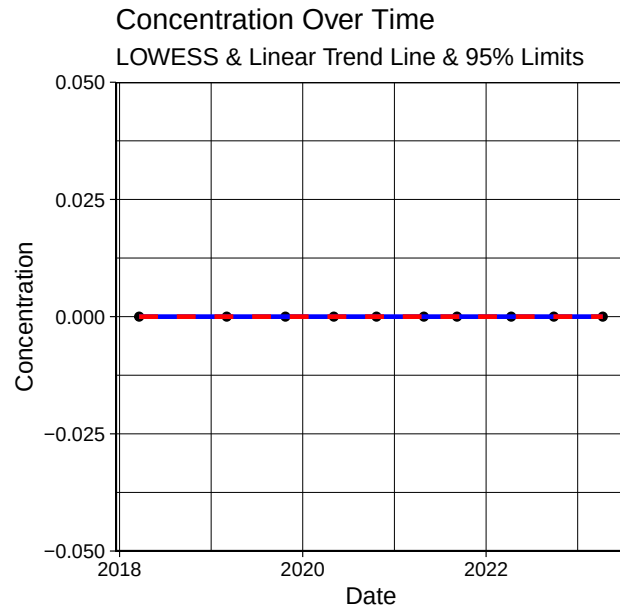
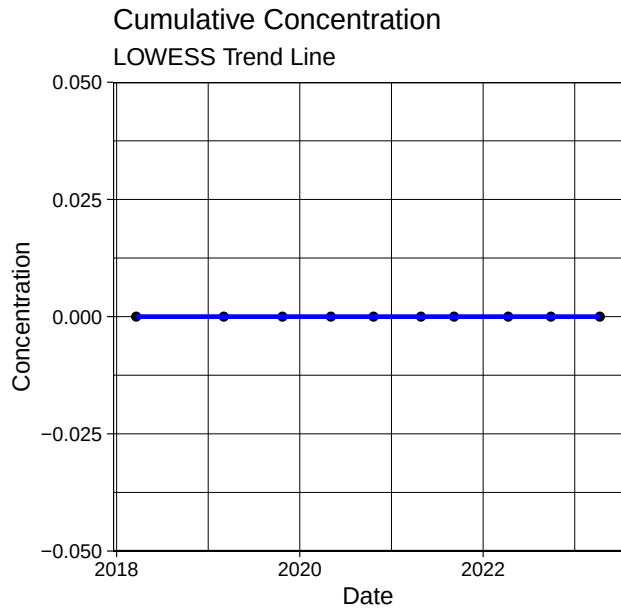
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW112S and Analyte : PFOA



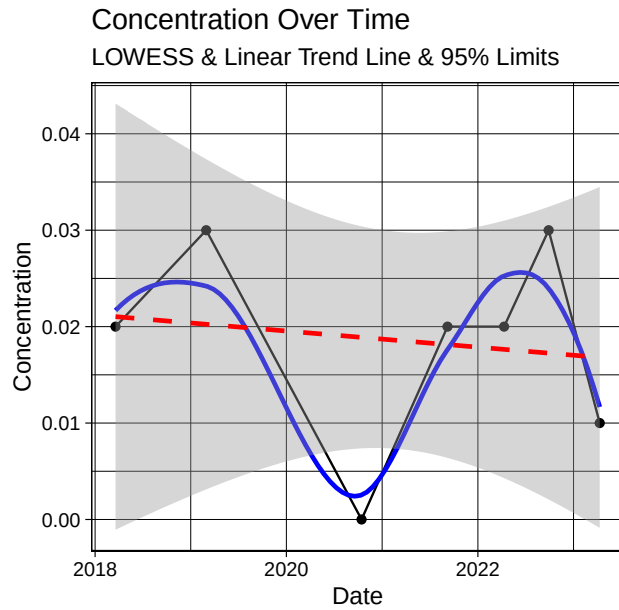
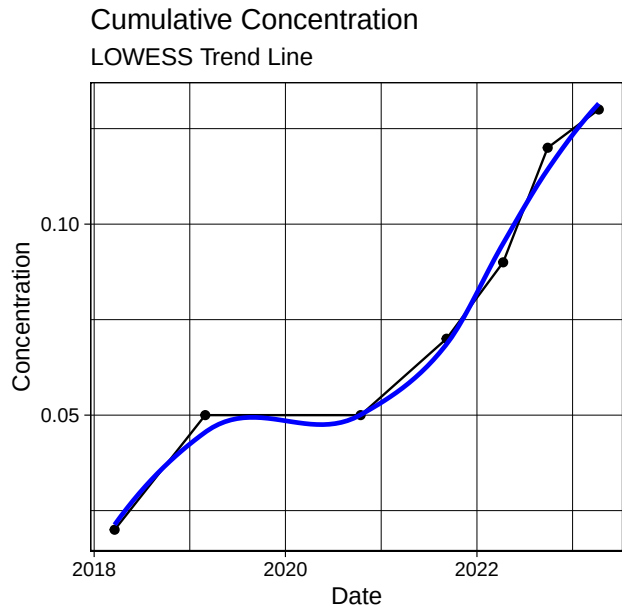
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW113S and Analyte : PFOA



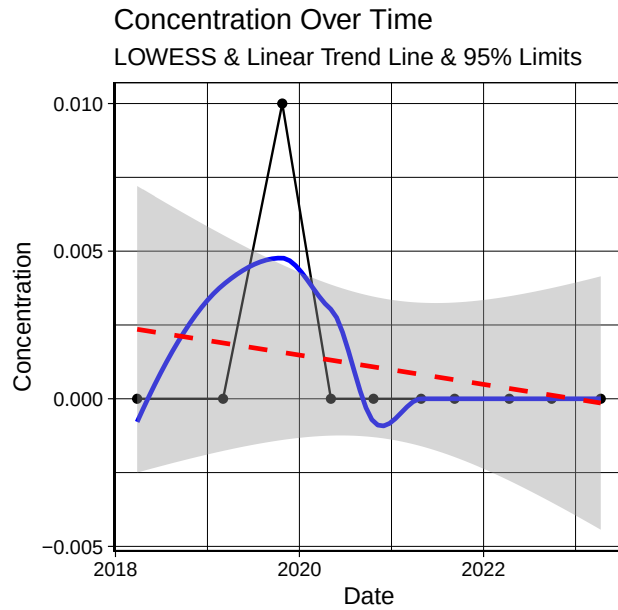
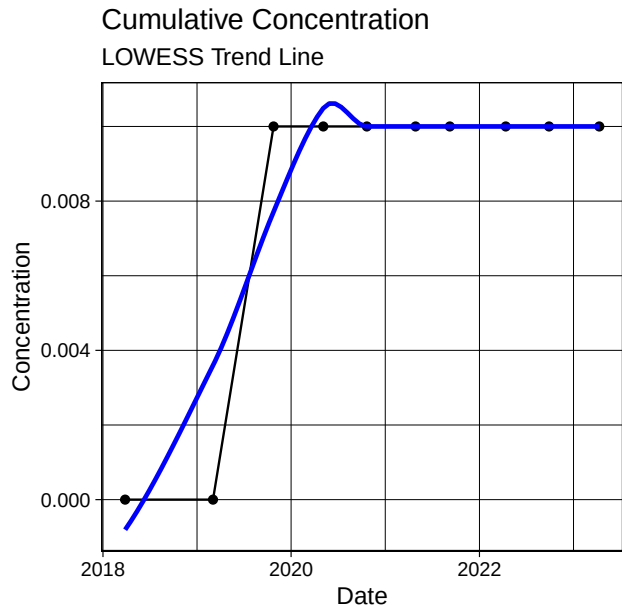
Kendall Trend Test Results Continuous	
n	7
z	0
p	1
S	-1
varS	39.67
tau	-0.05
mean	0.02
sd	0.01
cov	0.58
results	STABLE

Report for ID : MW114S and Analyte : PFOA



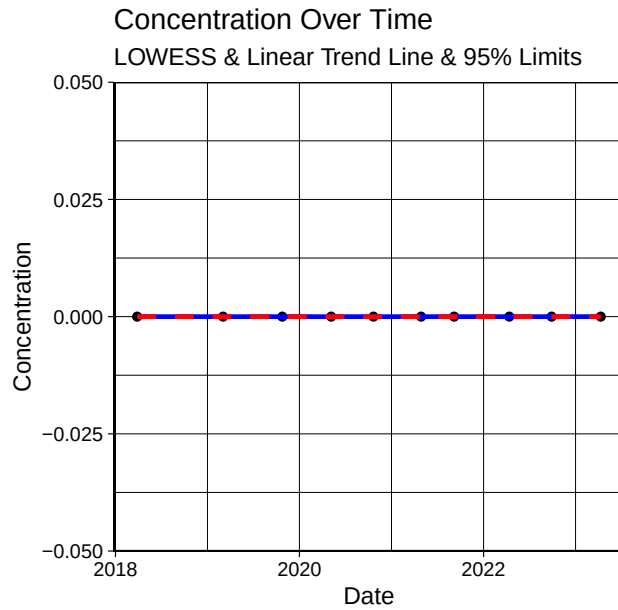
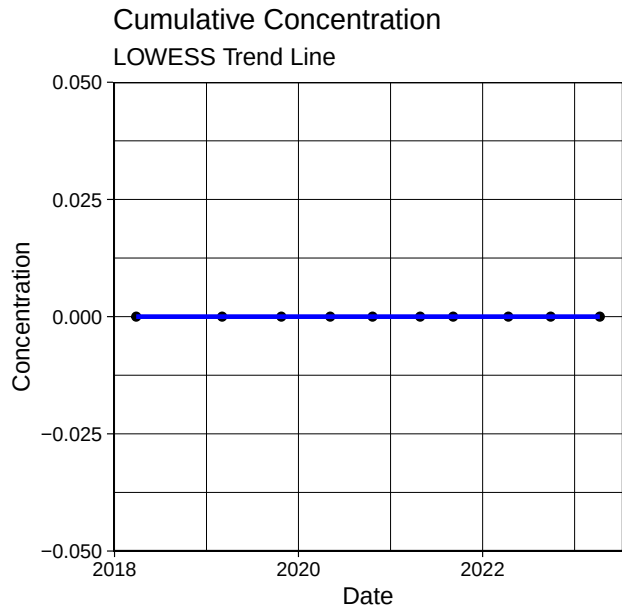
Kendall Trend Test Results Continuous	
n	10
z	-0.7
p	0.49
S	-5
varS	33
tau	-0.25
mean	0
sd	0
cov	3.16
results	NO CLEAR TREND

Report for ID : MW115S and Analyte : PFOA



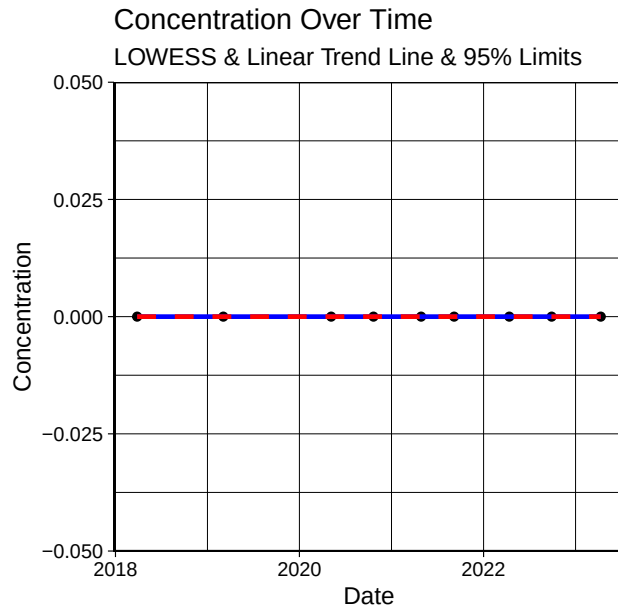
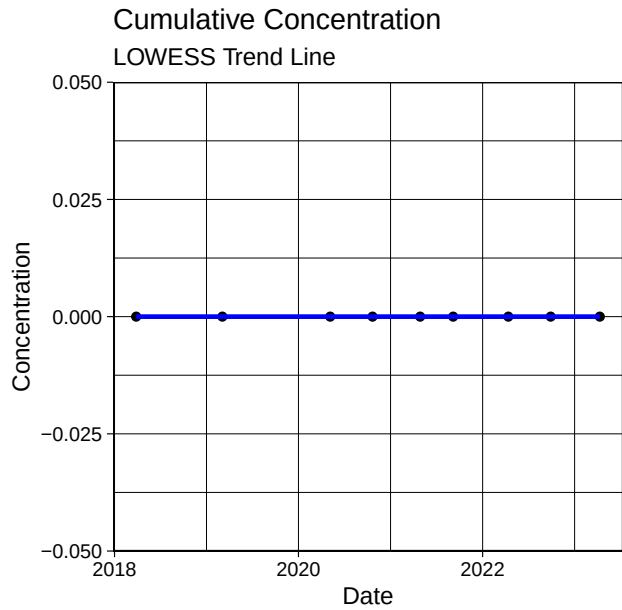
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW116S and Analyte : PFOA



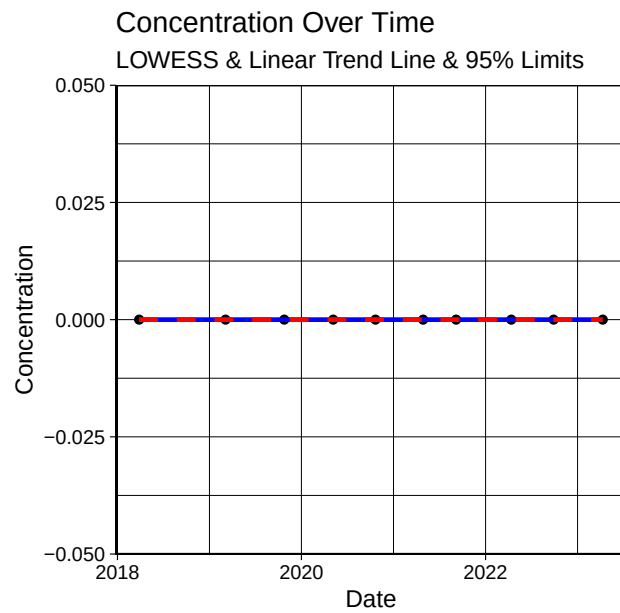
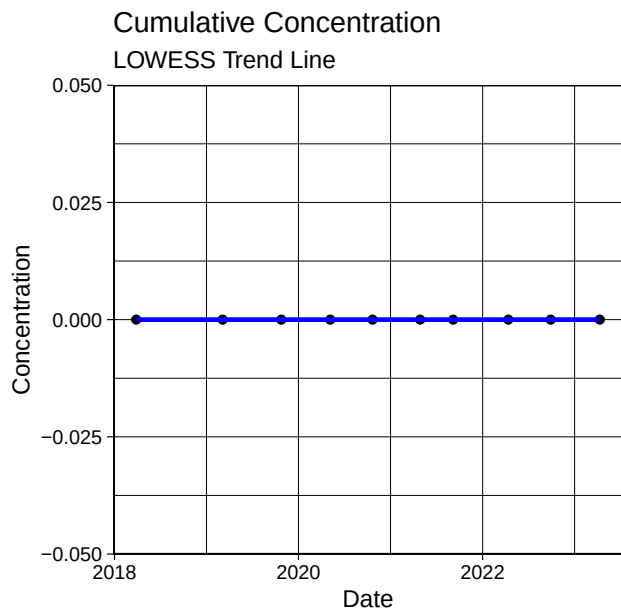
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW117I and Analyte : PFOA



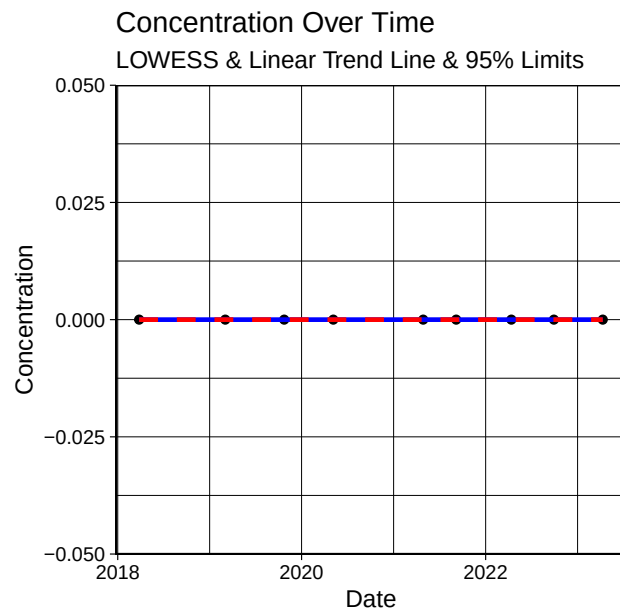
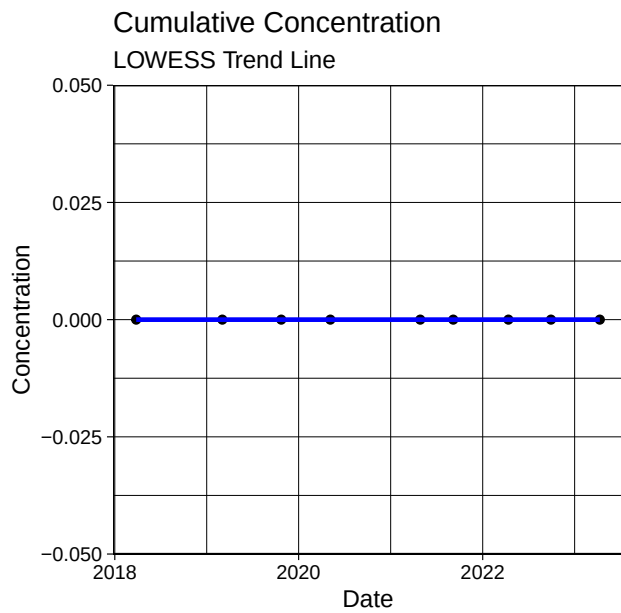
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW118D and Analyte : PFOA



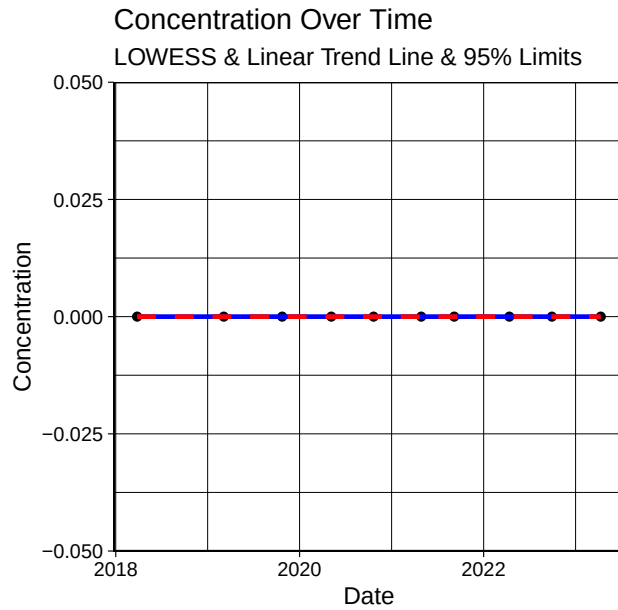
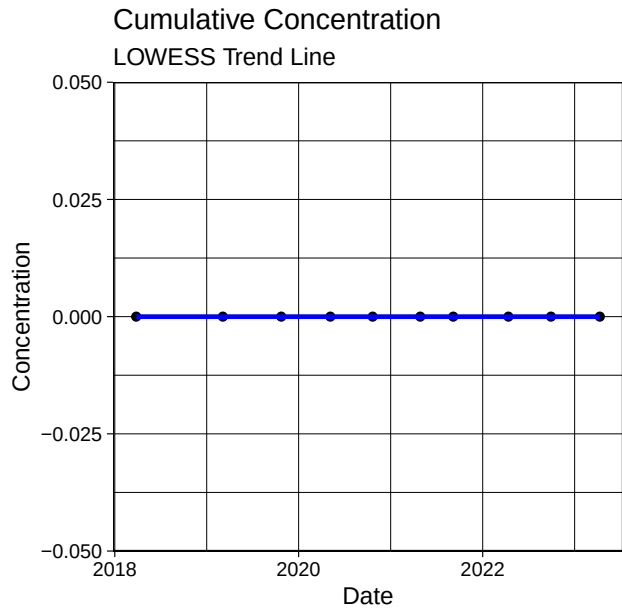
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW119S and Analyte : PFOA



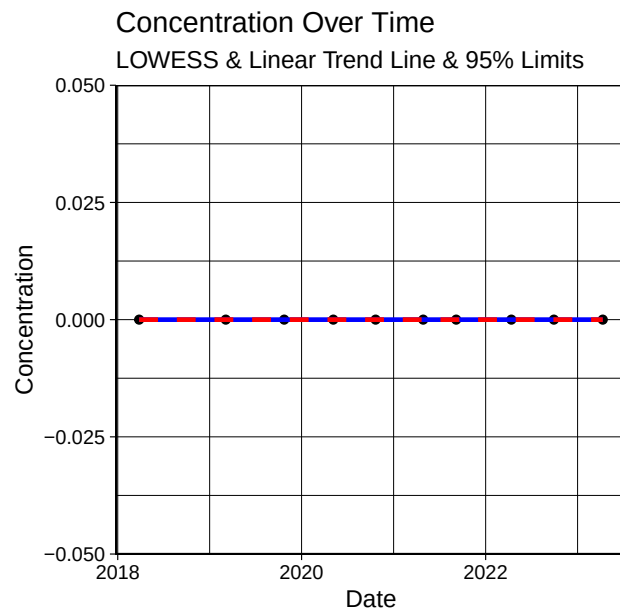
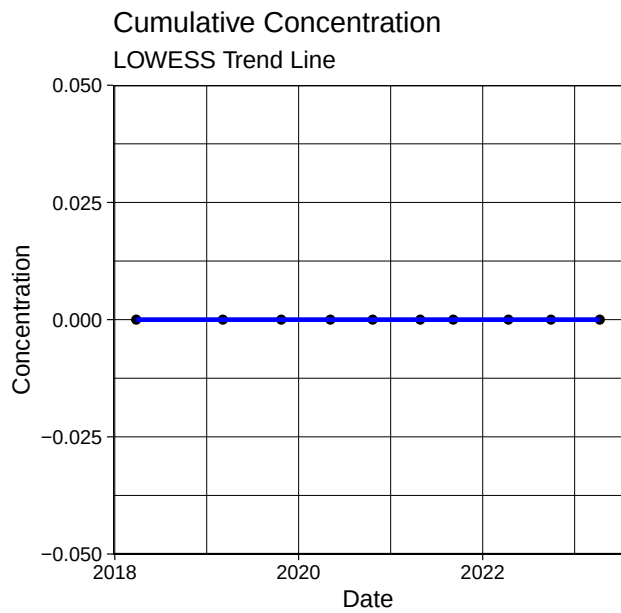
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW120I and Analyte : PFOA



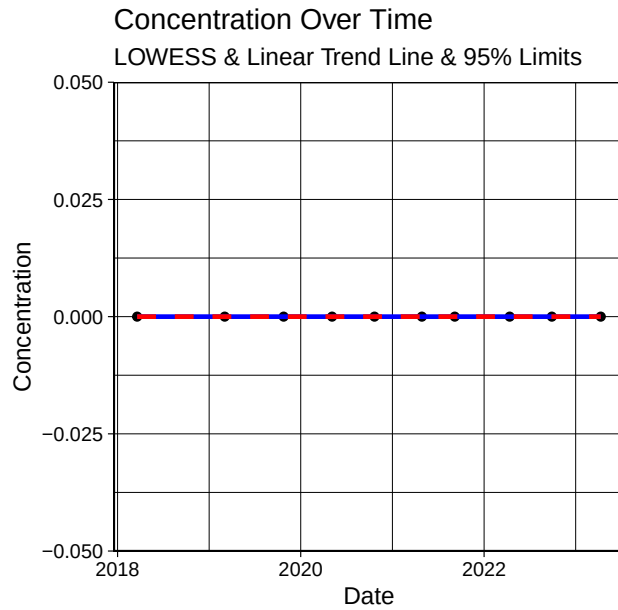
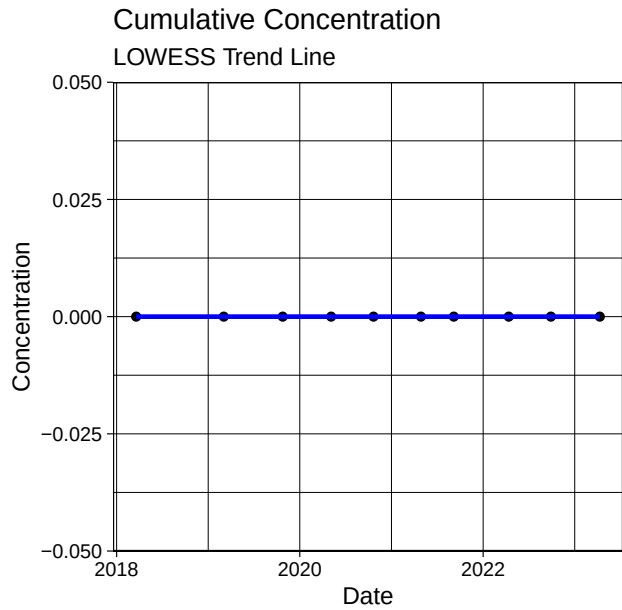
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW121D and Analyte : PFOA



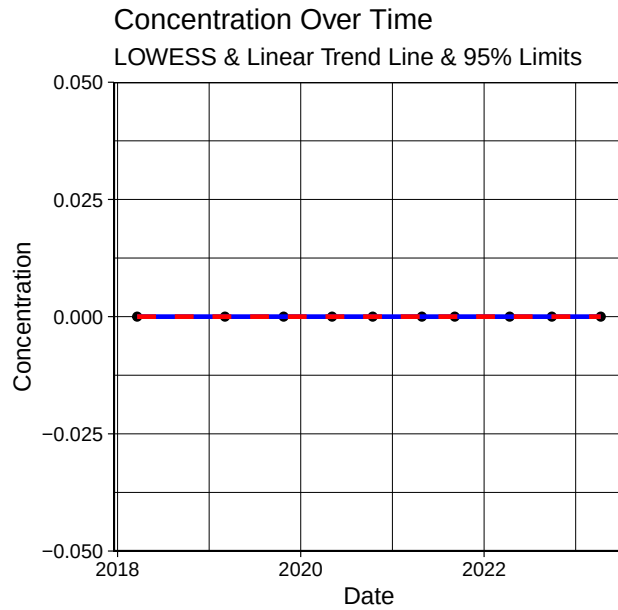
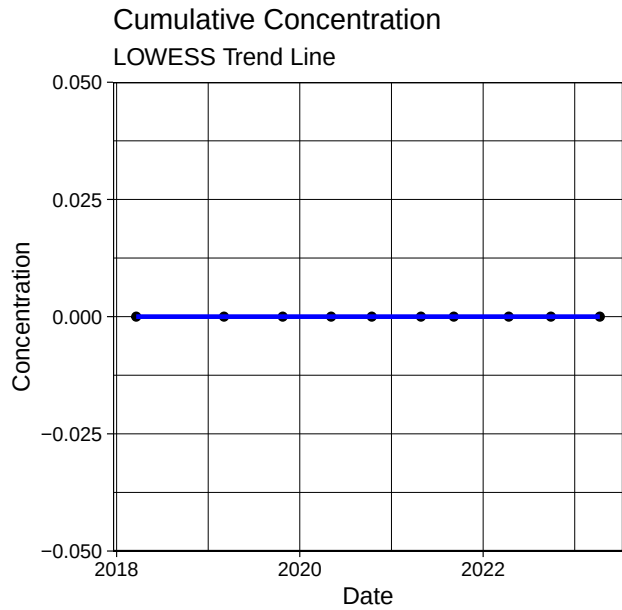
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW122S and Analyte : PFOA



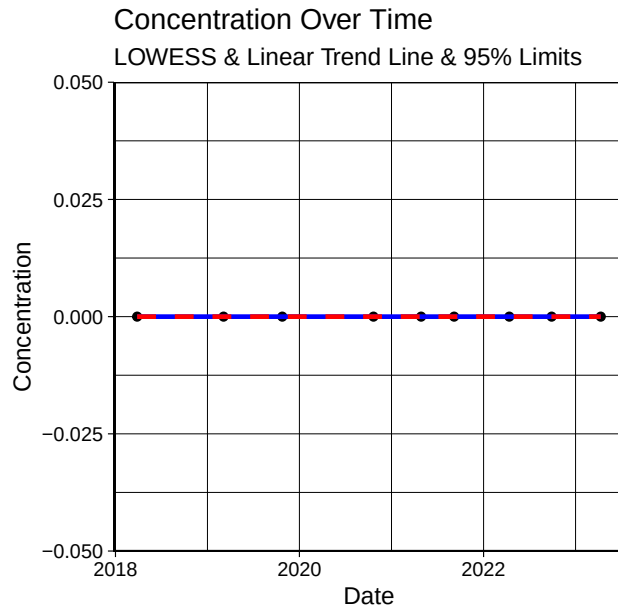
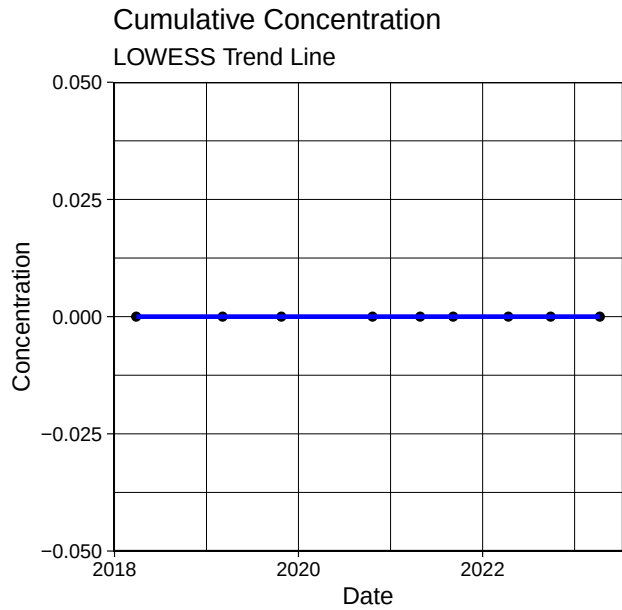
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW123I and Analyte : PFOA



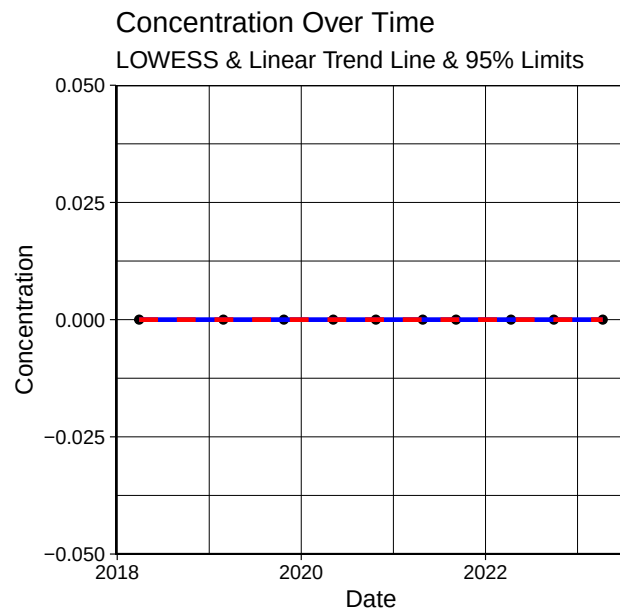
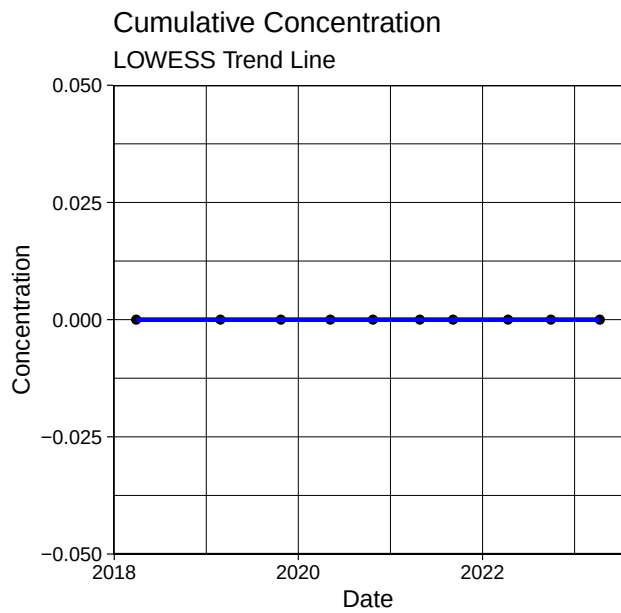
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW124D and Analyte : PFOA



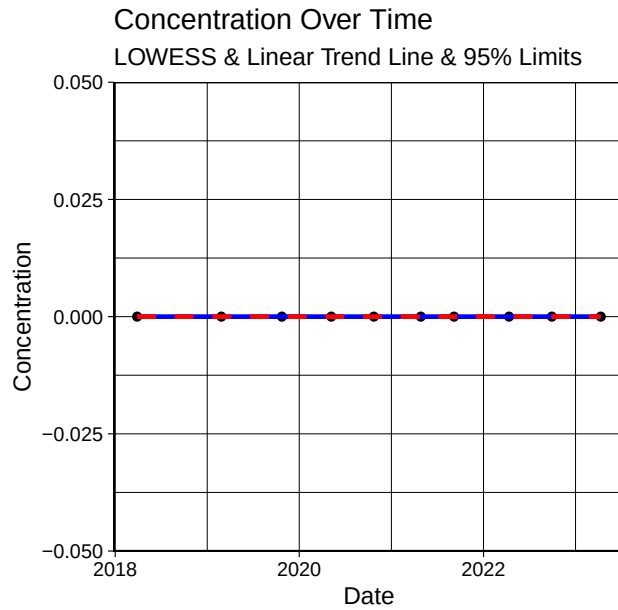
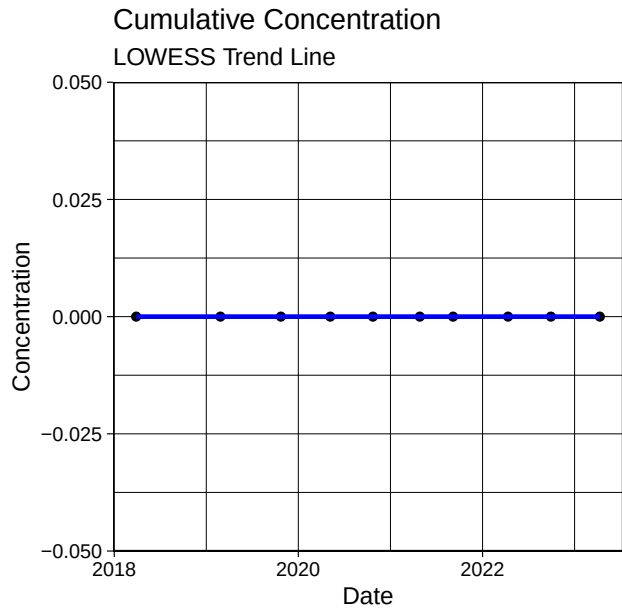
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW125S and Analyte : PFOA



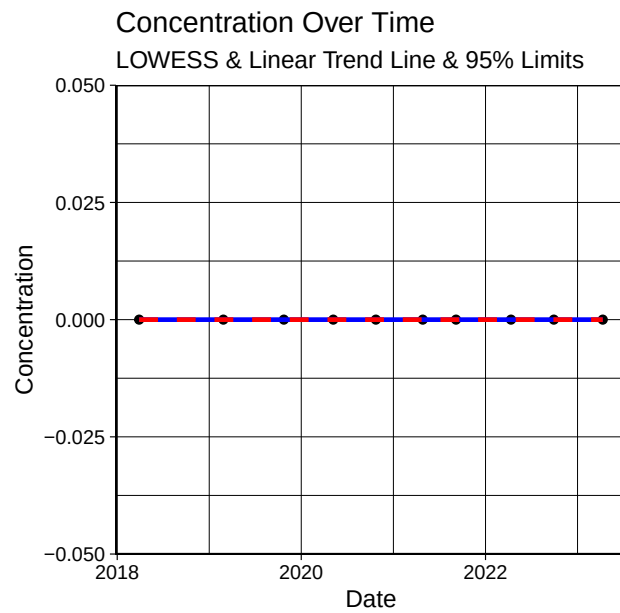
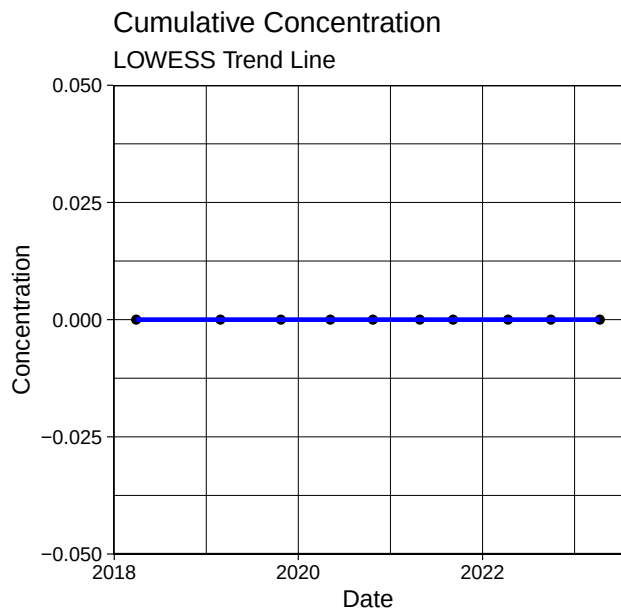
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW126I and Analyte : PFOA



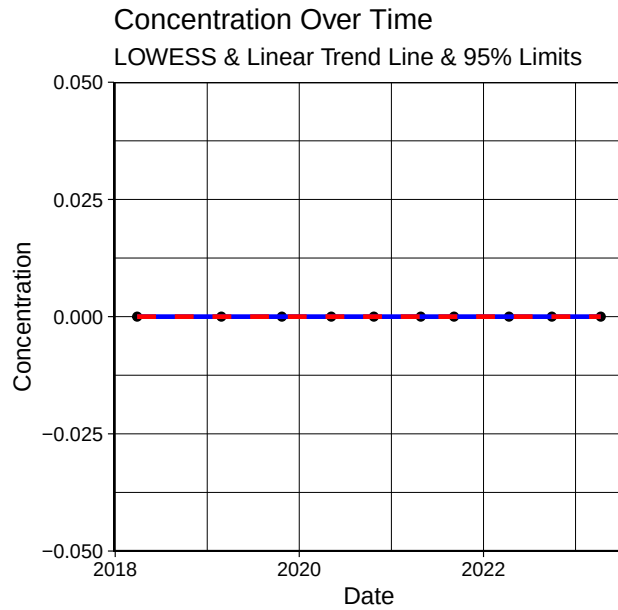
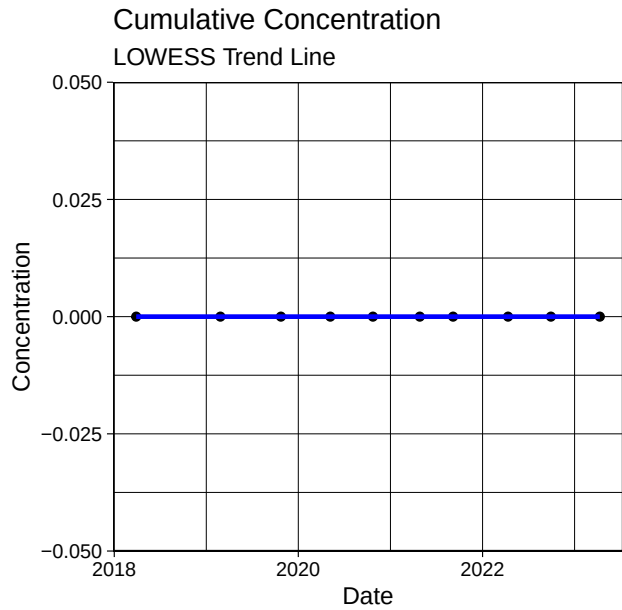
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW128D and Analyte : PFOA



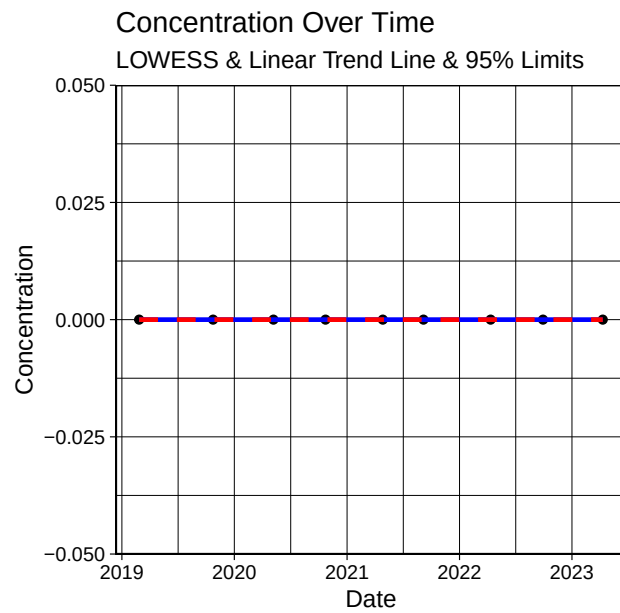
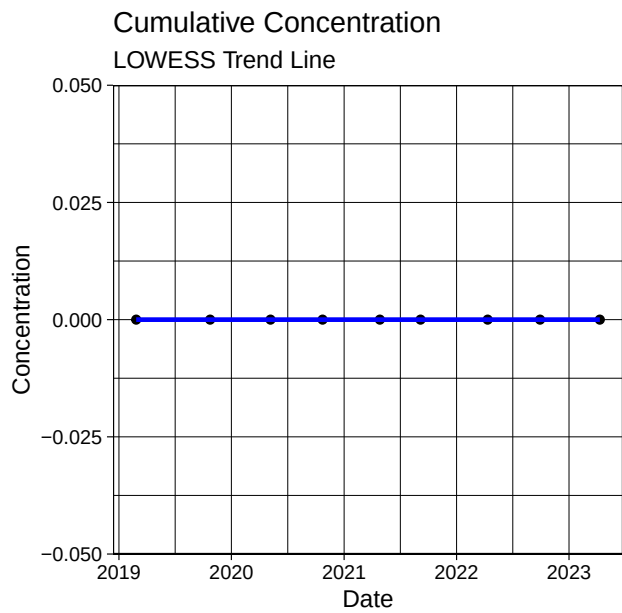
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW129S and Analyte : PFOA



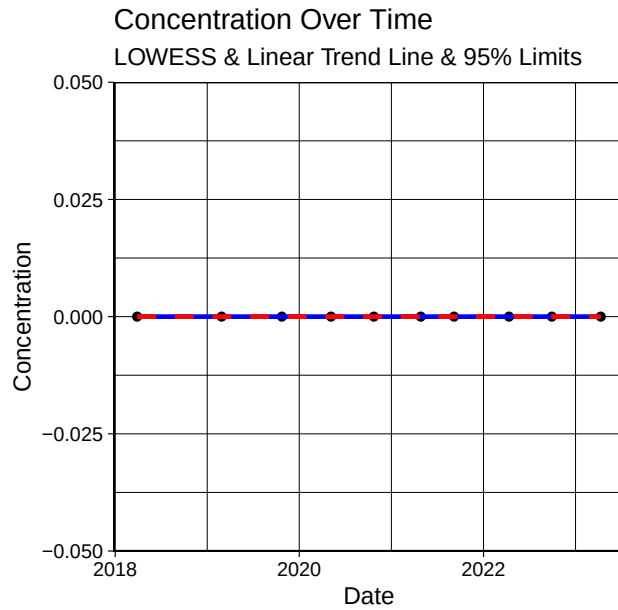
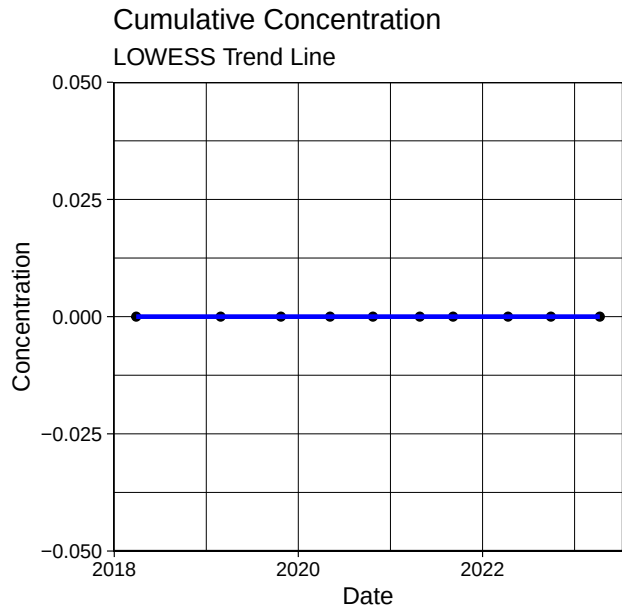
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW130D and Analyte : PFOA



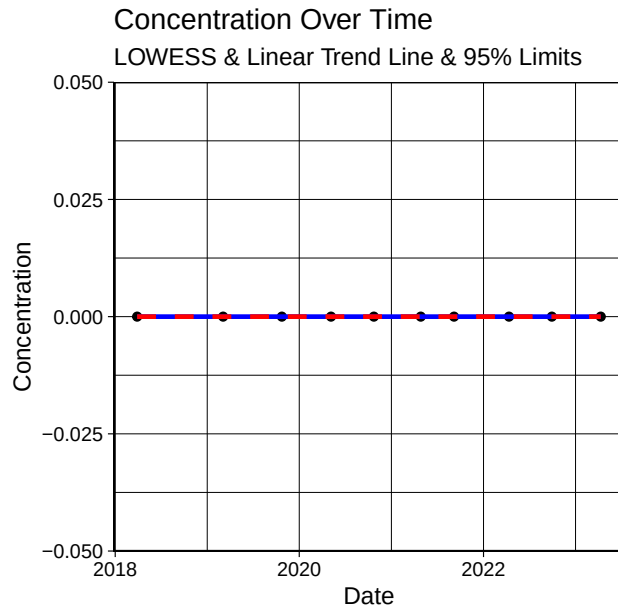
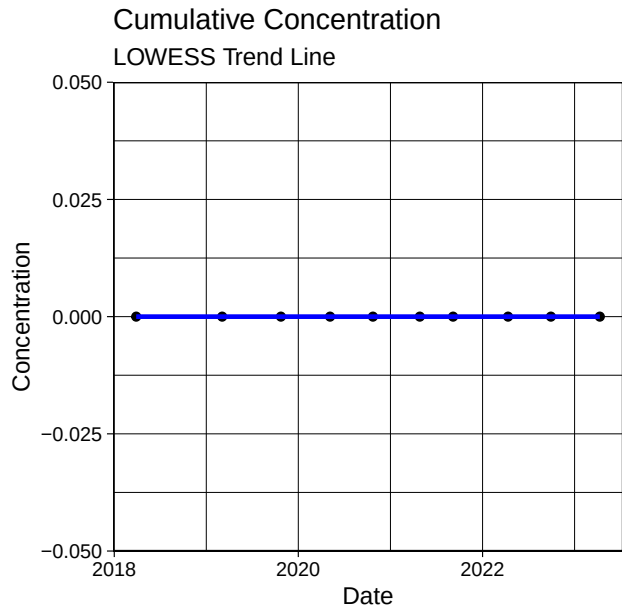
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW131D and Analyte : PFOA



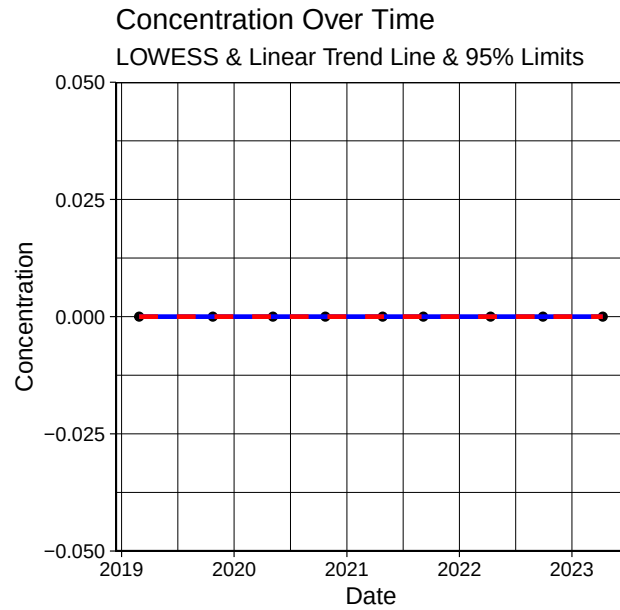
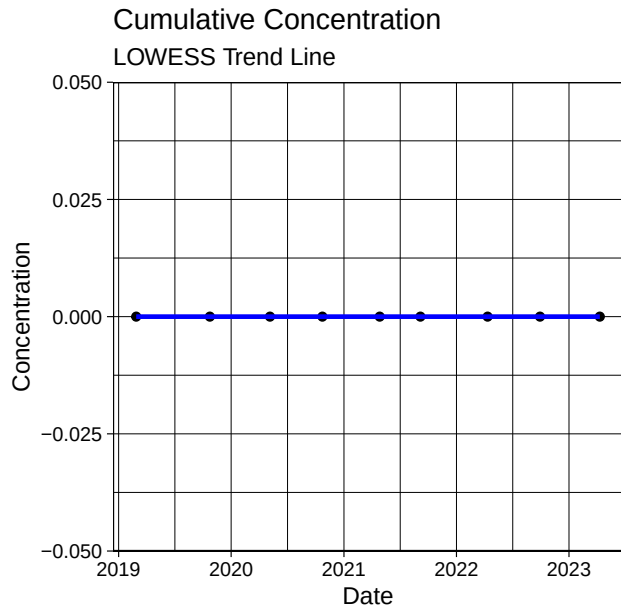
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW132I and Analyte : PFOA



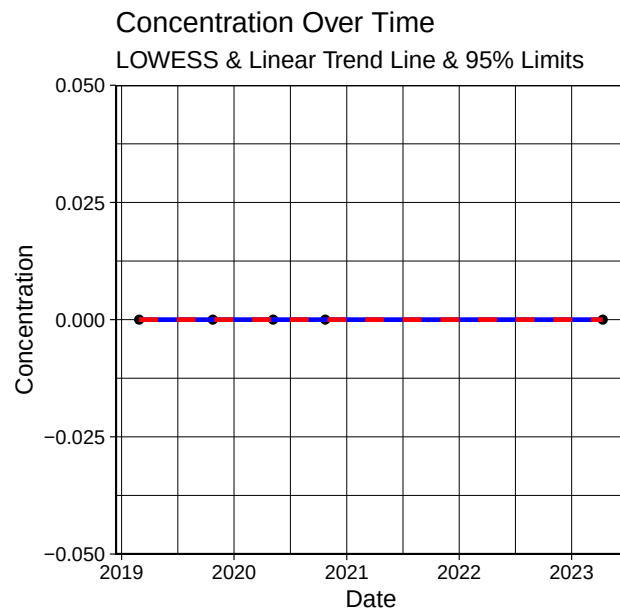
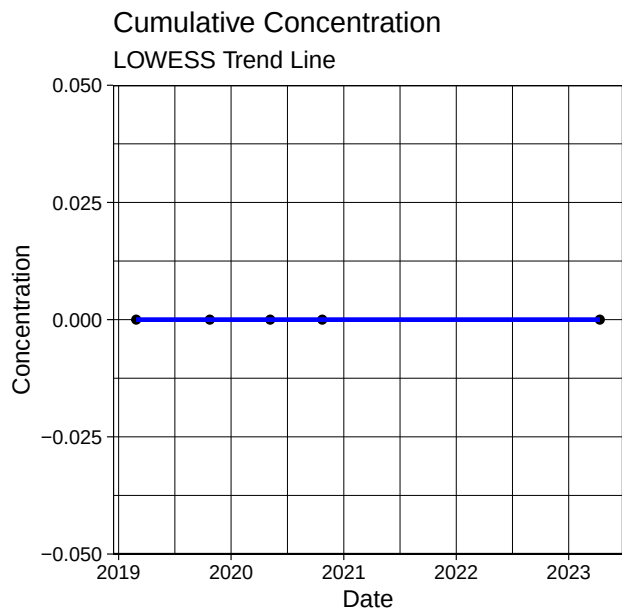
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW133D and Analyte : PFOA



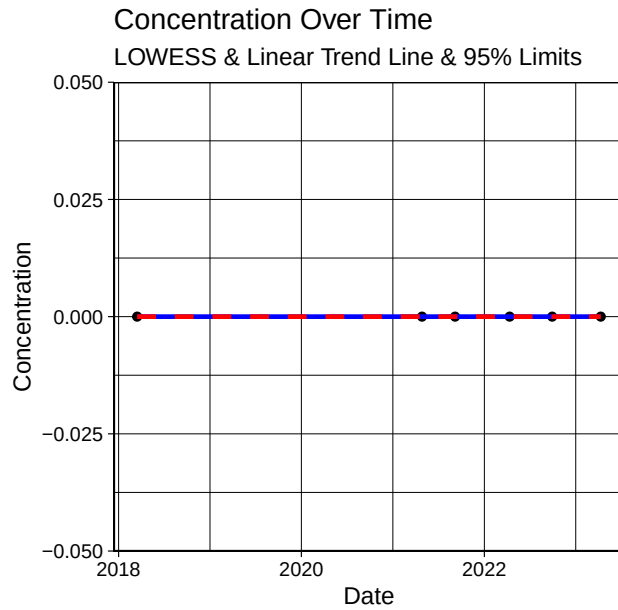
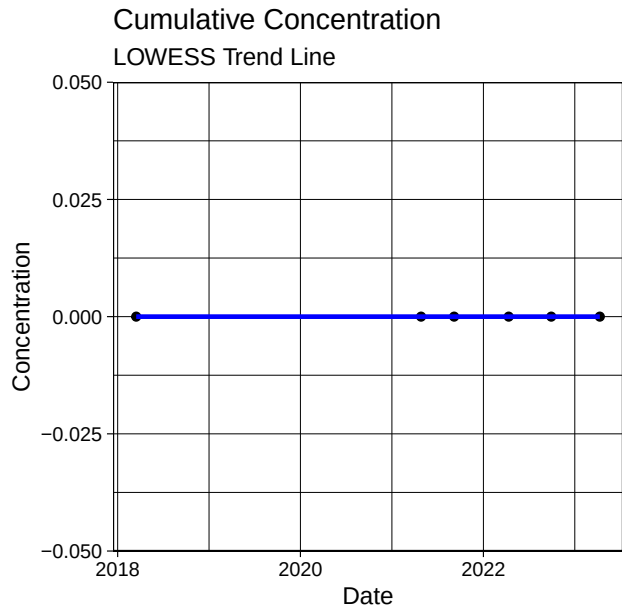
Kendall Trend Test Results Continuous	
n	5
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW134D and Analyte : PFOA



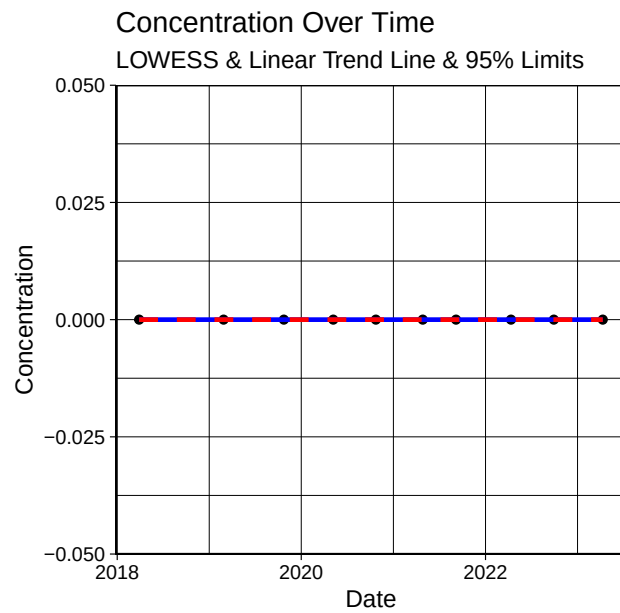
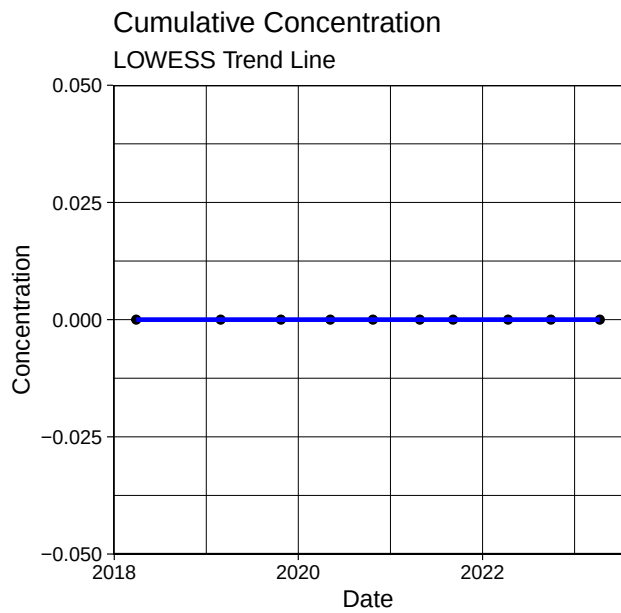
Kendall Trend Test Results Continuous	
n	6
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW135I and Analyte : PFOA



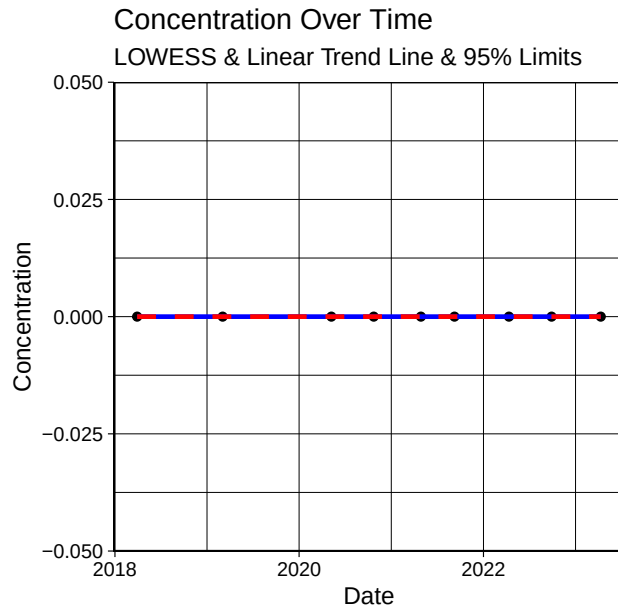
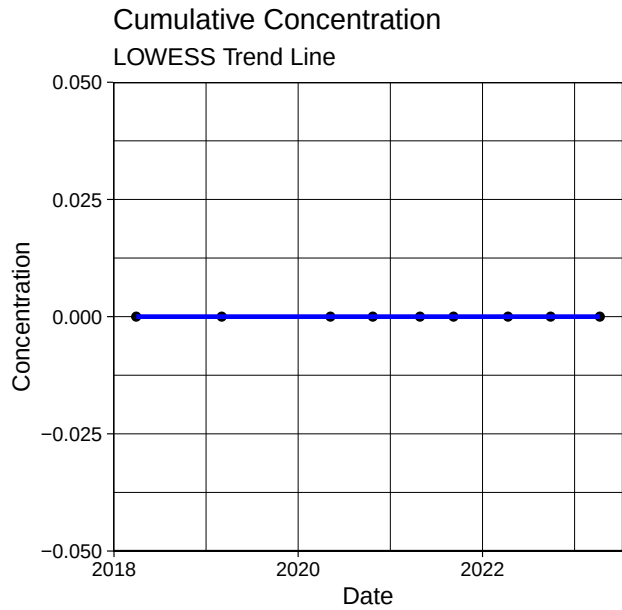
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW136D and Analyte : PFOA



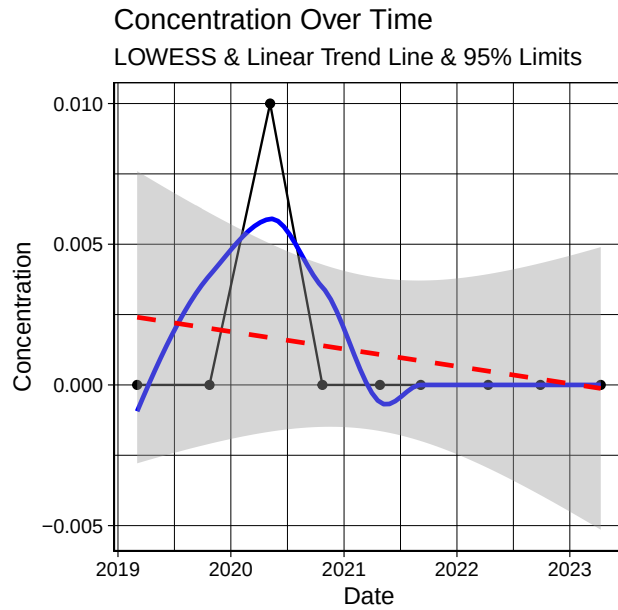
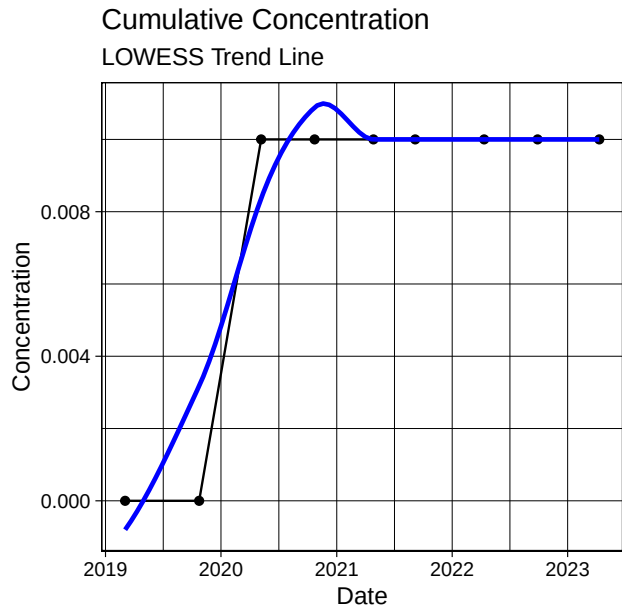
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW137S and Analyte : PFOA



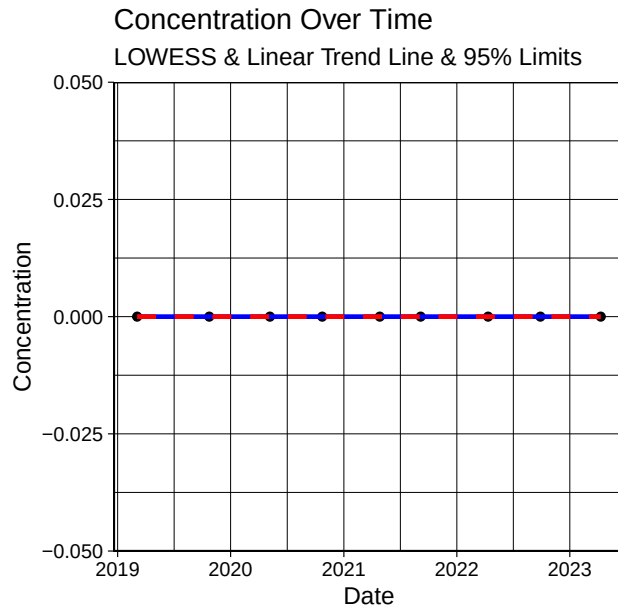
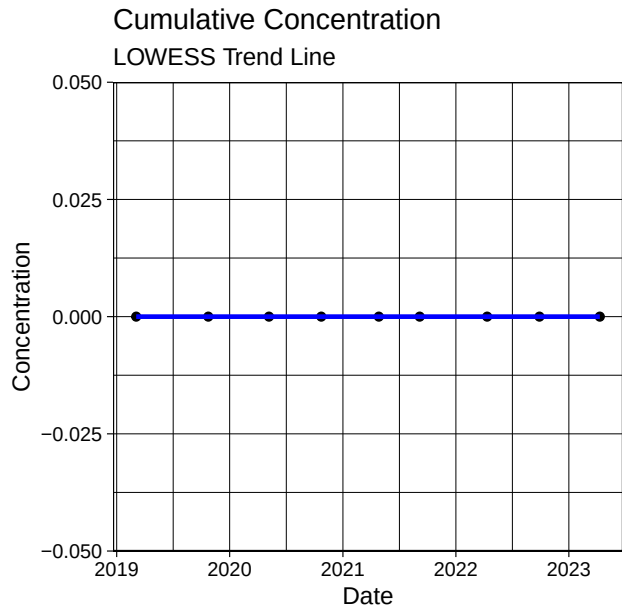
Kendall Trend Test Results Continuous	
n	9
z	-0.58
p	0.56
S	-4
varS	26.67
tau	-0.24
mean	0
sd	0
cov	3
results	NO CLEAR TREND

Report for ID : MW138S and Analyte : PFOA



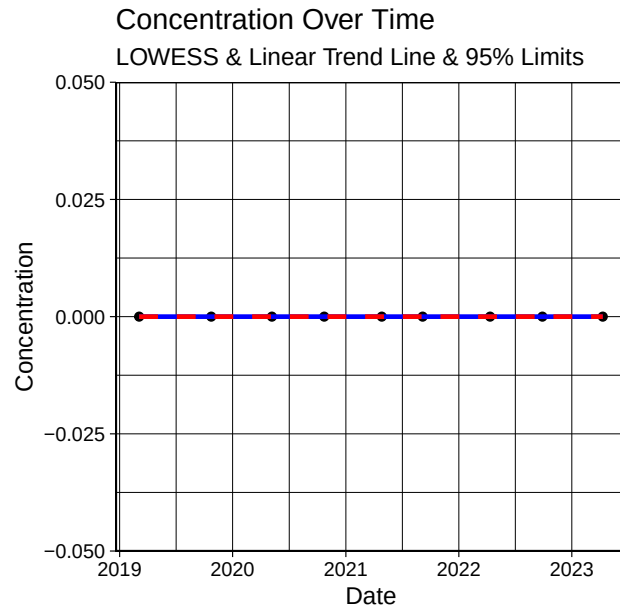
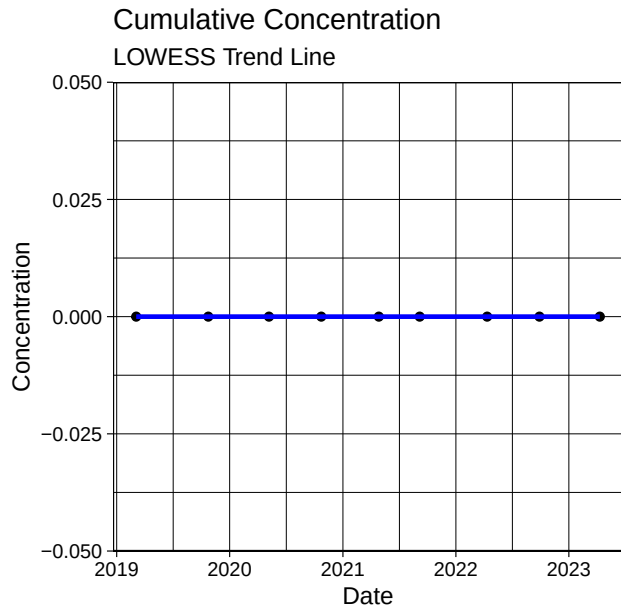
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW139I and Analyte : PFOA



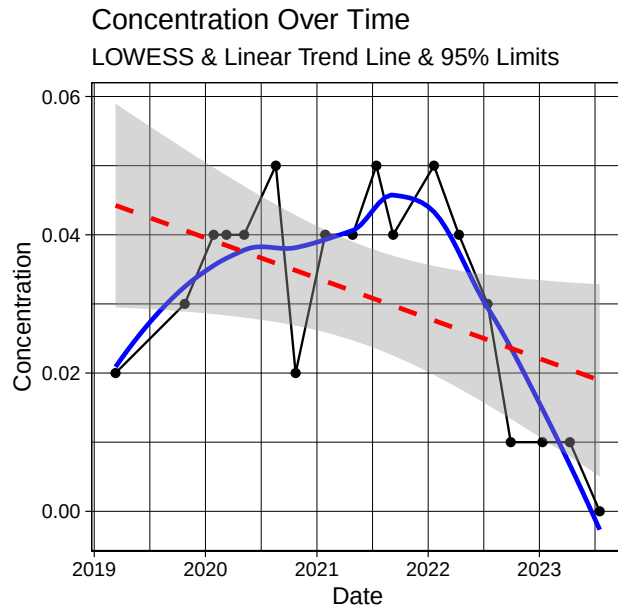
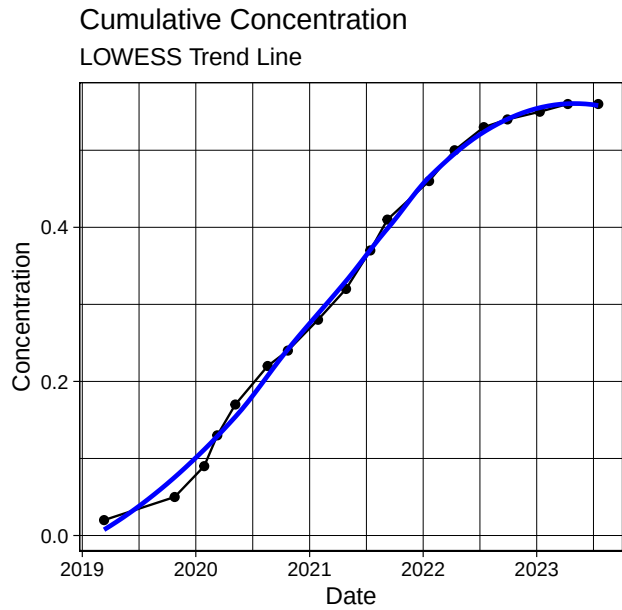
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW140D and Analyte : PFOA



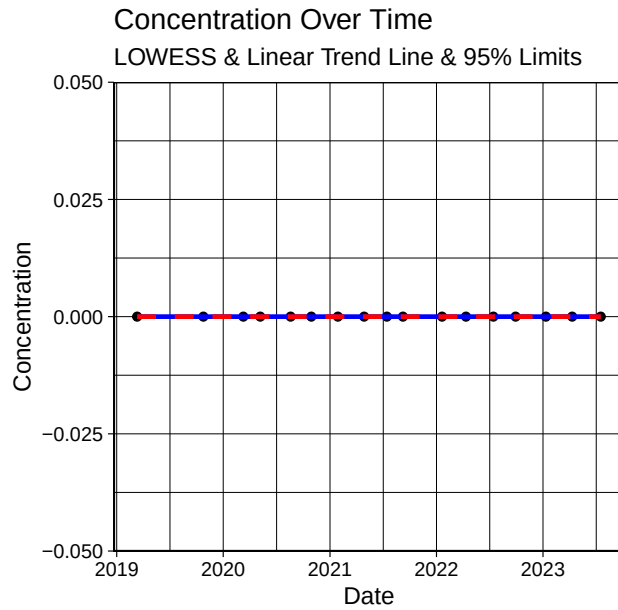
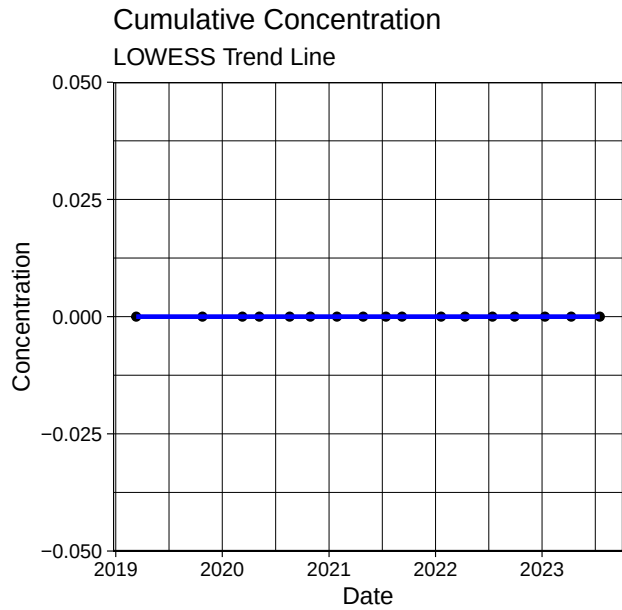
Kendall Trend Test Results Continuous	
n	18
z	-1.46
p	0.14
S	-38
varS	643.33
tau	-0.28
mean	0.03
sd	0.02
cov	0.5
results	STABLE

Report for ID : MW141S and Analyte : PFOA



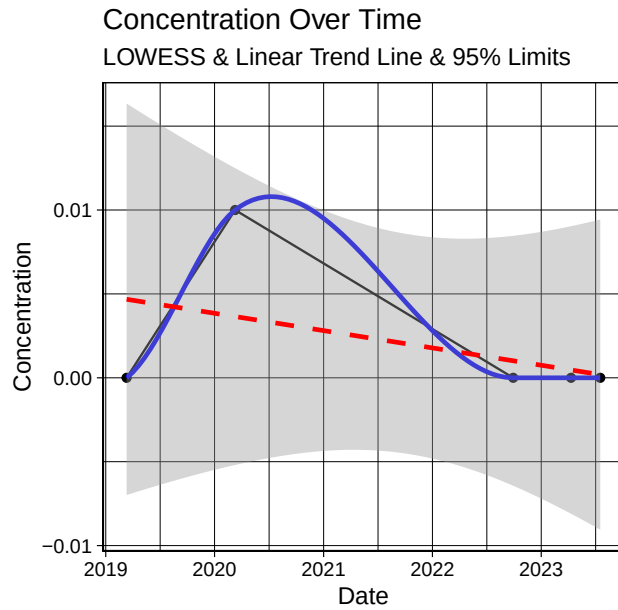
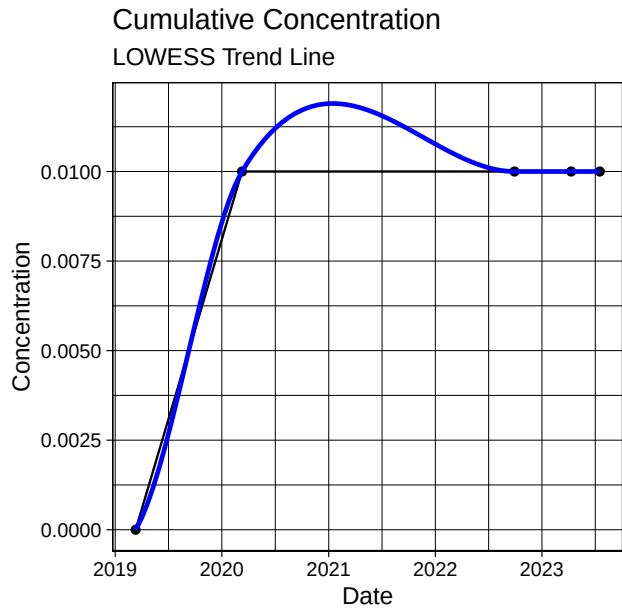
Kendall Trend Test Results Continuous	
n	17
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW142S and Analyte : PFOA



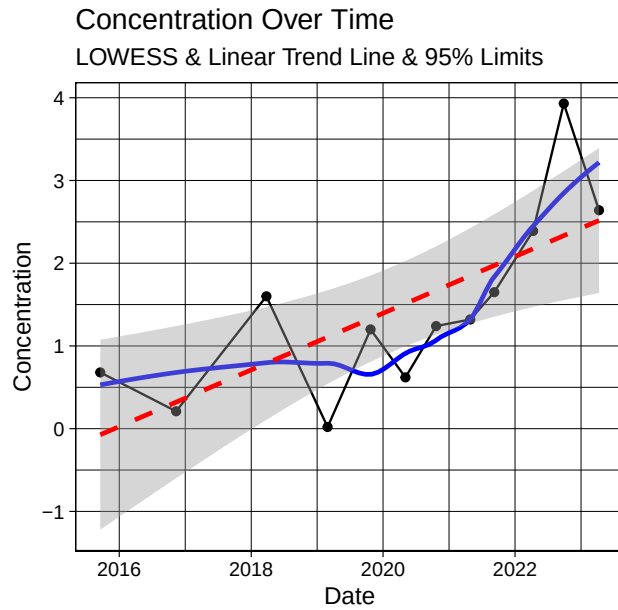
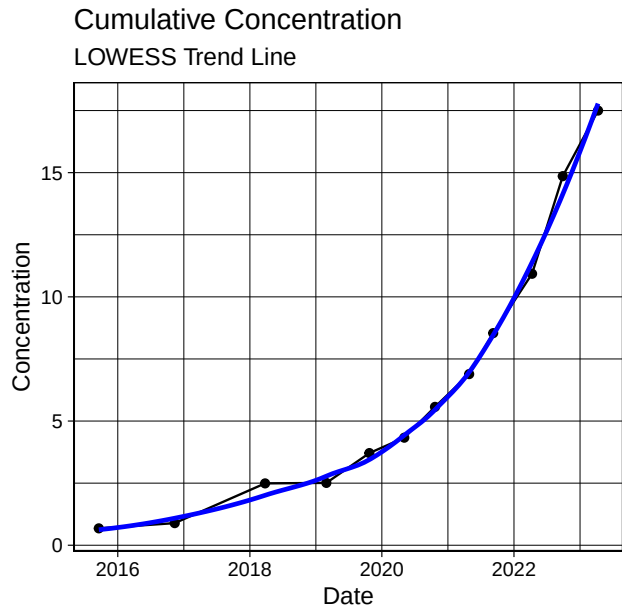
Kendall Trend Test Results Continuous	
n	5
z	-0.35
p	0.72
S	-2
varS	8
tau	-0.32
mean	0
sd	0
cov	2.24
results	NO CLEAR TREND

Report for ID : MW143S and Analyte : PFOA



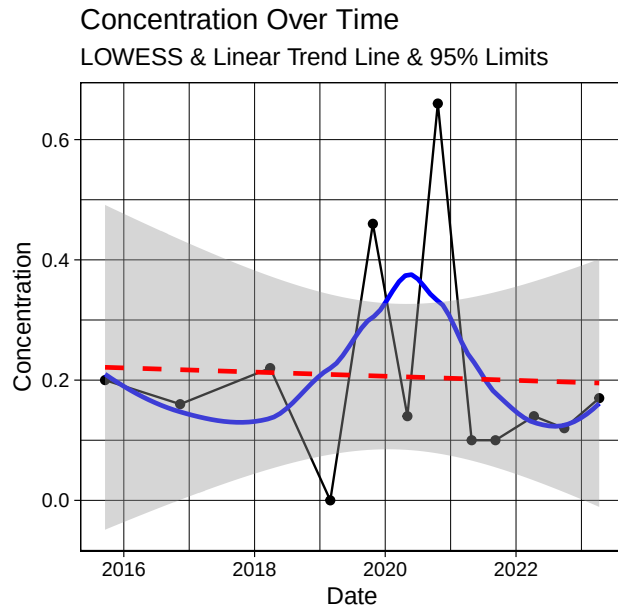
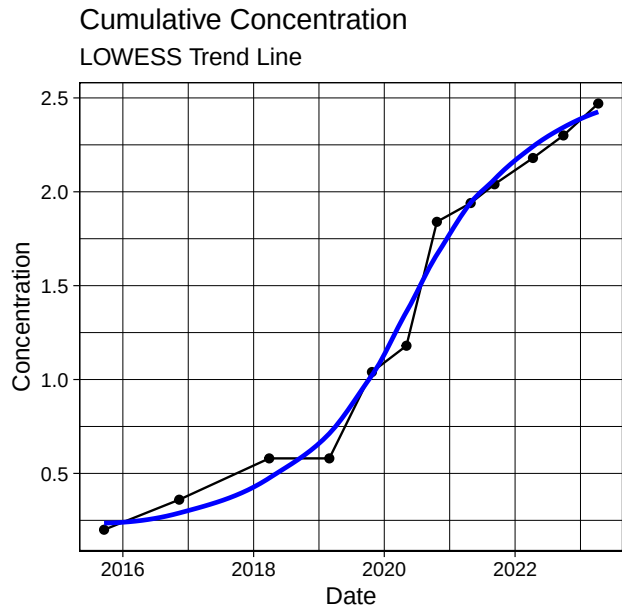
Kendall Trend Test Results Continuous	
n	12
z	2.95
p	0
S	44
varS	212.67
tau	0.67
mean	1.46
sd	1.11
cov	0.76
results	INCREASING

Report for ID : MW301 and Analyte : PFOA



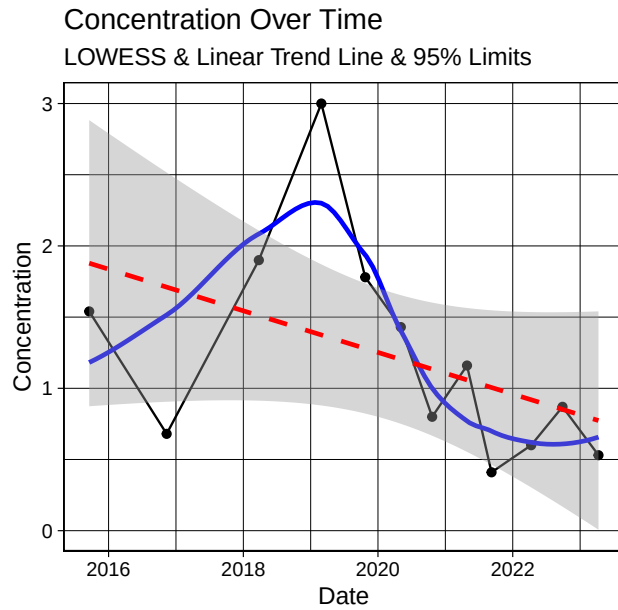
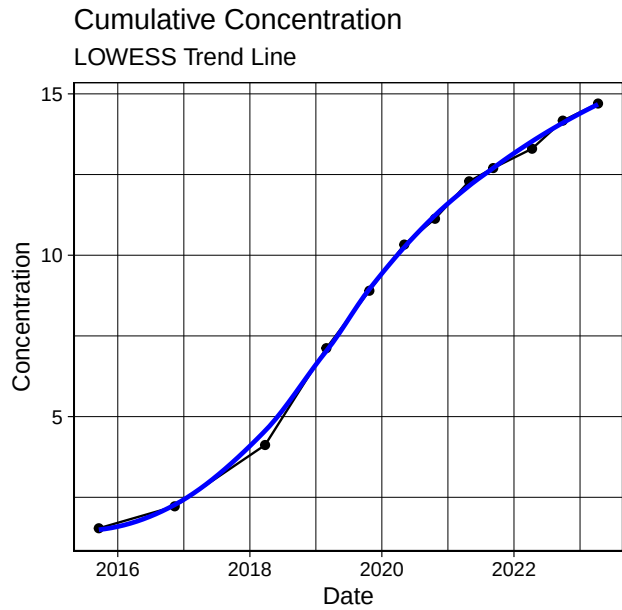
Kendall Trend Test Results Continuous	
n	12
z	-0.48
p	0.63
S	-8
varS	210.67
tau	-0.12
mean	0.21
sd	0.18
cov	0.87
results	STABLE

Report for ID : MW302 and Analyte : PFOA



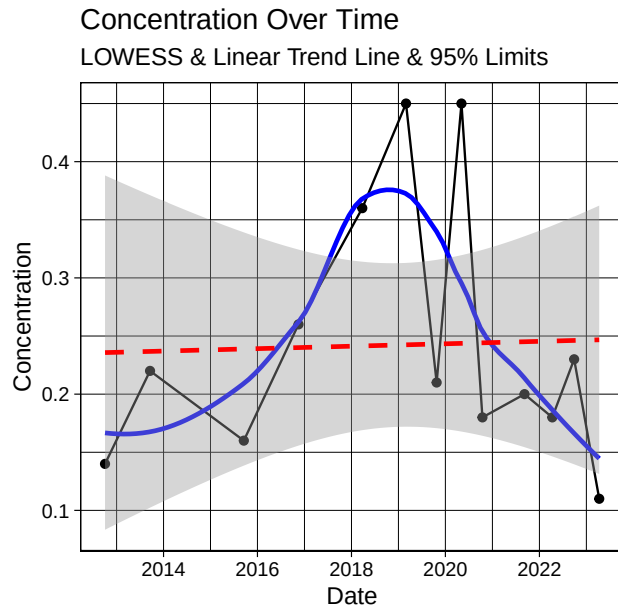
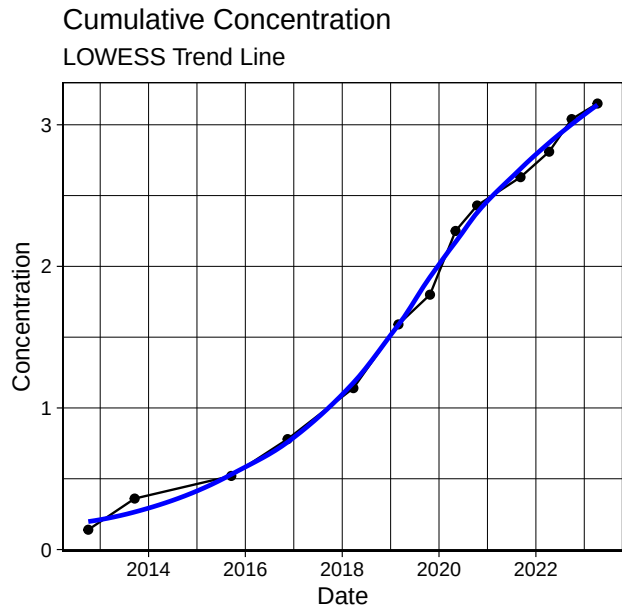
Kendall Trend Test Results Continuous	
n	12
z	-2.13
p	0.03
S	-32
varS	212.67
tau	-0.48
mean	1.23
sd	0.75
cov	0.61
results	DECREASING

Report for ID : MW303 and Analyte : PFOA



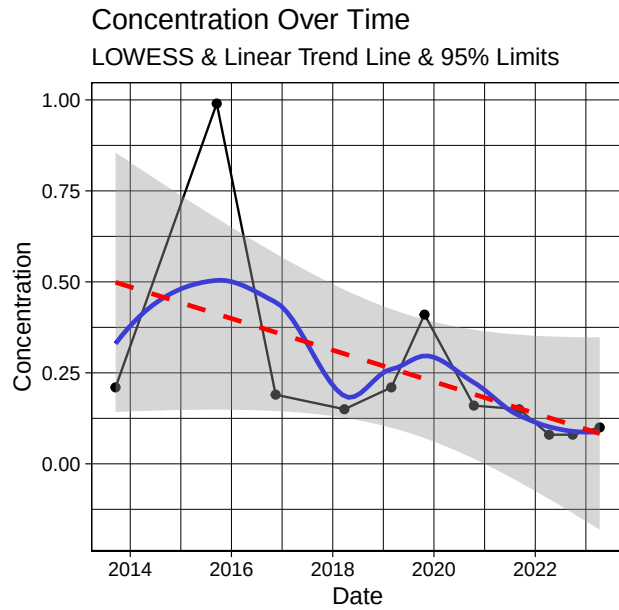
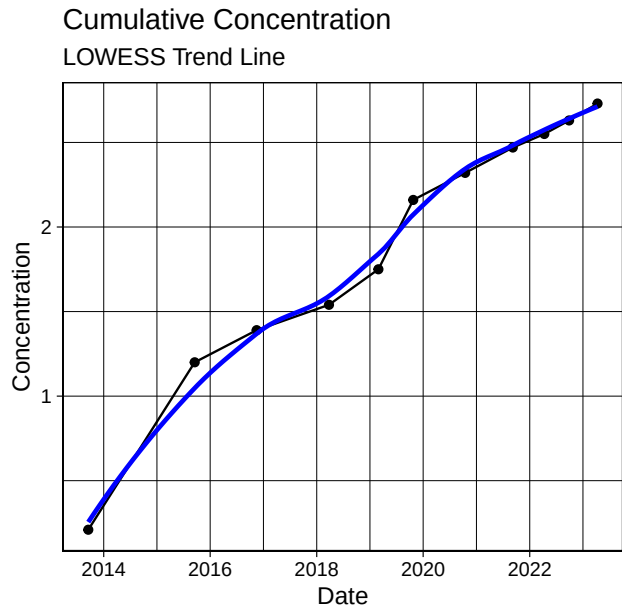
Kendall Trend Test Results Continuous	
n	13
z	-0.18
p	0.85
S	-4
varS	266.67
tau	-0.05
mean	0.24
sd	0.11
cov	0.46
results	STABLE

Report for ID : MW304 and Analyte : PFOA



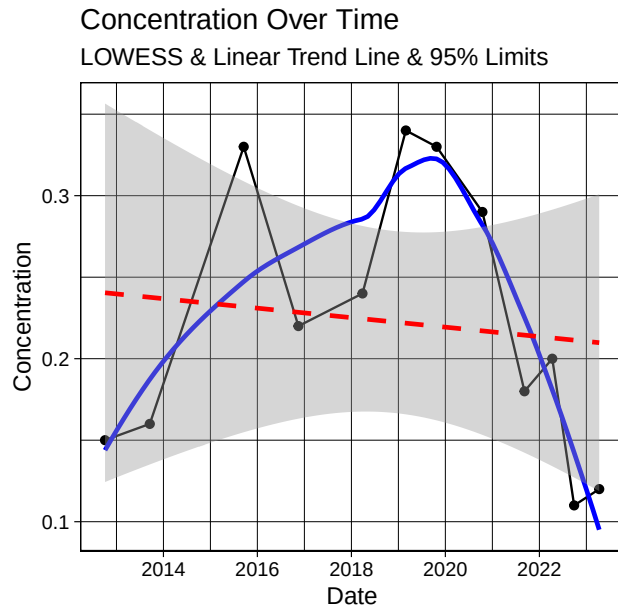
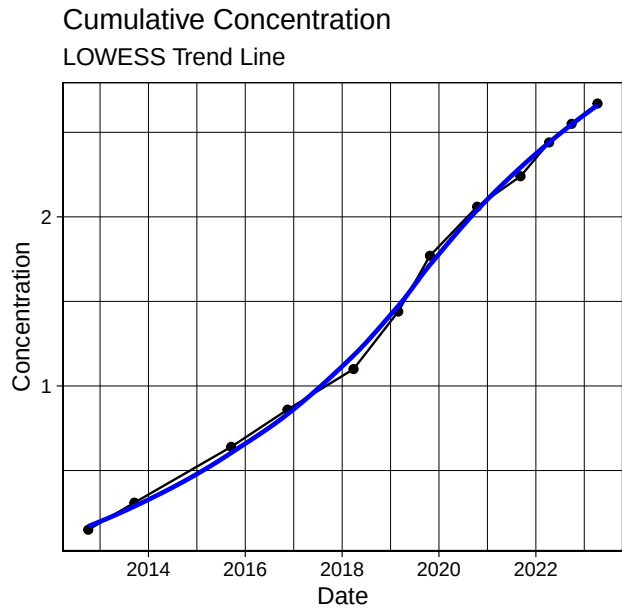
Kendall Trend Test Results Continuous	
n	11
z	-2.44
p	0.01
S	-32
varS	162
tau	-0.6
mean	0.25
sd	0.26
cov	1.06
results	DECREASING

Report for ID : MW305 and Analyte : PFOA



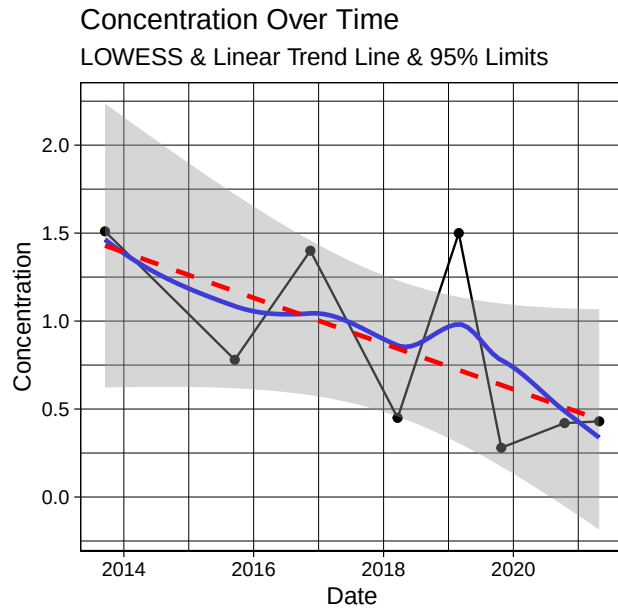
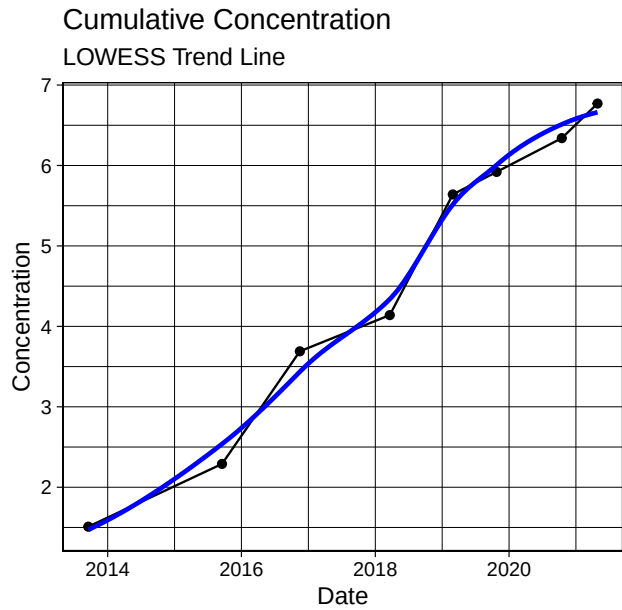
Kendall Trend Test Results Continuous	
n	12
z	-0.69
p	0.49
S	-11
varS	211.67
tau	-0.17
mean	0.22
sd	0.08
cov	0.37
results	STABLE

Report for ID : MW306 and Analyte : PFOA



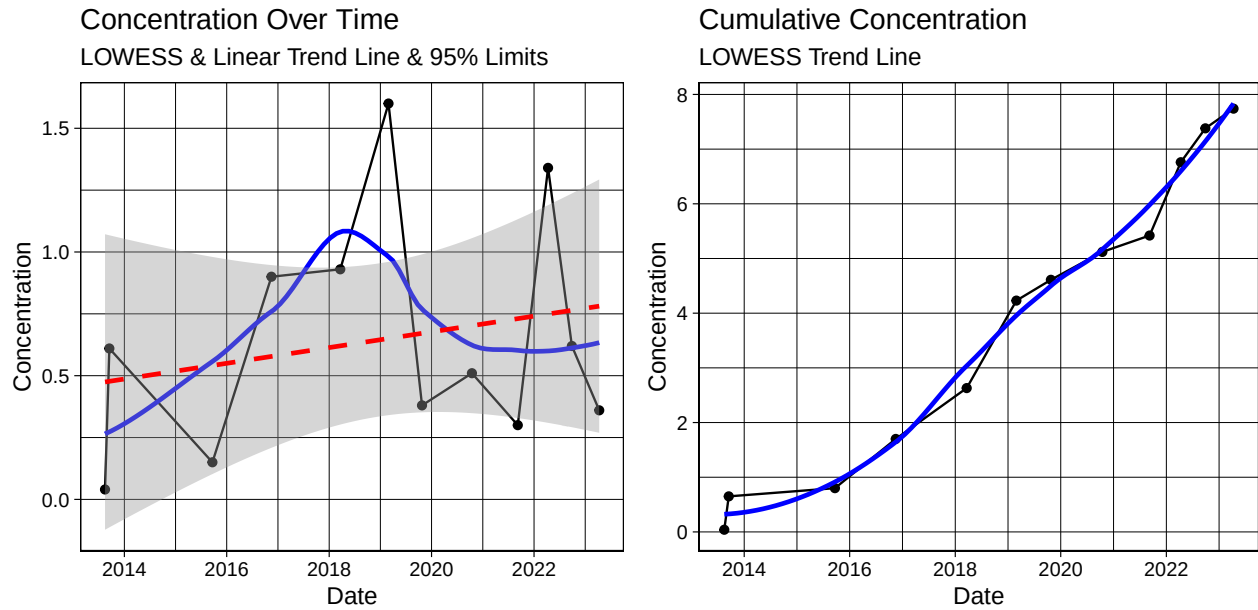
Kendall Trend Test Results Continuous	
n	8
z	-1.61
p	0.11
S	-14
varS	65.33
tau	-0.5
mean	0.85
sd	0.54
cov	0.63
results	STABLE

Report for ID : MW307 and Analyte : PFOA



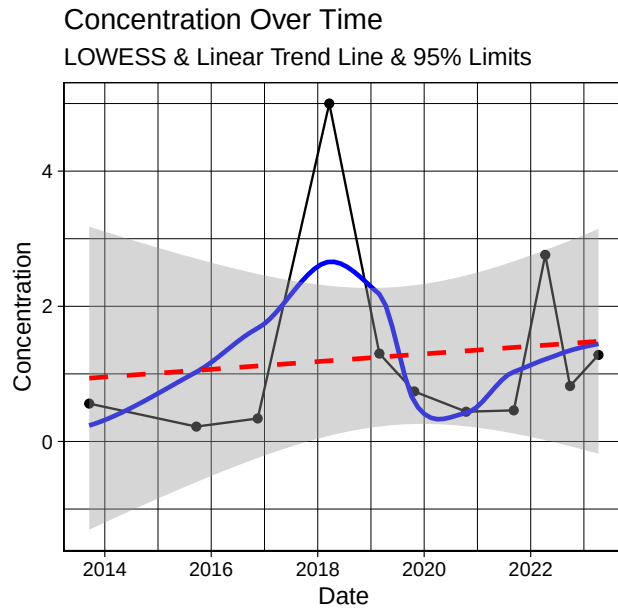
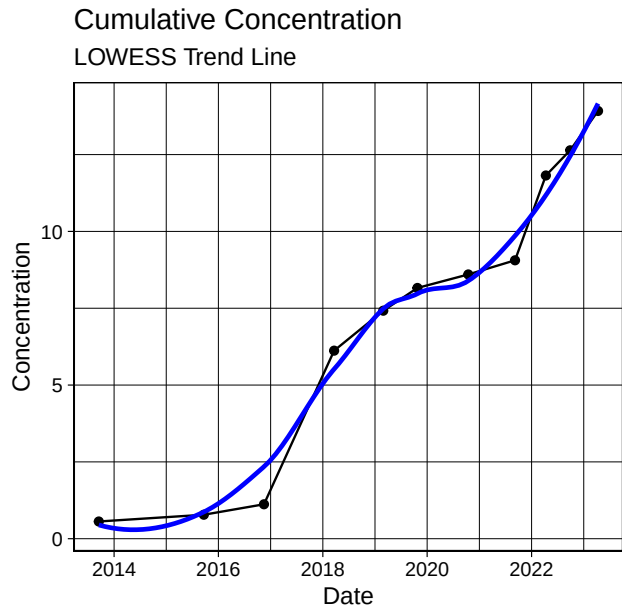
Kendall Trend Test Results Continuous	
n	12
z	0.62
p	0.54
S	10
varS	212.67
tau	0.15
mean	0.64
sd	0.47
cov	0.73
results	NO CLEAR TREND

Report for ID : MW308 and Analyte : PFOA



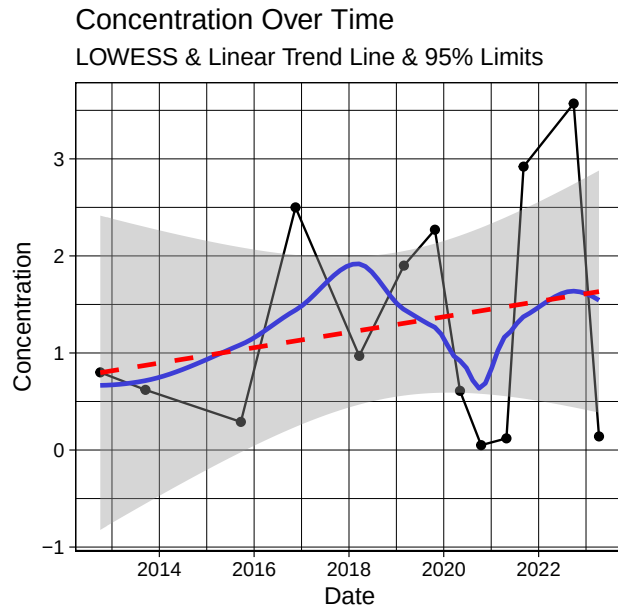
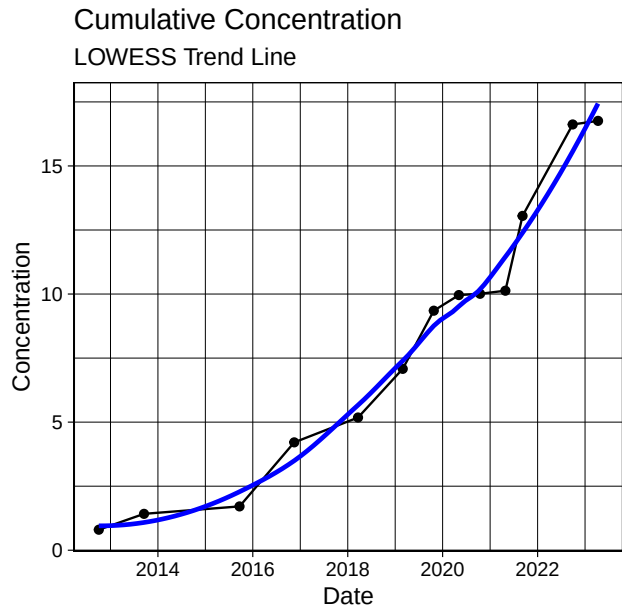
Kendall Trend Test Results Continuous	
n	11
z	1.09
p	0.28
S	15
varS	165
tau	0.27
mean	1.27
sd	1.43
cov	1.13
results	NO CLEAR TREND

Report for ID : MW309 and Analyte : PFOA



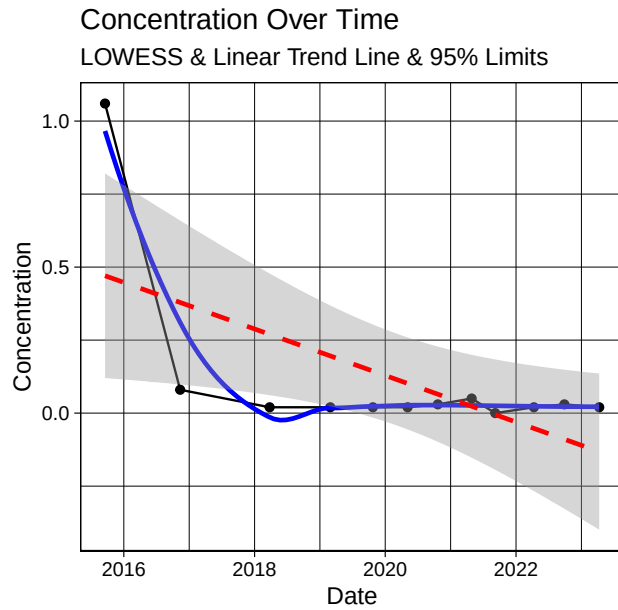
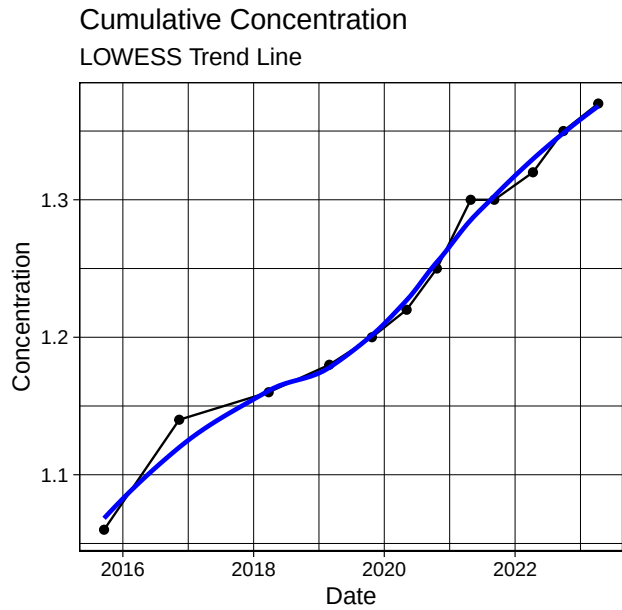
Kendall Trend Test Results Continuous	
n	13
z	0.06
p	0.95
S	2
varS	268.67
tau	0.03
mean	1.29
sd	1.19
cov	0.93
results	NO CLEAR TREND

Report for ID : MW310 and Analyte : PFOA



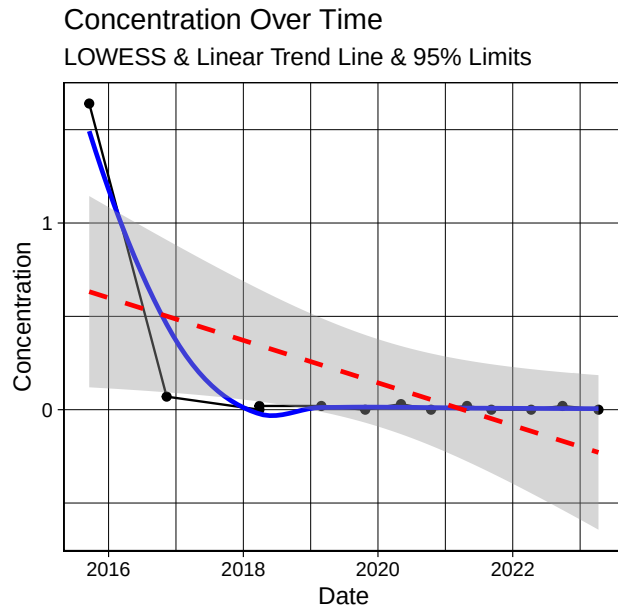
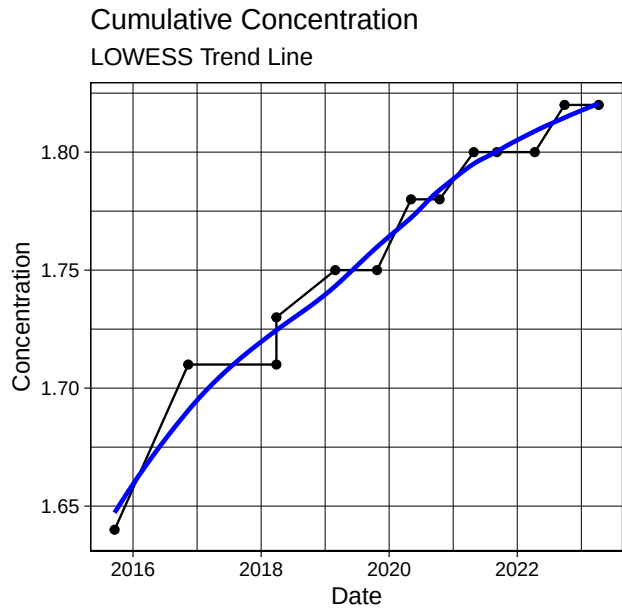
Kendall Trend Test Results Continuous	
n	12
z	-1.11
p	0.27
S	-16
varS	183.33
tau	-0.28
mean	0.11
sd	0.3
cov	2.61
results	NO CLEAR TREND

Report for ID : MW312 and Analyte : PFOA



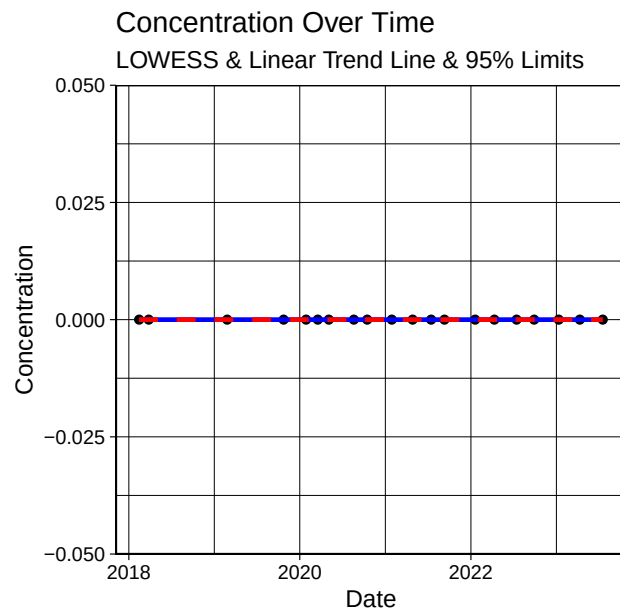
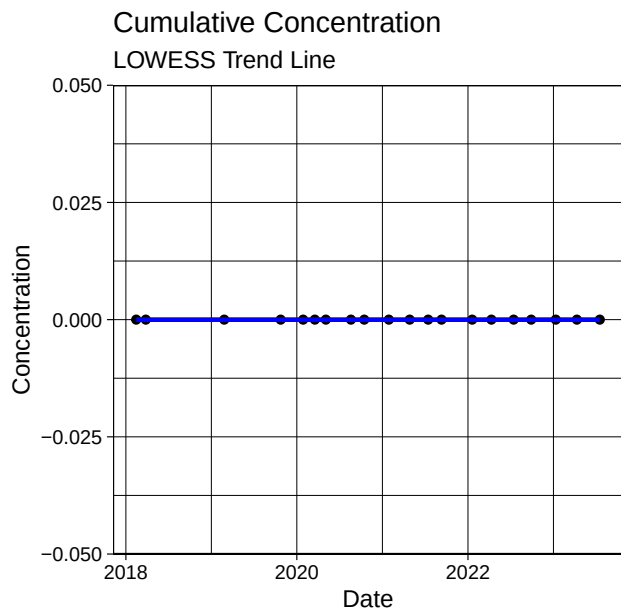
Kendall Trend Test Results Continuous	
n	13
z	-1.84
p	0.07
S	-29
varS	231.67
tau	-0.43
mean	0.14
sd	0.45
cov	3.22
results	POSSIBLY DECREASING

Report for ID : MW313 and Analyte : PFOA



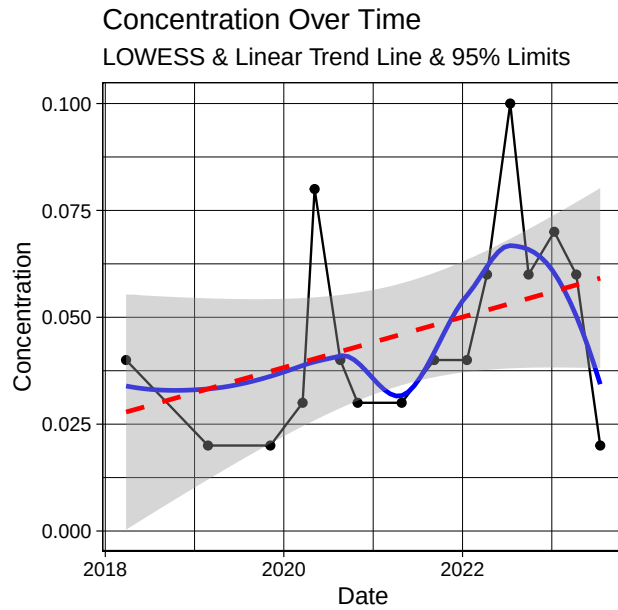
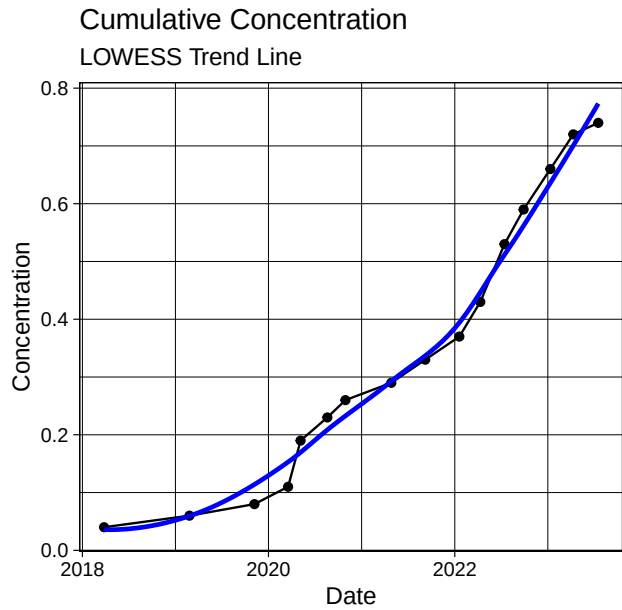
Kendall Trend Test Results Continuous	
n	20
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW401 and Analyte : PFOA



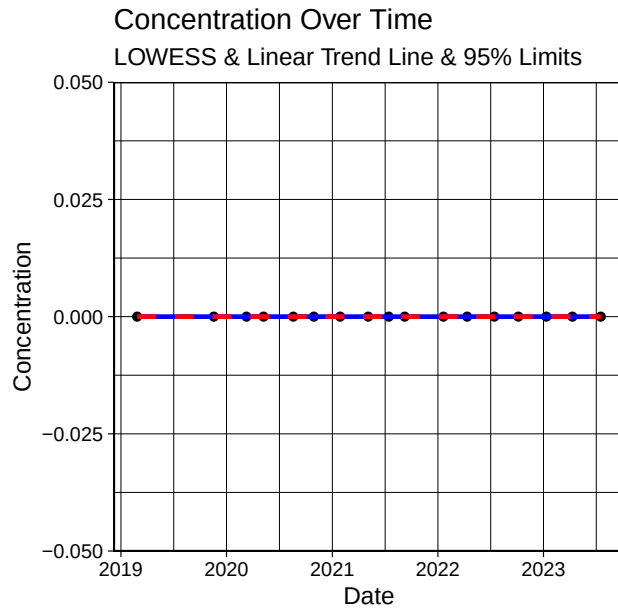
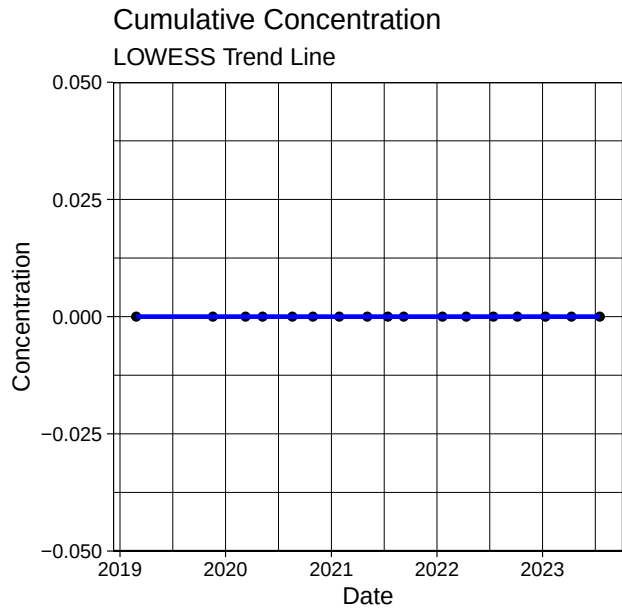
Kendall Trend Test Results Continuous	
n	16
z	1.75
p	0.08
S	39
varS	473.67
tau	0.35
mean	0.05
sd	0.02
cov	0.5
results	POSSIBLY INCREASING

Report for ID : MW402 and Analyte : PFOA



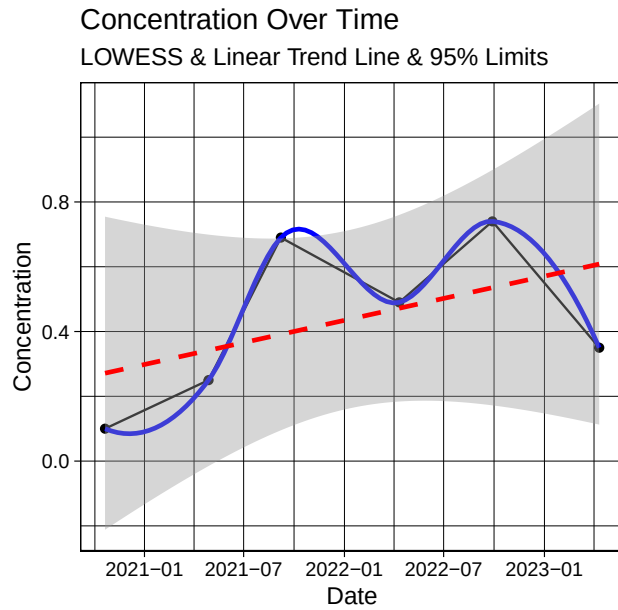
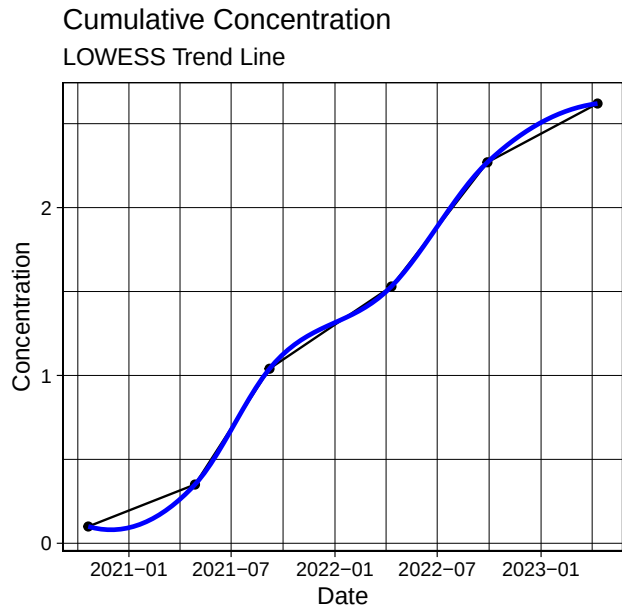
Kendall Trend Test Results Continuous	
n	17
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW403 and Analyte : PFOA



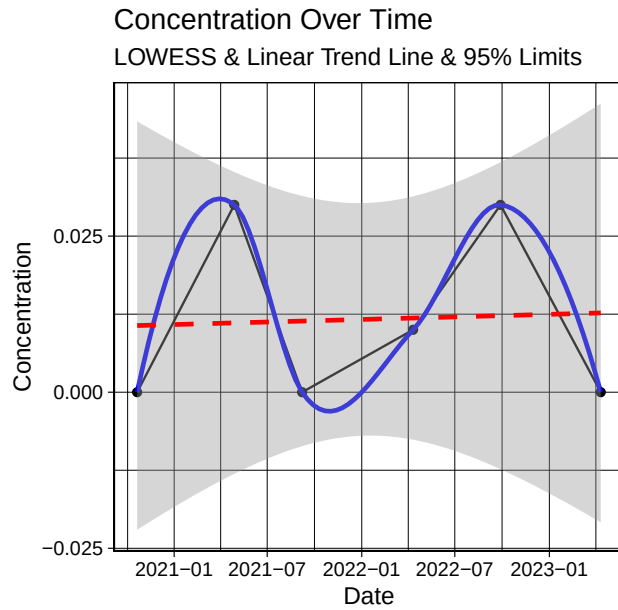
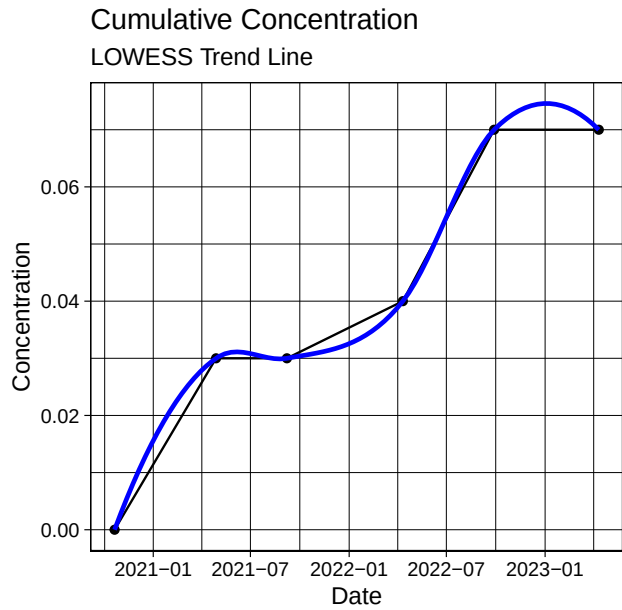
Kendall Trend Test Results Continuous	
n	6
z	1.13
p	0.26
S	7
varS	28.33
tau	0.47
mean	0.44
sd	0.25
cov	0.57
results	NO CLEAR TREND

Report for ID : MW504 and Analyte : PFOA



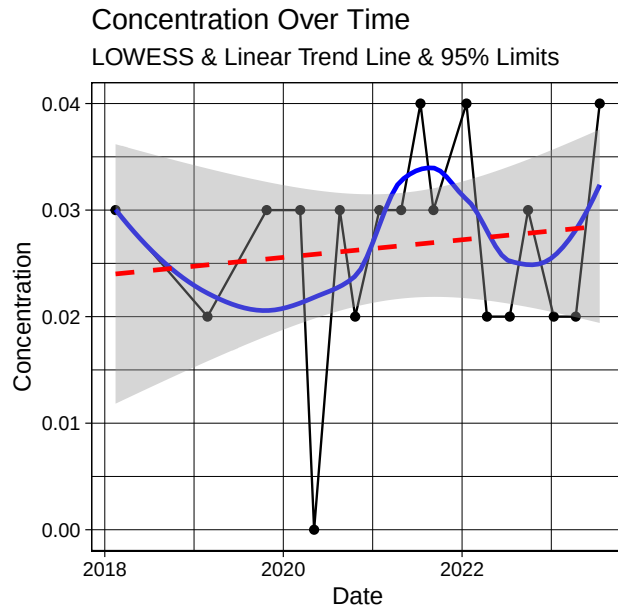
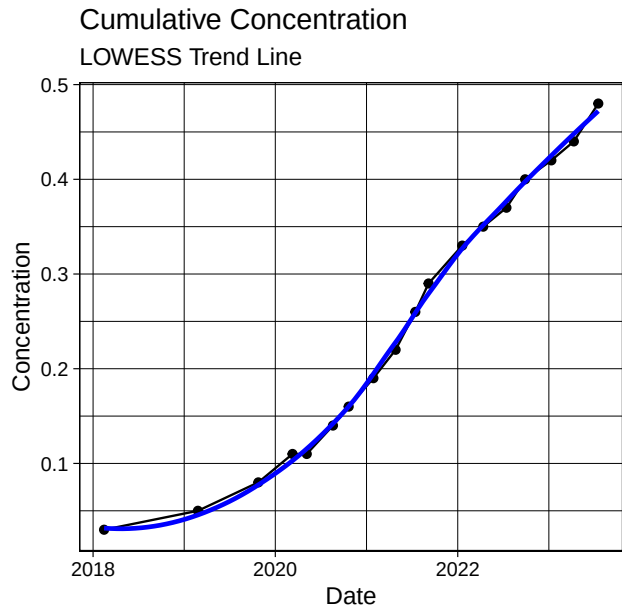
Kendall Trend Test Results Continuous	
n	6
z	0
p	1
S	1
varS	23.67
tau	0.08
mean	0.01
sd	0.01
cov	1.26
results	NO CLEAR TREND

Report for ID : MW505 and Analyte : PFOA



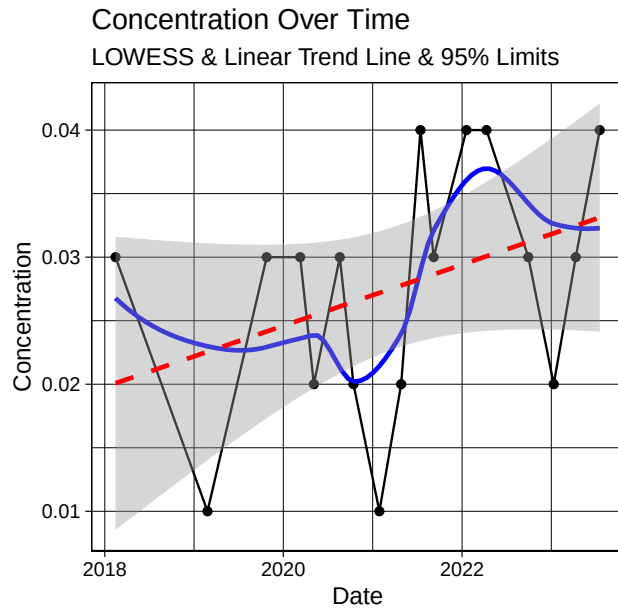
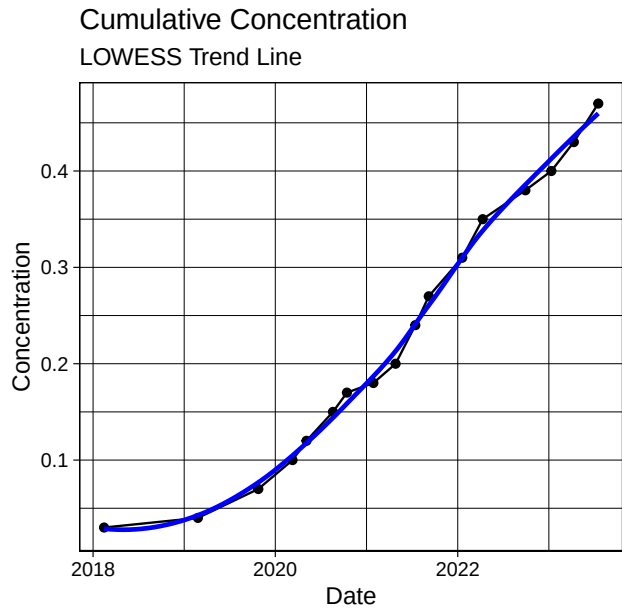
Kendall Trend Test Results Continuous	
n	18
z	0.25
p	0.81
S	7
varS	599.67
tau	0.05
mean	0.03
sd	0.01
cov	0.36
results	NO CLEAR TREND

Report for ID : POT102 and Analyte : PFOA



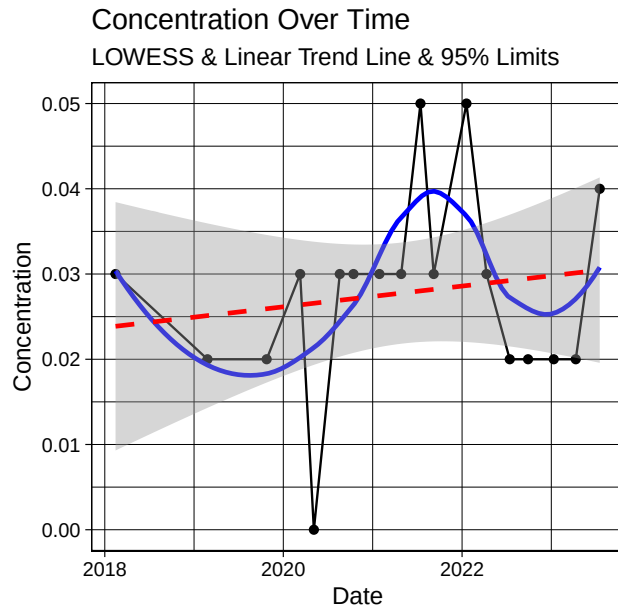
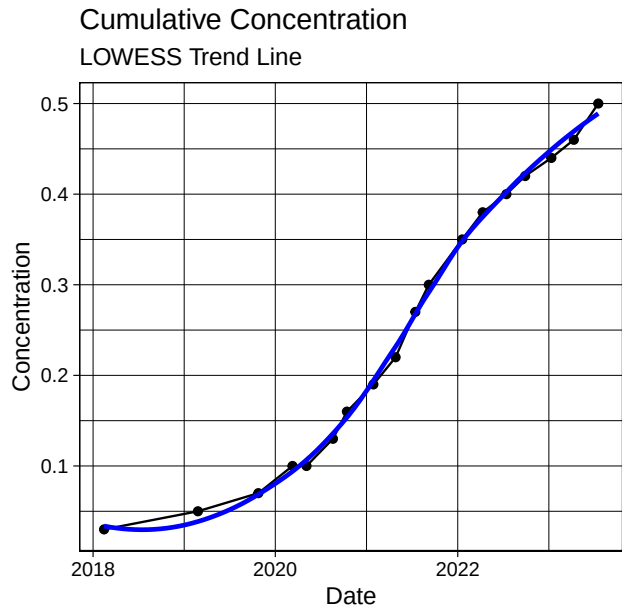
Kendall Trend Test Results Continuous	
n	17
z	1.44
p	0.15
S	34
varS	526.67
tau	0.29
mean	0.03
sd	0.01
cov	0.35
results	NO CLEAR TREND

Report for ID : POT103 and Analyte : PFOA



Kendall Trend Test Results Continuous	
n	18
z	0.24
p	0.81
S	7
varS	602.33
tau	0.05
mean	0.03
sd	0.01
cov	0.42
results	NO CLEAR TREND

Report for ID : POT104 and Analyte : PFOA



Trend Report

Report Date & Time: 2024-08-01 06:23:42

Data File Name: PFOS+PFHxS_MKA_240801.csv

Report Title: Groundwater PFOS+PFHxS Trend Data

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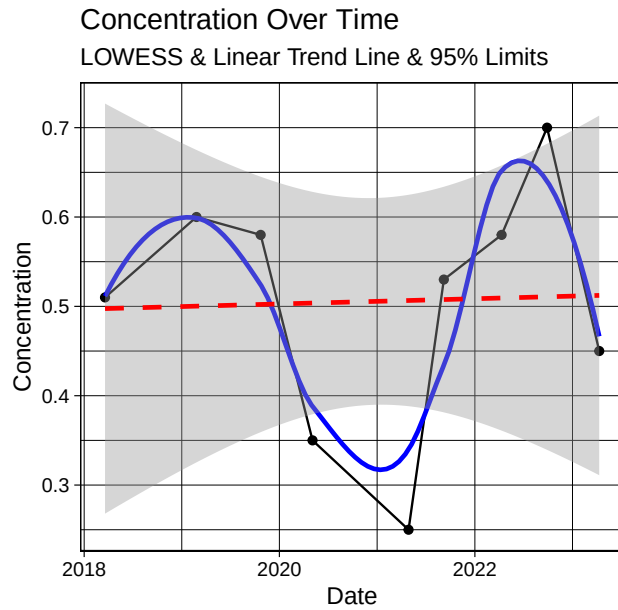
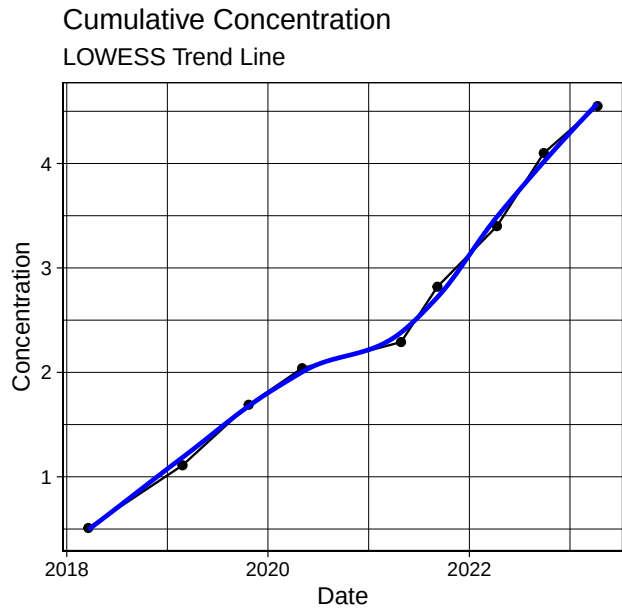
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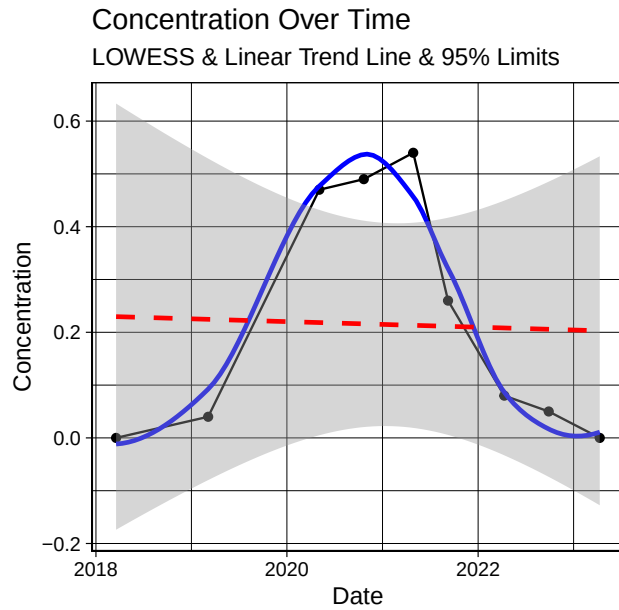
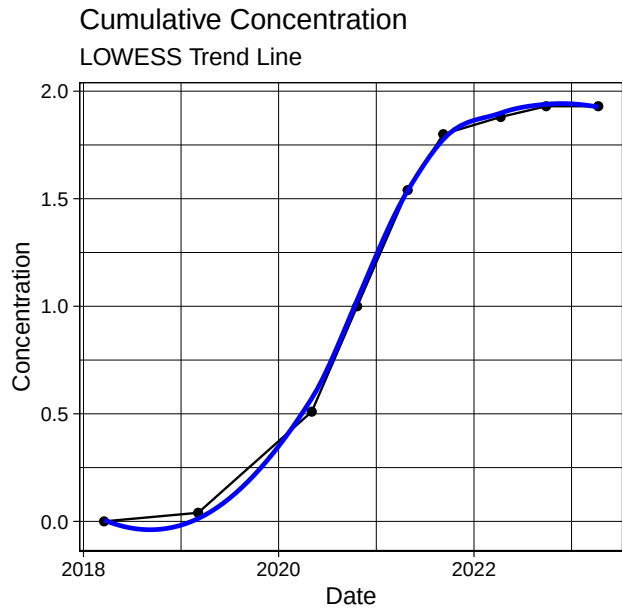
Kendall Trend Test Results Continuous	
n	9
z	0
p	1
S	1
varS	91
tau	0.03
mean	0.51
sd	0.14
cov	0.27
results	NO CLEAR TREND

Report for ID : MW101I and Analyte : PFOS+PFHxS



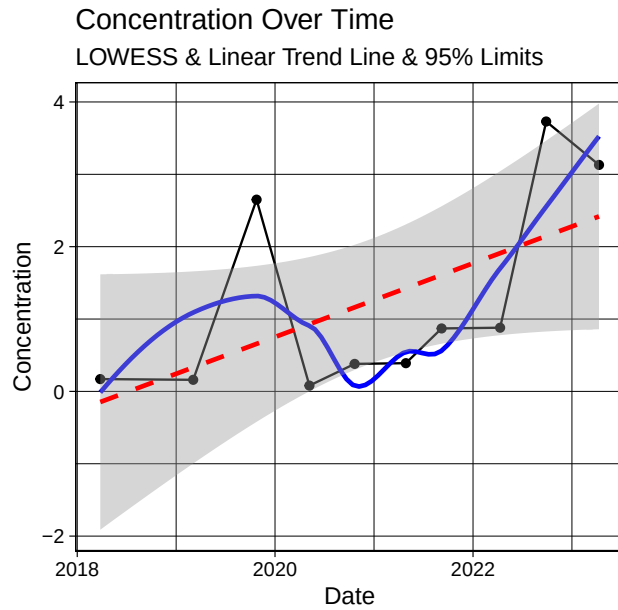
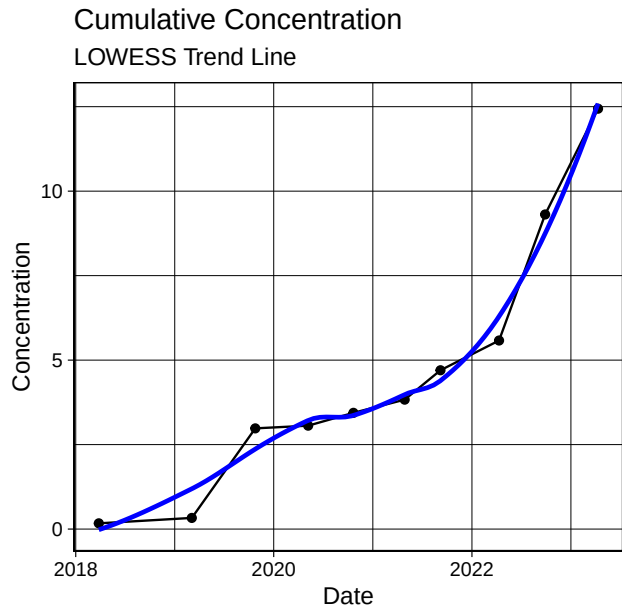
Kendall Trend Test Results Continuous	
n	9
z	-0.21
p	0.83
S	-3
varS	91
tau	-0.08
mean	0.21
sd	0.23
cov	1.06
results	NO CLEAR TREND

Report for ID : MW102D and Analyte : PFOS+PFHxS



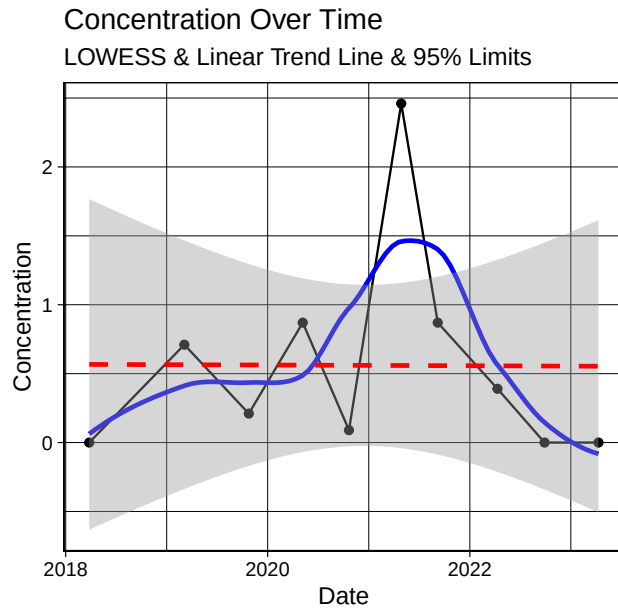
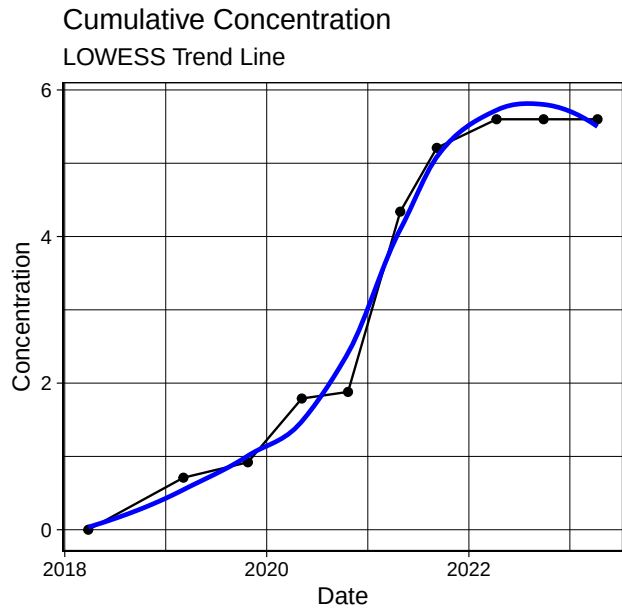
Kendall Trend Test Results Continuous	
n	10
z	2.33
p	0.02
S	27
varS	125
tau	0.6
mean	1.24
sd	1.38
cov	1.11
results	INCREASING

Report for ID : MW104I and Analyte : PFOS+PFHxS



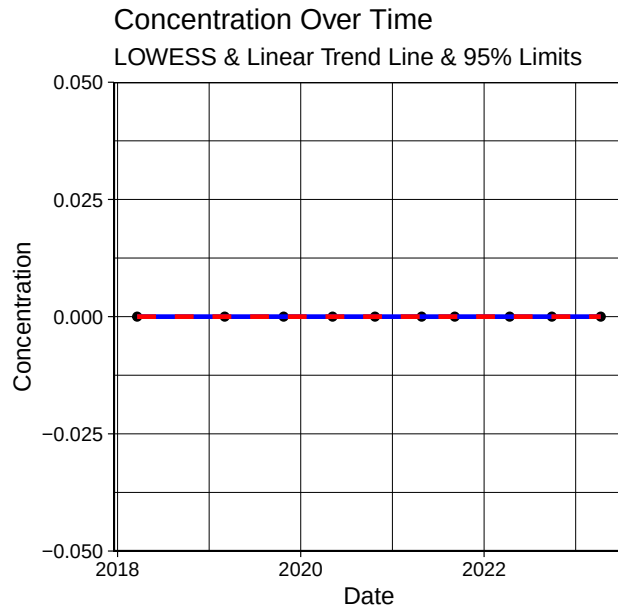
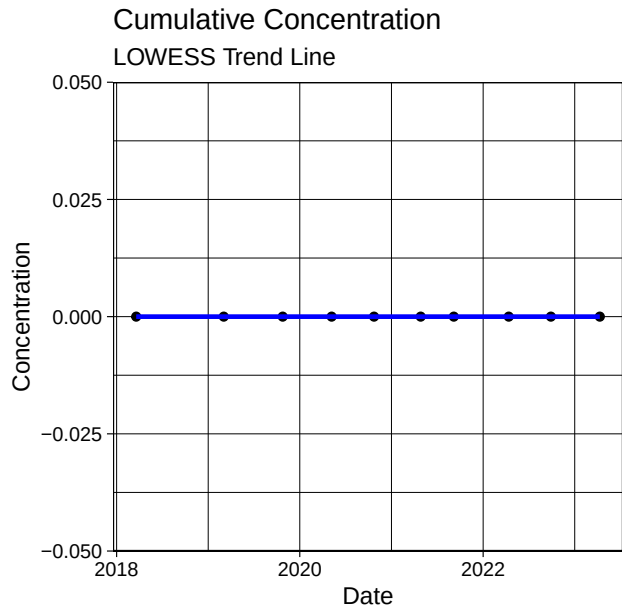
Kendall Trend Test Results Continuous	
n	10
z	-0.36
p	0.72
S	-5
varS	120.33
tau	-0.12
mean	0.56
sd	0.76
cov	1.35
results	NO CLEAR TREND

Report for ID : MW105D and Analyte : PFOS+PFHxS



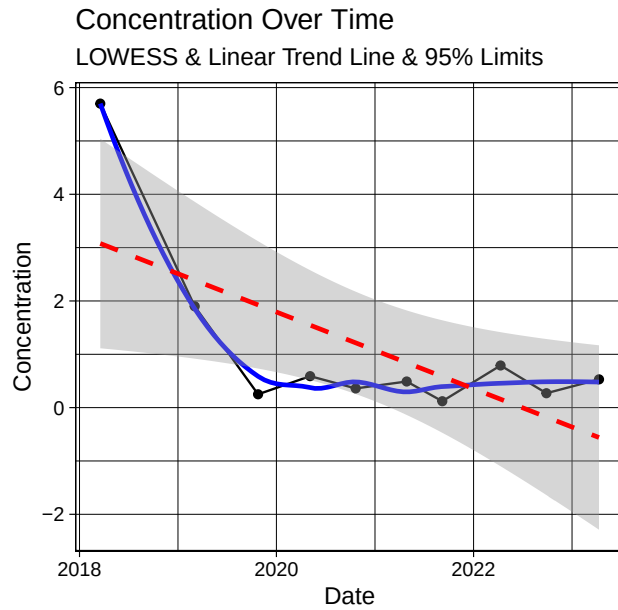
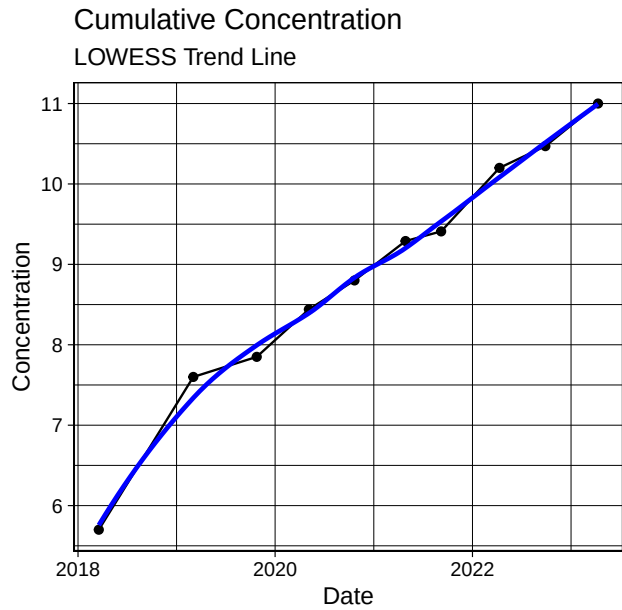
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW106S and Analyte : PFOS+PFHxS



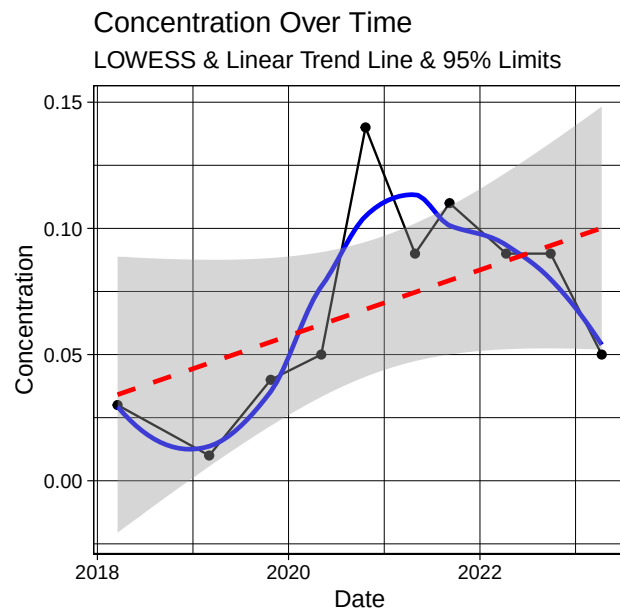
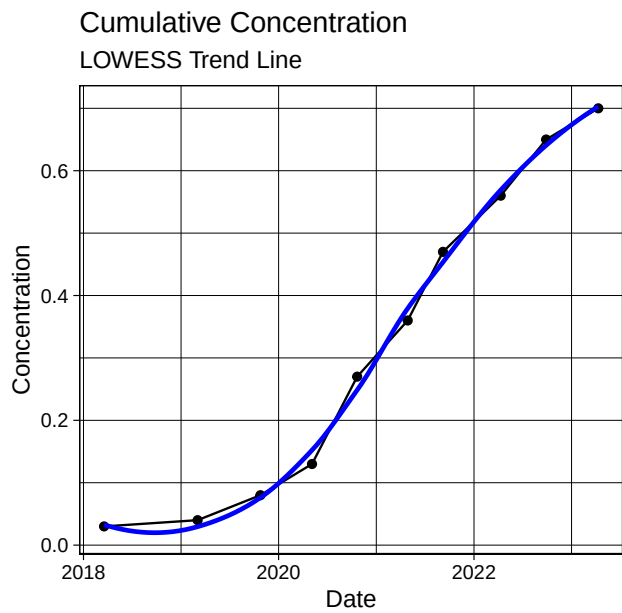
Kendall Trend Test Results Continuous	
n	10
z	-1.07
p	0.28
S	-13
varS	125
tau	-0.29
mean	1.1
sd	1.69
cov	1.54
results	NO CLEAR TREND

Report for ID : MW109S and Analyte : PFOS+PFHxS



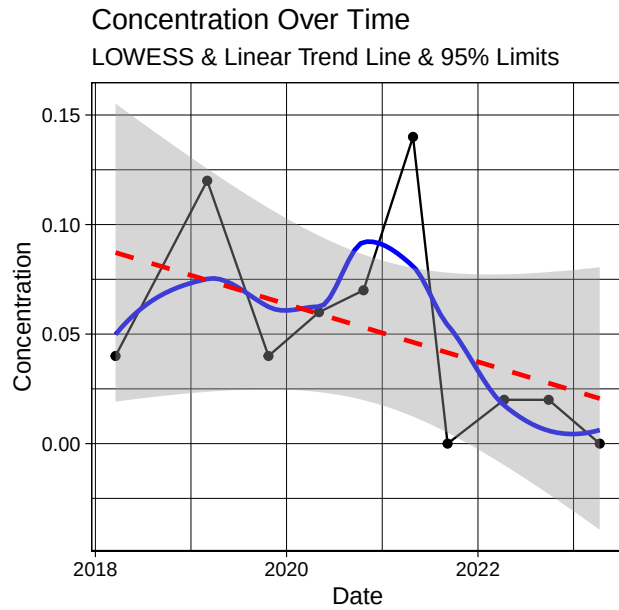
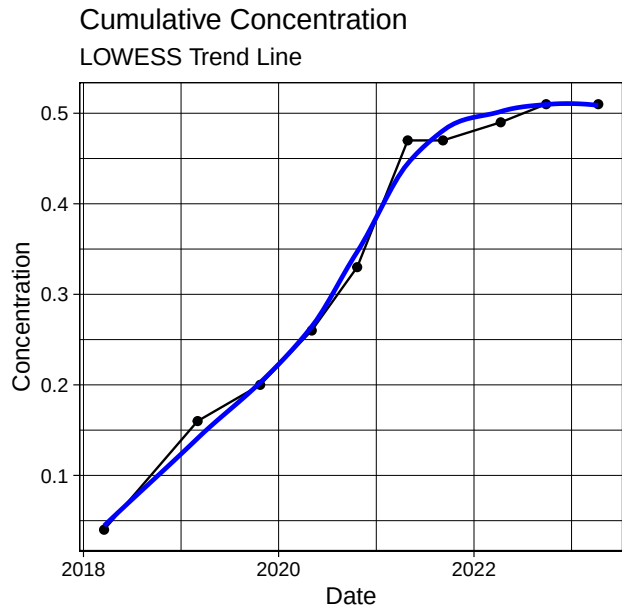
Kendall Trend Test Results Continuous	
n	10
z	1.46
p	0.14
S	17
varS	120.33
tau	0.4
mean	0.07
sd	0.04
cov	0.58
results	NO CLEAR TREND

Report for ID : MW110S and Analyte : PFOS+PFHxS



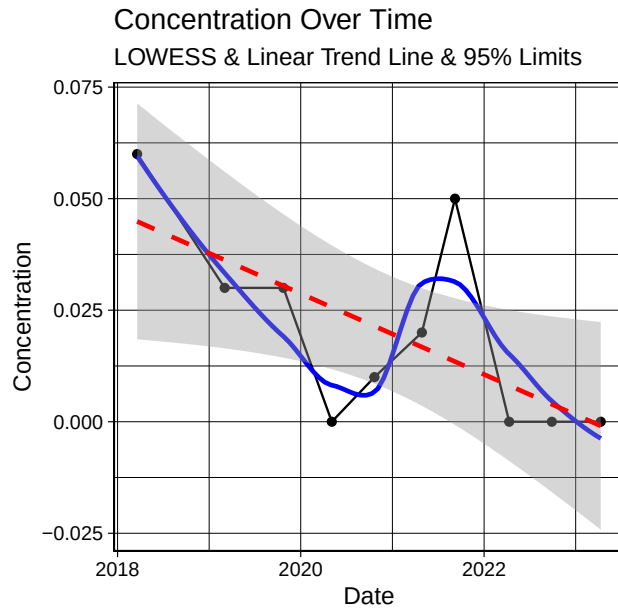
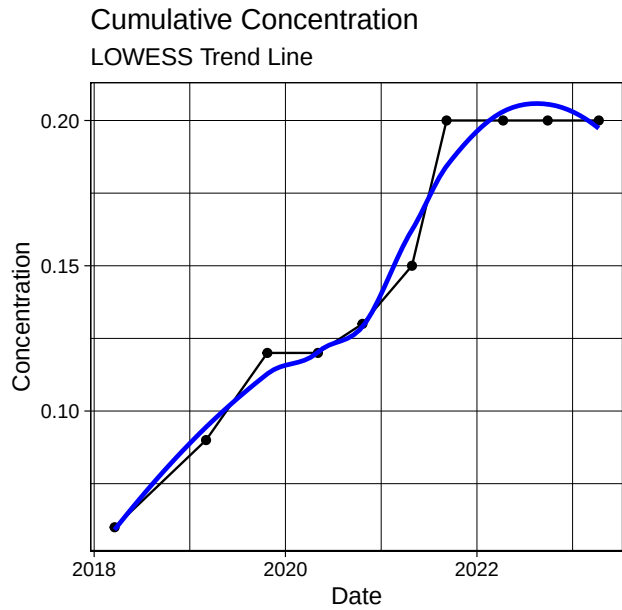
Kendall Trend Test Results Continuous	
n	10
z	-1.36
p	0.17
S	-16
varS	122
tau	-0.37
mean	0.05
sd	0.05
cov	0.94
results	STABLE

Report for ID : MW112S and Analyte : PFOS+PFHxS



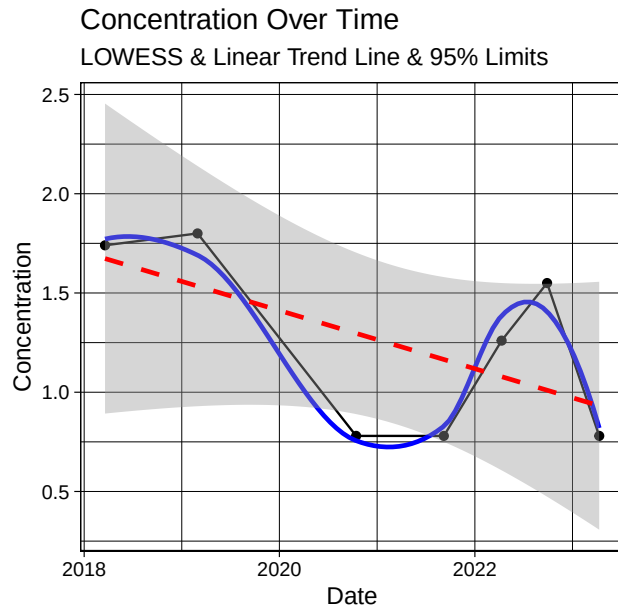
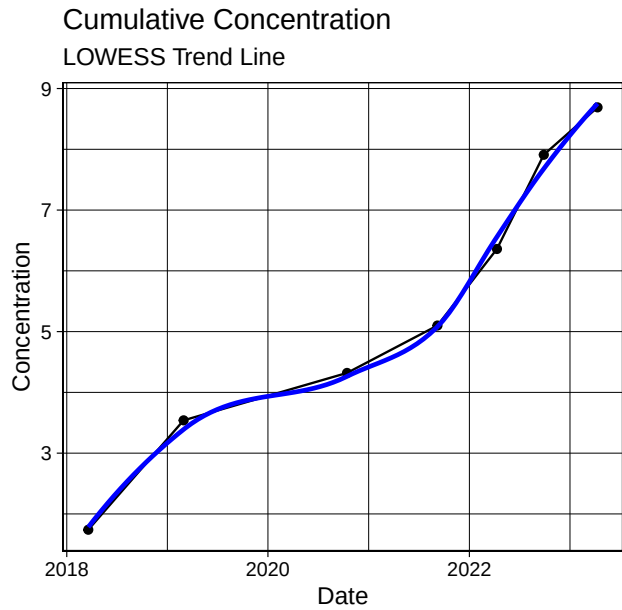
Kendall Trend Test Results Continuous	
n	10
z	-1.96
p	0.05
S	-22
varS	115.33
tau	-0.53
mean	0.02
sd	0.02
cov	1.11
results	POSSIBLY DECREASING

Report for ID : MW113S and Analyte : PFOS+PFHxS



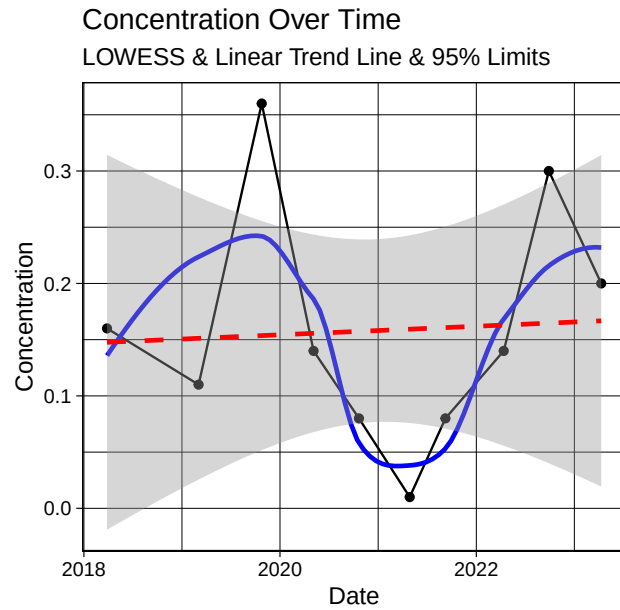
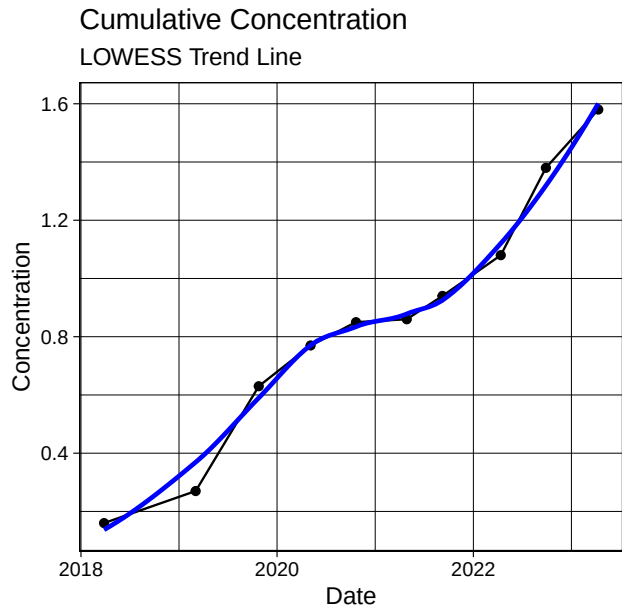
Kendall Trend Test Results Continuous	
n	7
z	-0.78
p	0.43
S	-6
varS	40.67
tau	-0.31
mean	1.24
sd	0.46
cov	0.37
results	STABLE

Report for ID : MW114S and Analyte : PFOS+PFHxS



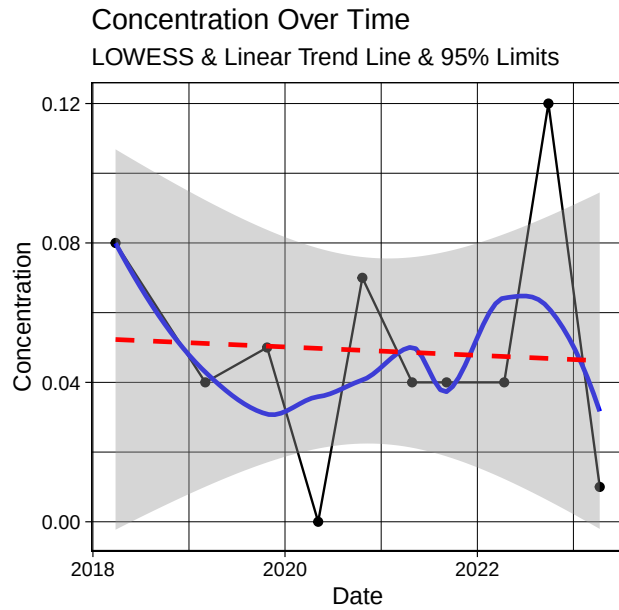
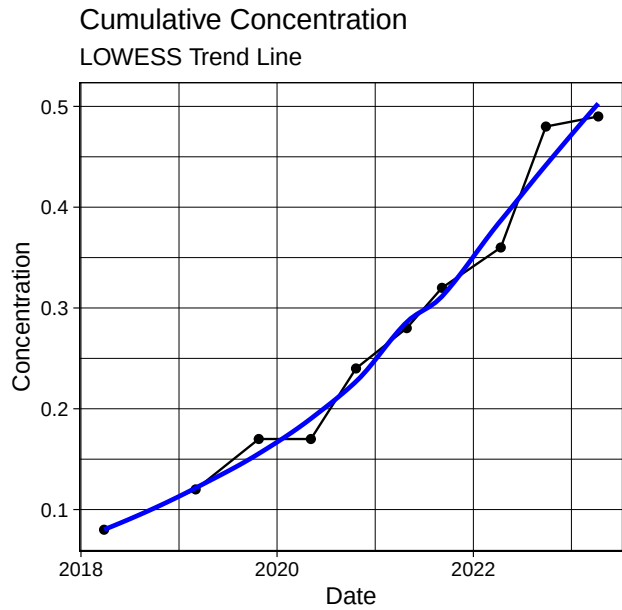
Kendall Trend Test Results Continuous	
n	10
z	0
p	1
S	1
varS	123
tau	0.02
mean	0.16
sd	0.11
cov	0.67
results	NO CLEAR TREND

Report for ID : MW115S and Analyte : PFOS+PFHxS



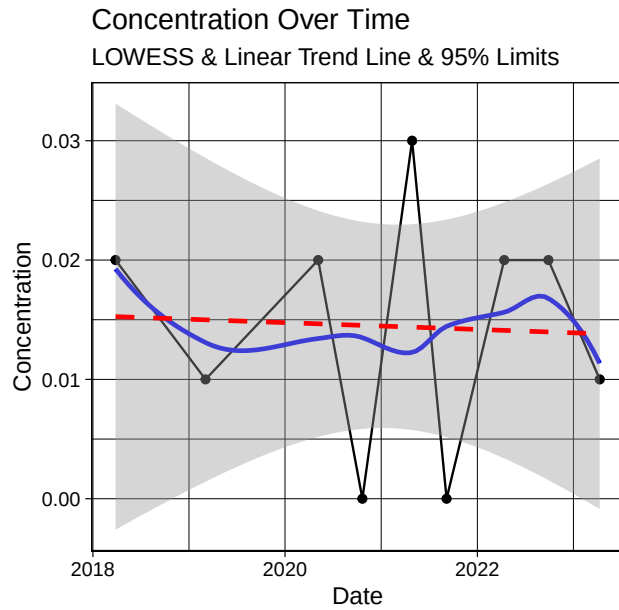
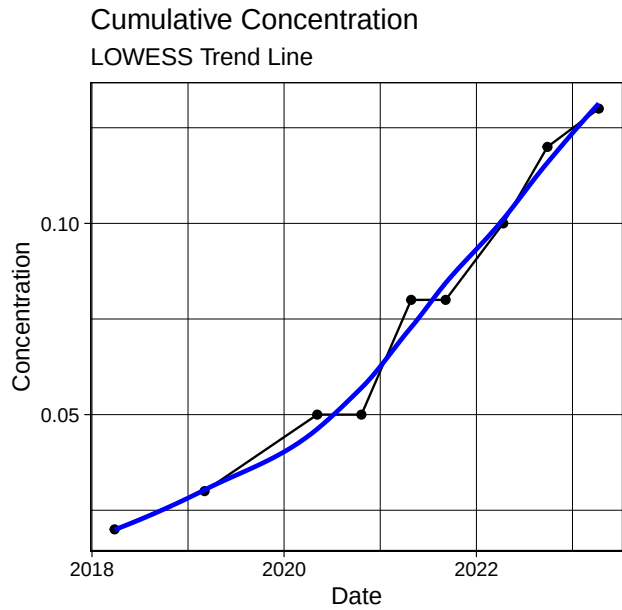
Kendall Trend Test Results Continuous	
n	10
z	-0.56
p	0.58
S	-7
varS	116.33
tau	-0.17
mean	0.05
sd	0.03
cov	0.7
results	STABLE

Report for ID : MW116S and Analyte : PFOS+PFHxS



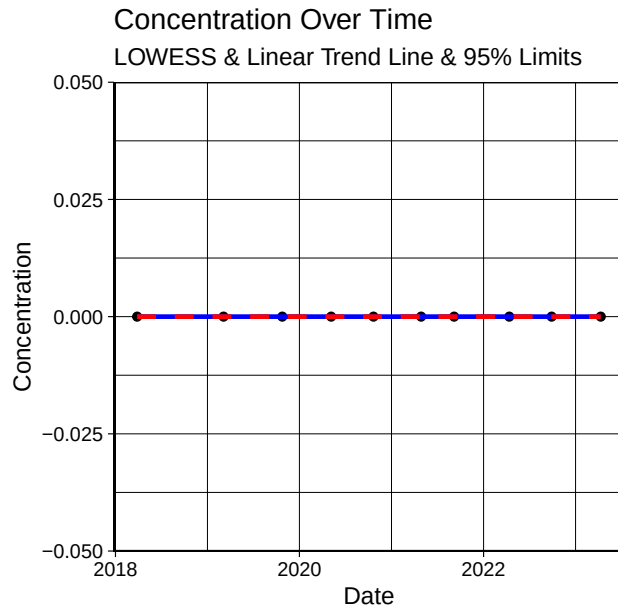
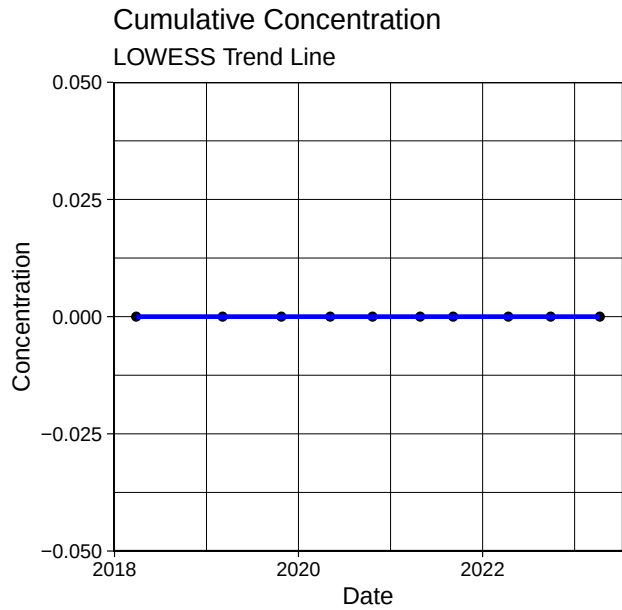
Kendall Trend Test Results Continuous	
n	9
z	-0.11
p	0.91
S	-2
varS	81.33
tau	-0.06
mean	0.01
sd	0.01
cov	0.7
results	STABLE

Report for ID : MW117I and Analyte : PFOS+PFHxS



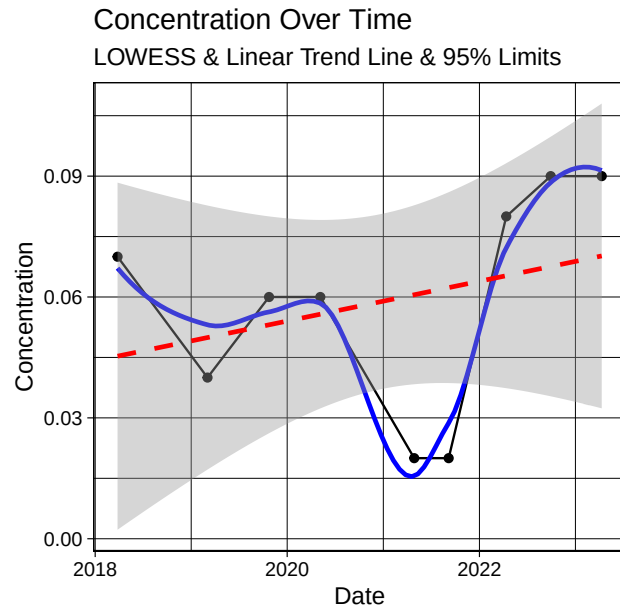
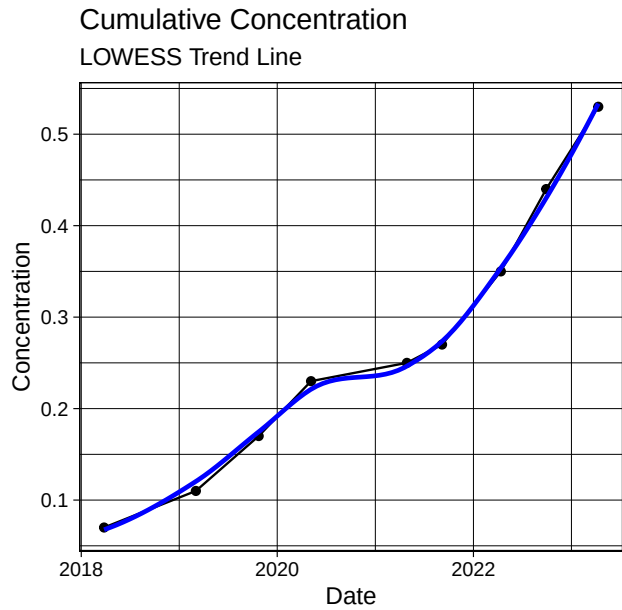
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW118D and Analyte : PFOS+PFHxS



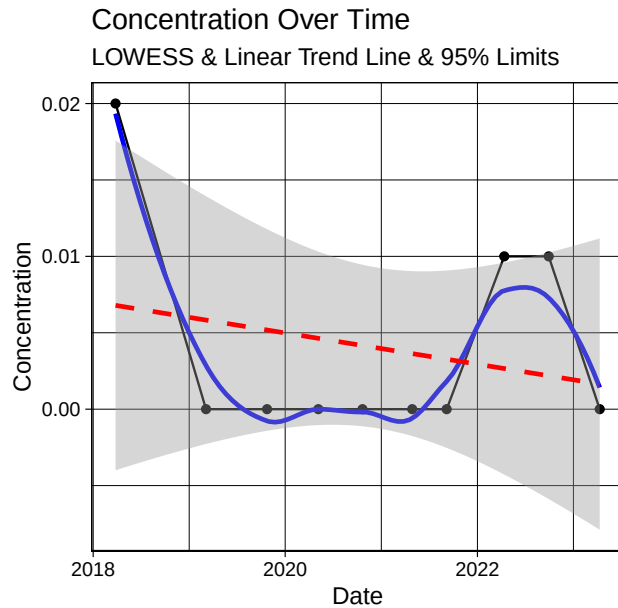
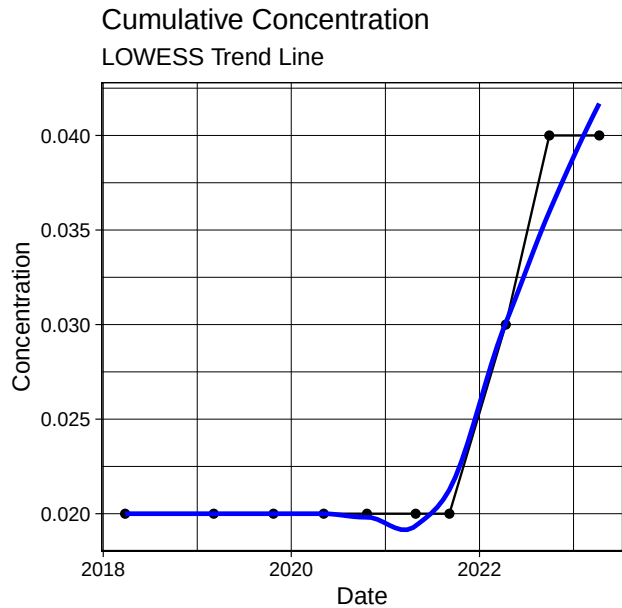
Kendall Trend Test Results Continuous	
n	9
z	1.06
p	0.29
S	11
varS	89
tau	0.32
mean	0.06
sd	0.03
cov	0.46
results	NO CLEAR TREND

Report for ID : MW119S and Analyte : PFOS+PFHxS



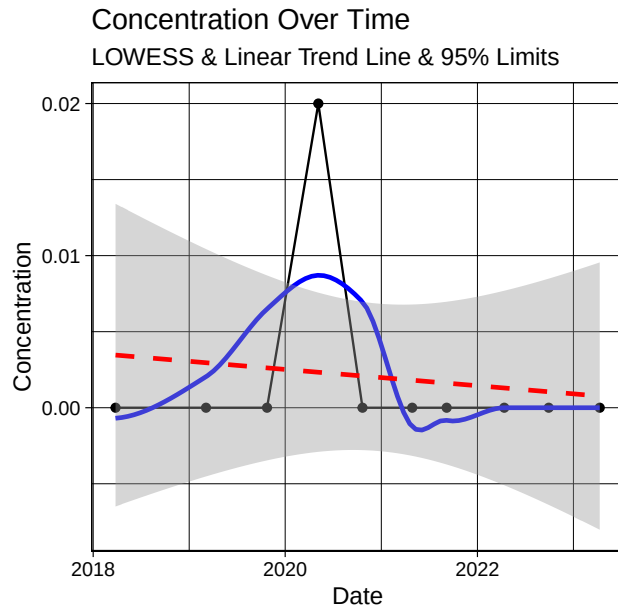
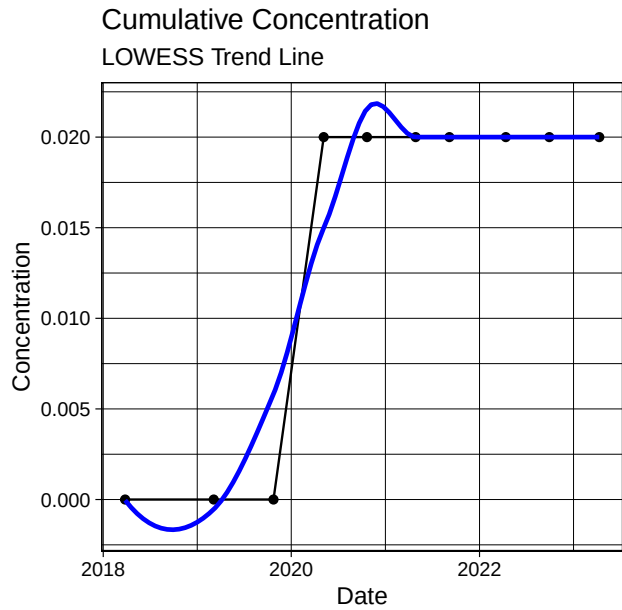
Kendall Trend Test Results Continuous	
n	10
z	0
p	1
S	1
varS	79.67
tau	0.03
mean	0
sd	0.01
cov	1.75
results	NO CLEAR TREND

Report for ID : MW120I and Analyte : PFOS+PFHxS



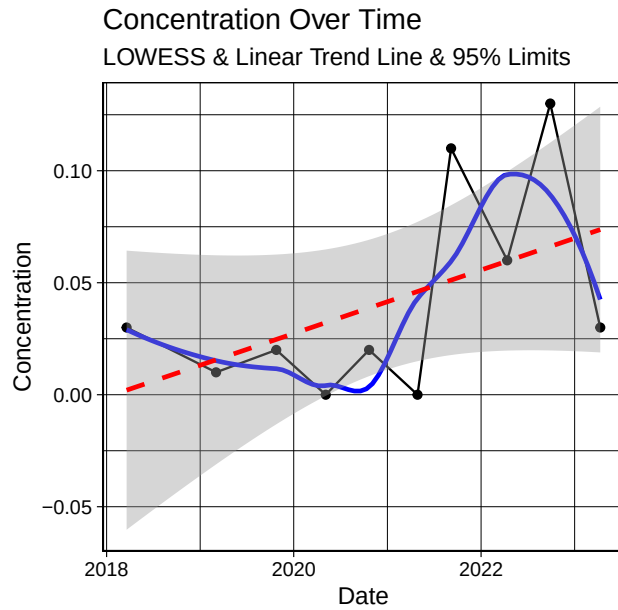
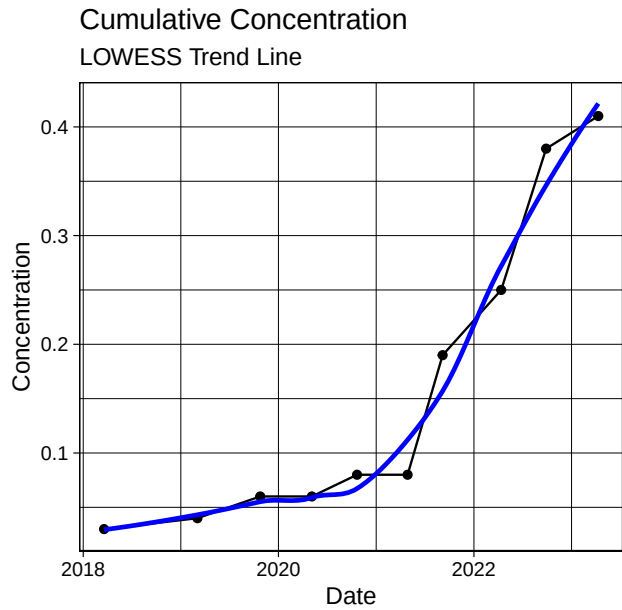
Kendall Trend Test Results Continuous	
n	10
z	-0.35
p	0.73
S	-3
varS	33
tau	-0.15
mean	0
sd	0.01
cov	3.16
results	NO CLEAR TREND

Report for ID : MW121D and Analyte : PFOS+PFHxS



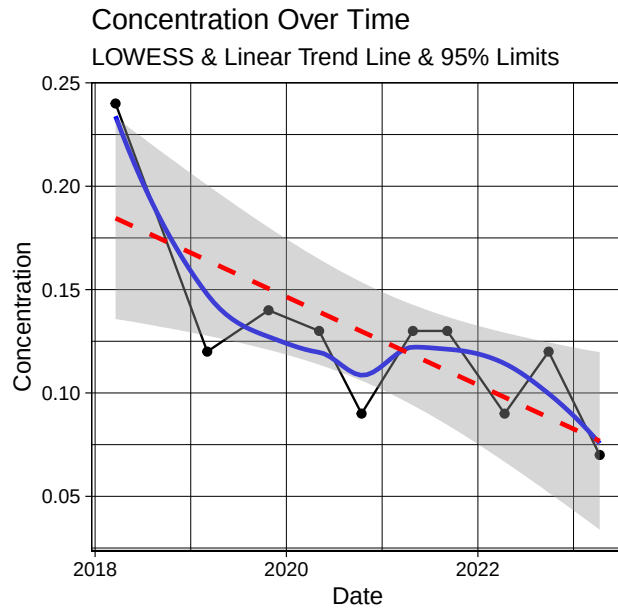
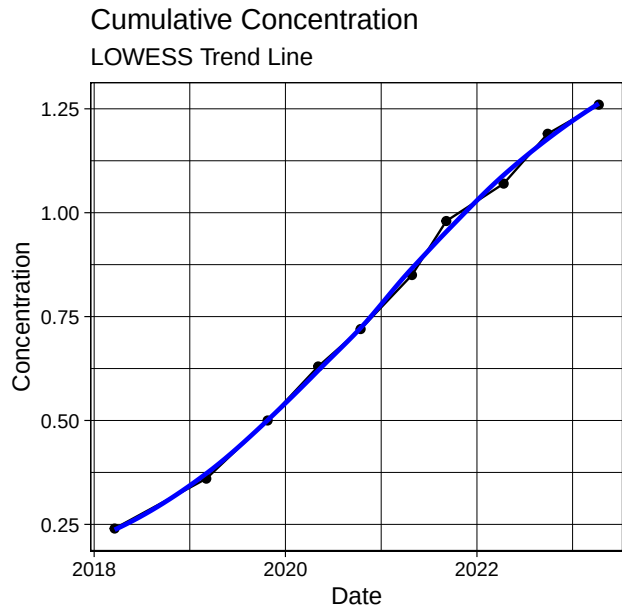
Kendall Trend Test Results Continuous	
n	10
z	1.18
p	0.24
S	14
varS	122
tau	0.32
mean	0.04
sd	0.05
cov	1.11
results	NO CLEAR TREND

Report for ID : MW122S and Analyte : PFOS+PFHxS



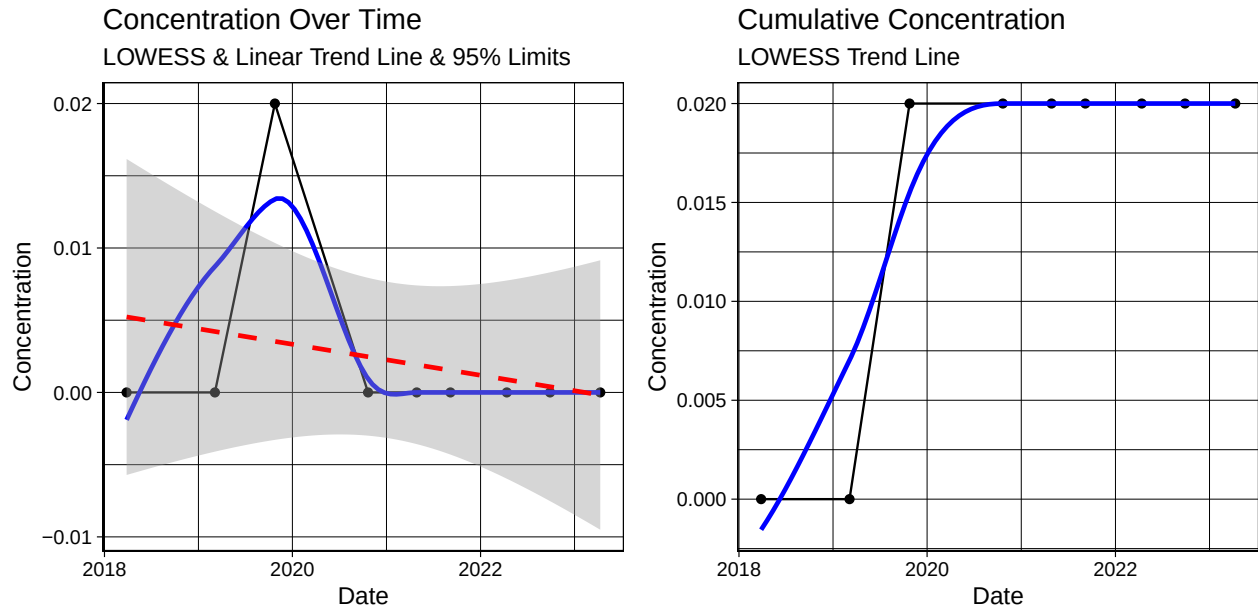
Kendall Trend Test Results Continuous	
n	10
z	-2.11
p	0.04
S	-24
varS	119.33
tau	-0.57
mean	0.13
sd	0.05
cov	0.37
results	DECREASING

Report for ID : MW123I and Analyte : PFOS+PFHxS



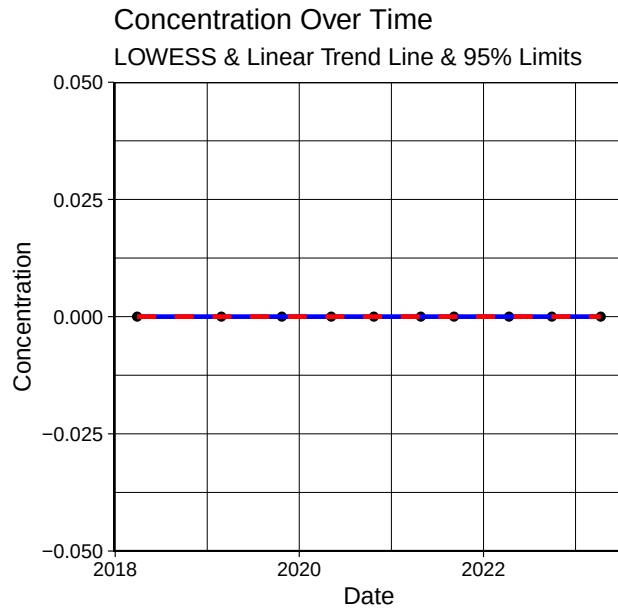
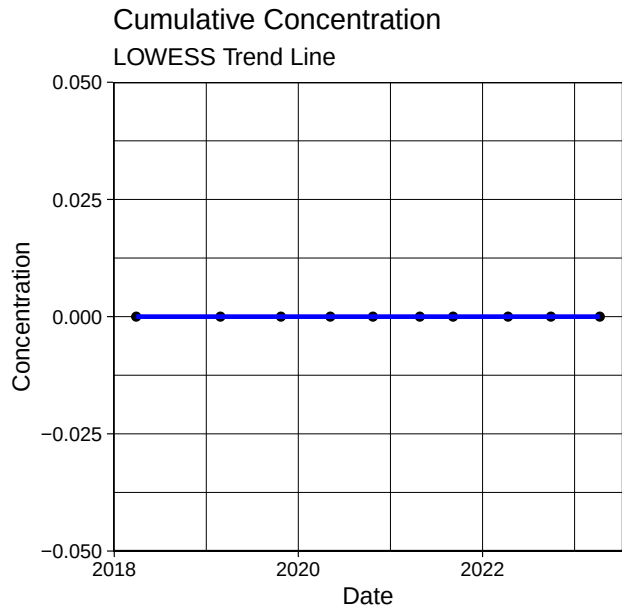
Kendall Trend Test Results Continuous	
n	9
z	-0.58
p	0.56
S	-4
varS	26.67
tau	-0.24
mean	0
sd	0.01
cov	3
results	NO CLEAR TREND

Report for ID : MW124D and Analyte : PFOS+PFHxS



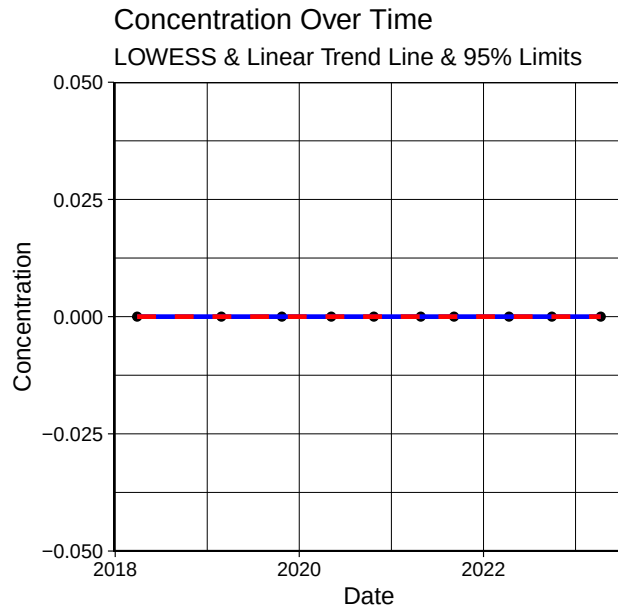
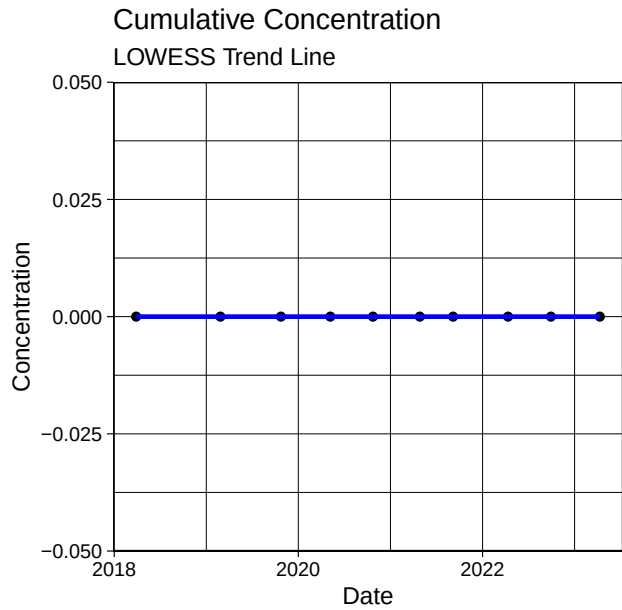
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW125S and Analyte : PFOS+PFHxS



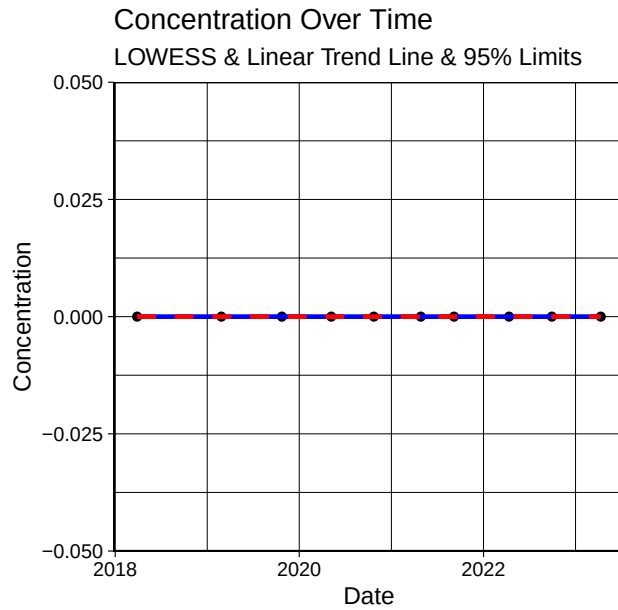
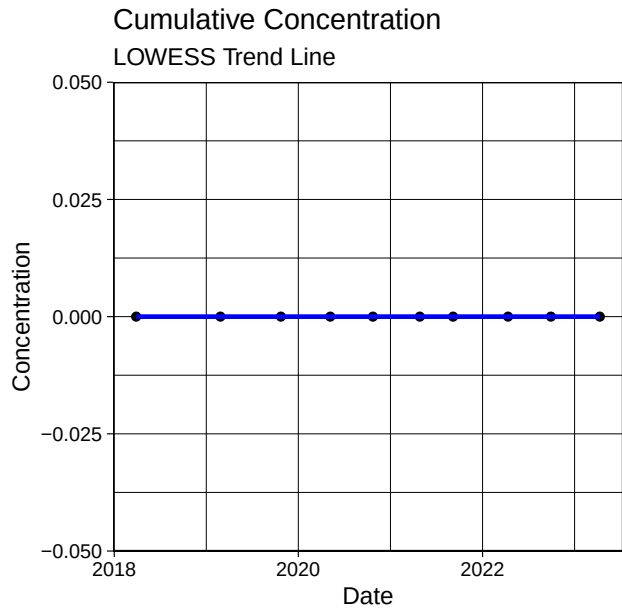
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW126I and Analyte : PFOS+PFHxS



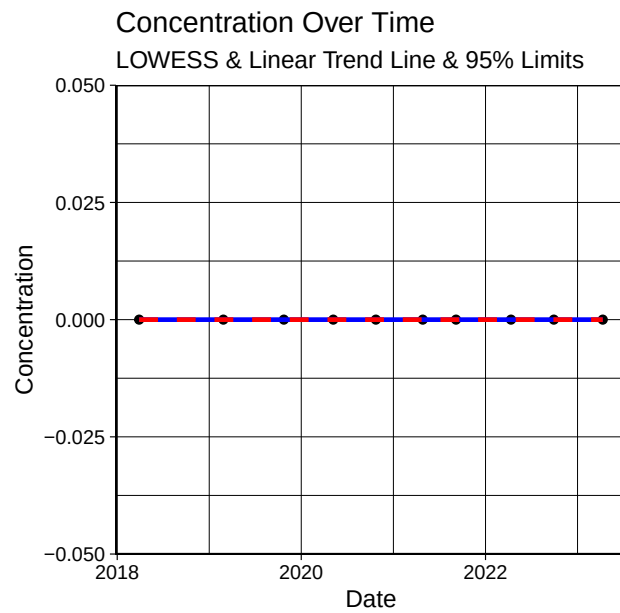
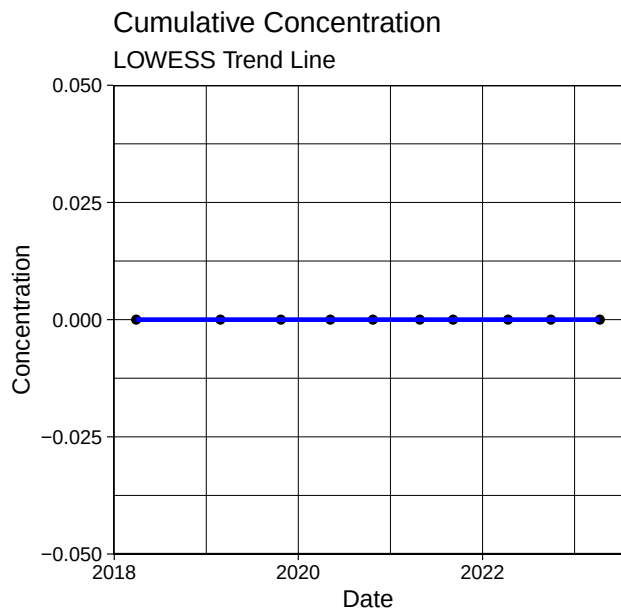
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW128D and Analyte : PFOS+PFHxS



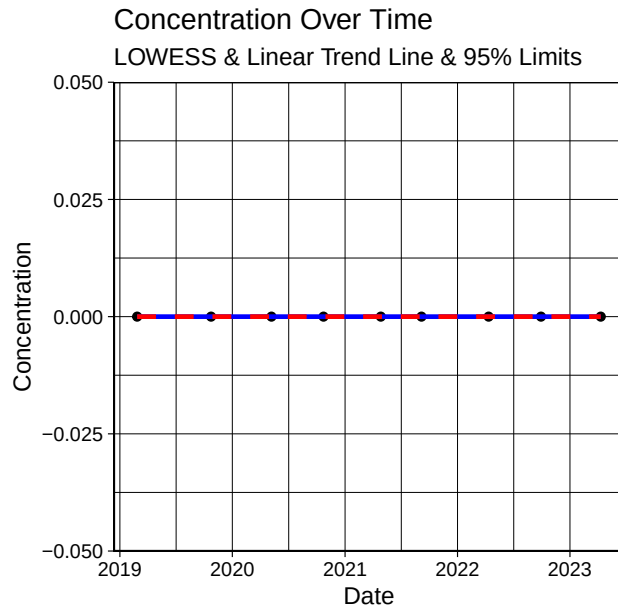
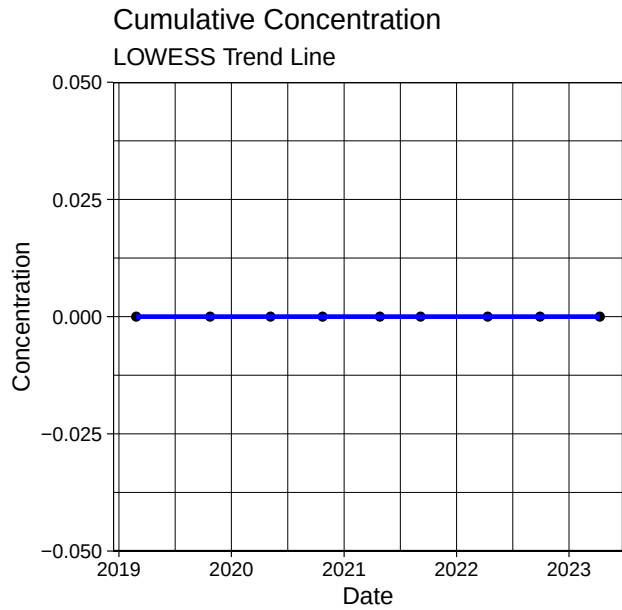
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW129S and Analyte : PFOS+PFHxS



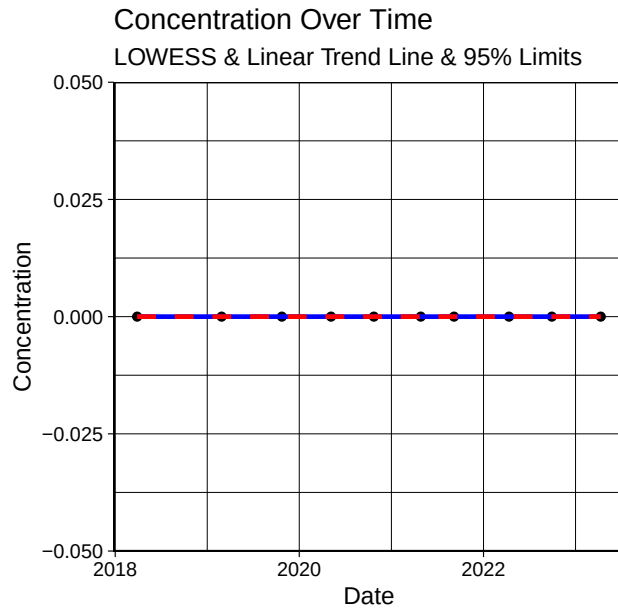
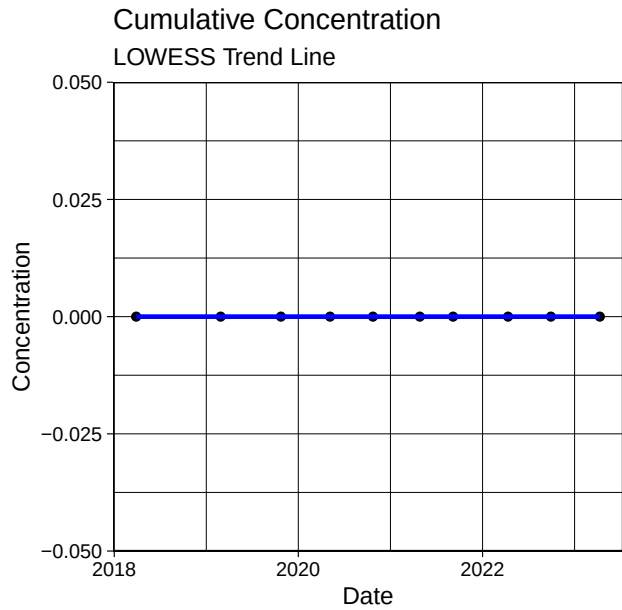
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW130D and Analyte : PFOS+PFHxS



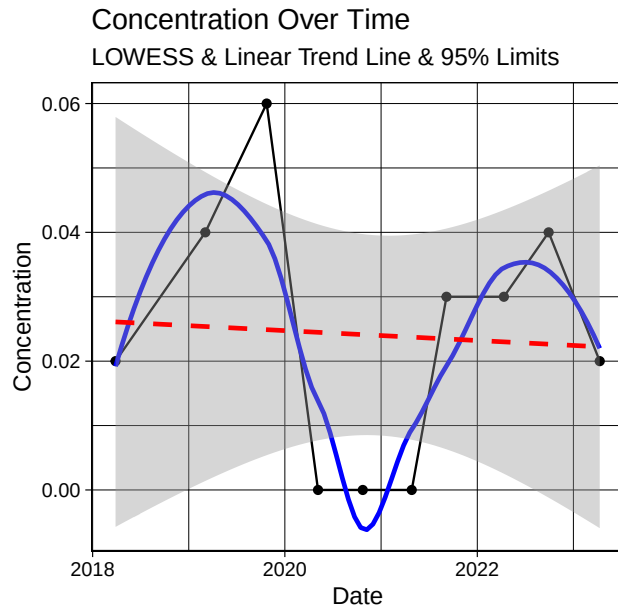
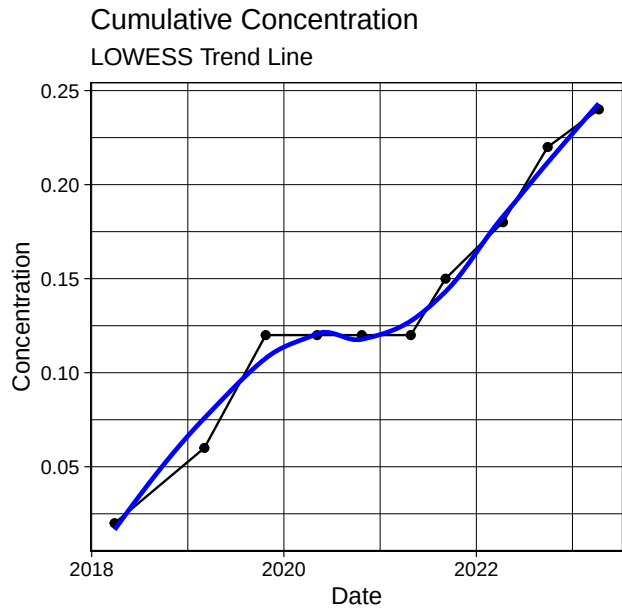
Kendall Trend Test Results Continuous	
n	10
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW131D and Analyte : PFOS+PFHxS



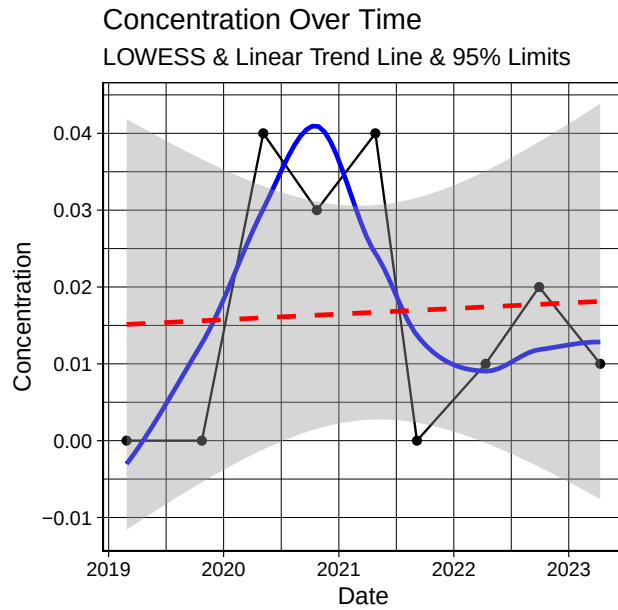
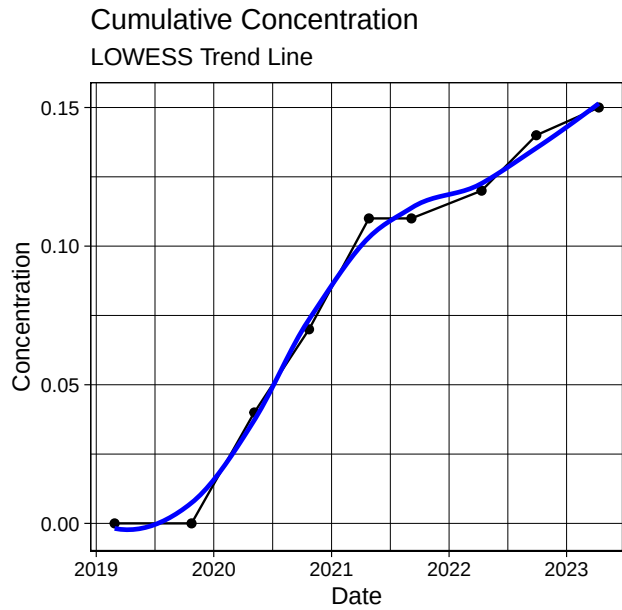
Kendall Trend Test Results Continuous	
n	10
z	0
p	1
S	1
varS	118.33
tau	0.02
mean	0.02
sd	0.02
cov	0.84
results	NO CLEAR TREND

Report for ID : MW132I and Analyte : PFOS+PFHxS



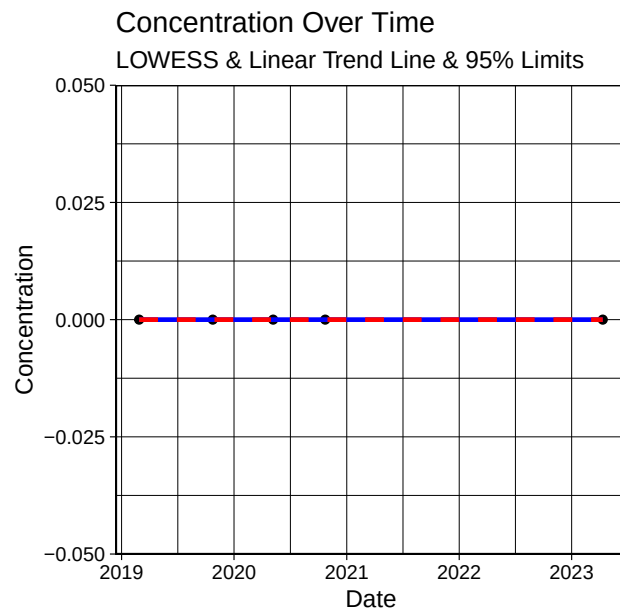
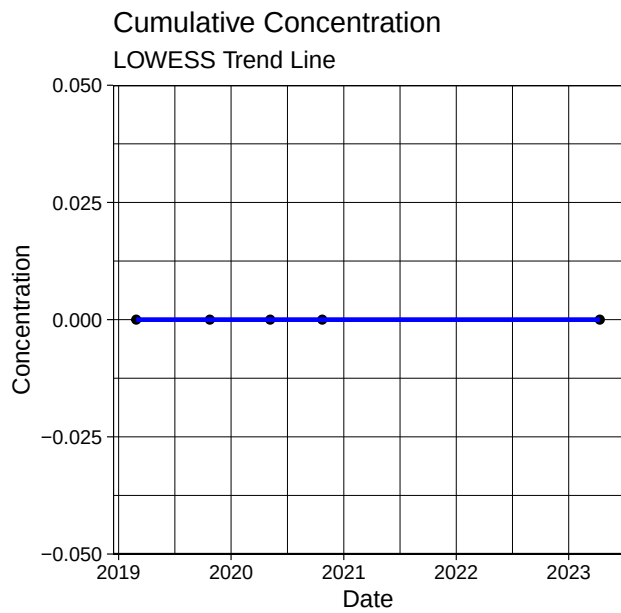
Kendall Trend Test Results Continuous	
n	9
z	0.22
p	0.83
S	3
varS	86.33
tau	0.09
mean	0.02
sd	0.02
cov	0.99
results	NO CLEAR TREND

Report for ID : MW133D and Analyte : PFOS+PFHxS



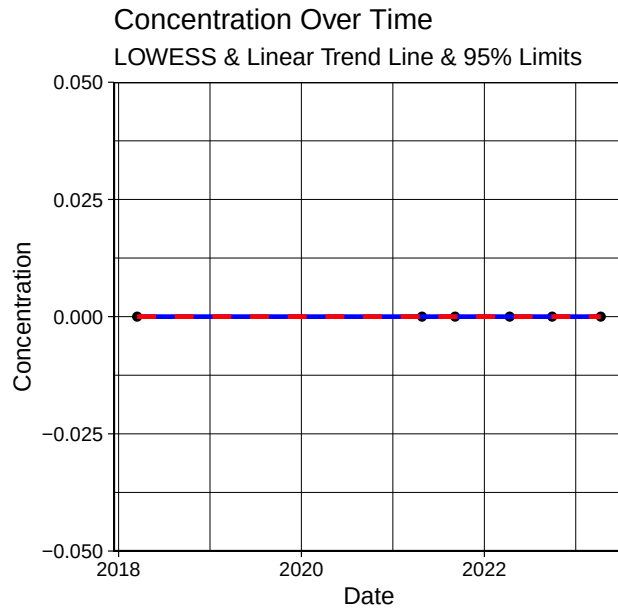
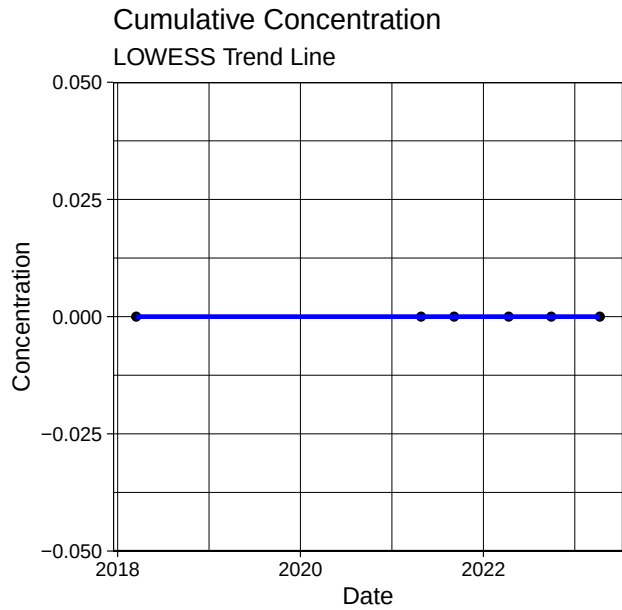
Kendall Trend Test Results Continuous	
n	5
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW134D and Analyte : PFOS+PFHxS



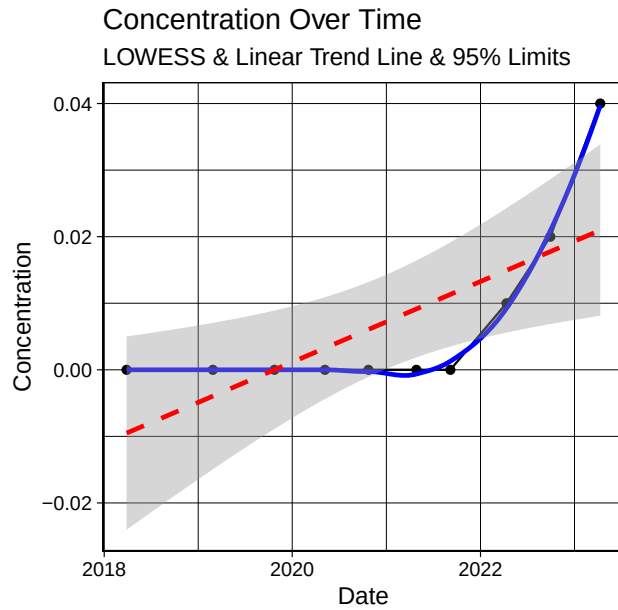
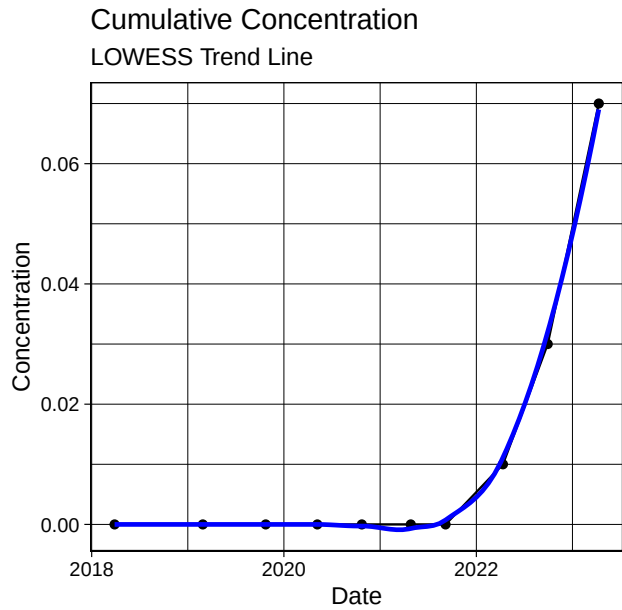
Kendall Trend Test Results Continuous	
n	6
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW135I and Analyte : PFOS+PFHxS



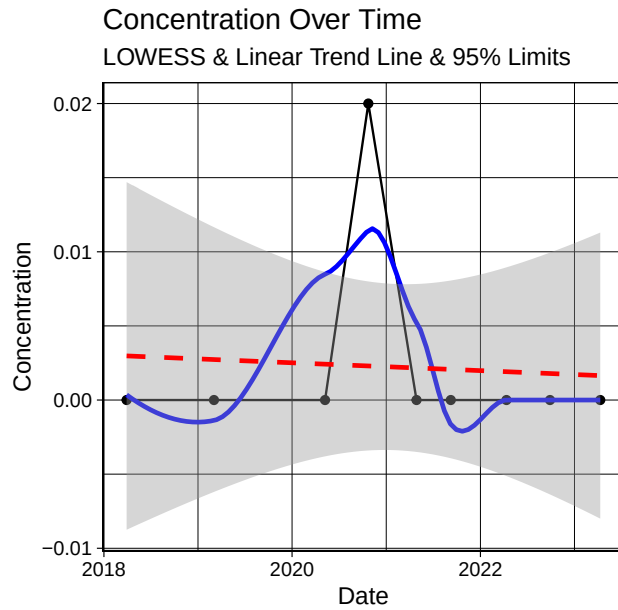
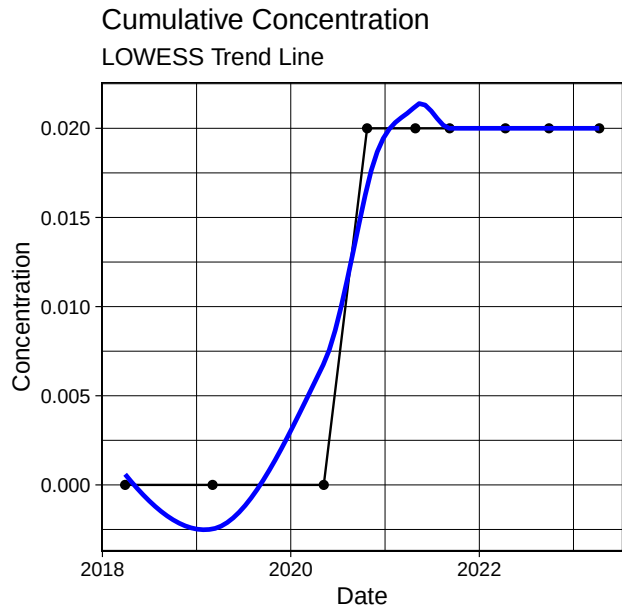
Kendall Trend Test Results Continuous	
n	10
z	2.56
p	0.01
S	24
varS	80.67
tau	0.73
mean	0.01
sd	0.01
cov	1.91
results	INCREASING

Report for ID : MW136D and Analyte : PFOS+PFHxS



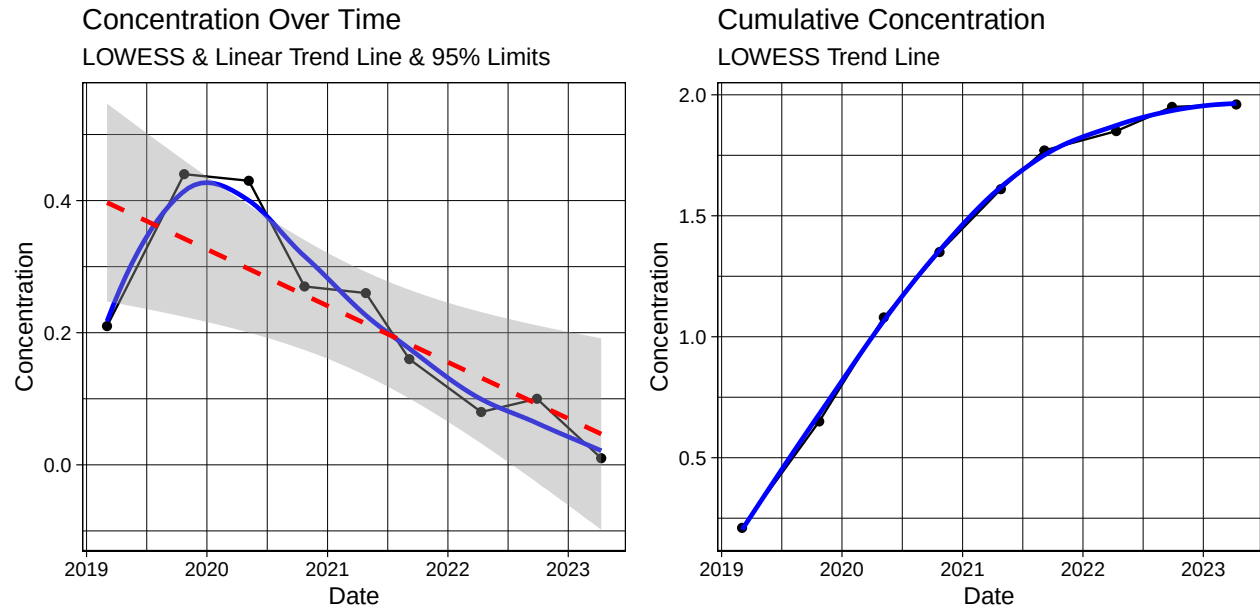
Kendall Trend Test Results Continuous	
n	9
z	-0.19
p	0.85
S	-2
varS	26.67
tau	-0.12
mean	0
sd	0.01
cov	3
results	NO CLEAR TREND

Report for ID : MW137S and Analyte : PFOS+PFHxS



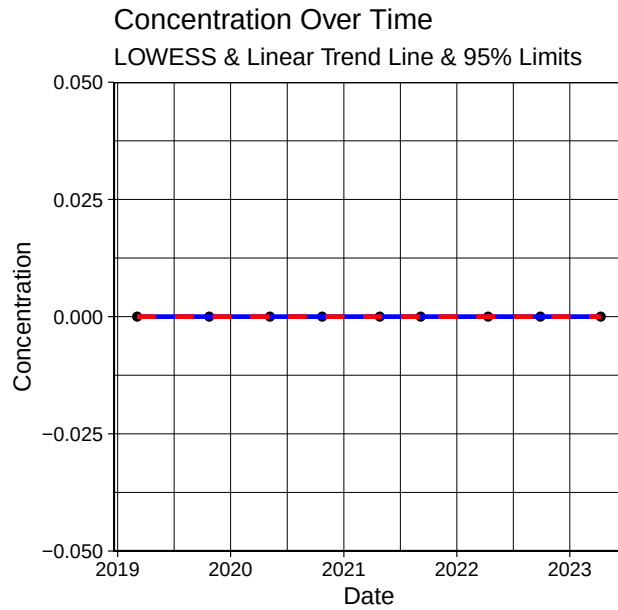
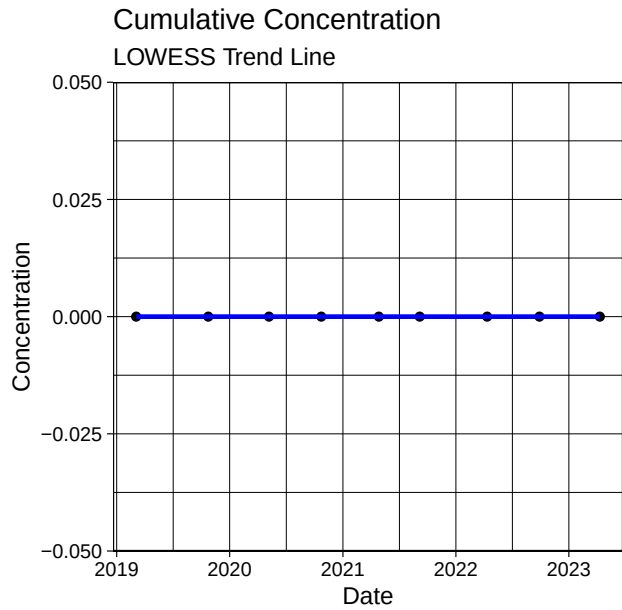
Kendall Trend Test Results Continuous	
n	9
z	-2.61
p	0.01
S	-26
varS	92
tau	-0.72
mean	0.22
sd	0.15
cov	0.69
results	DECREASING

Report for ID : MW138S and Analyte : PFOS+PFHxS



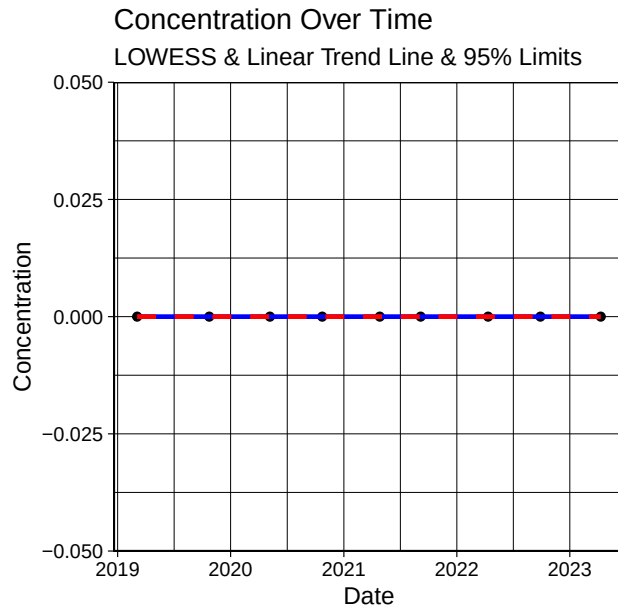
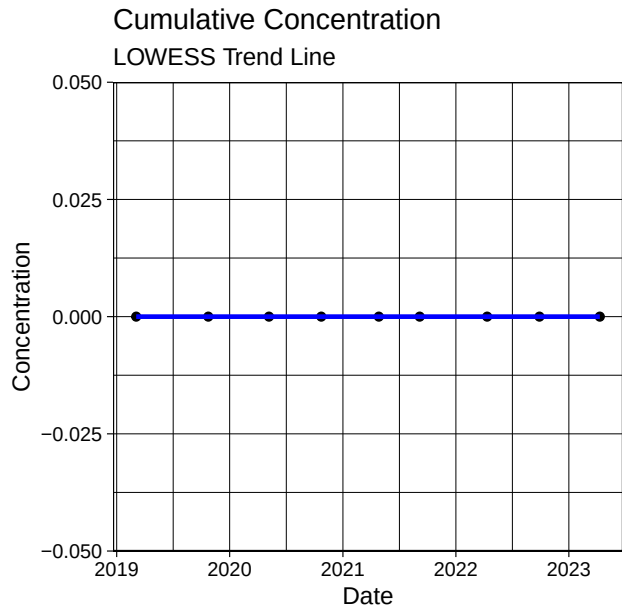
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW139I and Analyte : PFOS+PFHxS



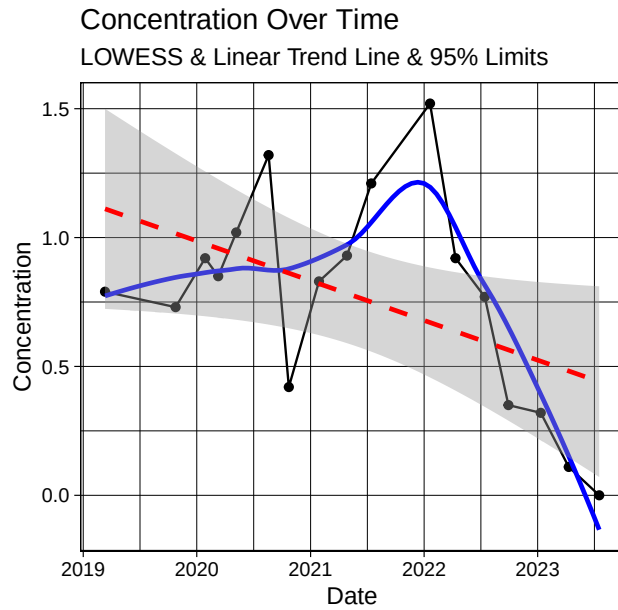
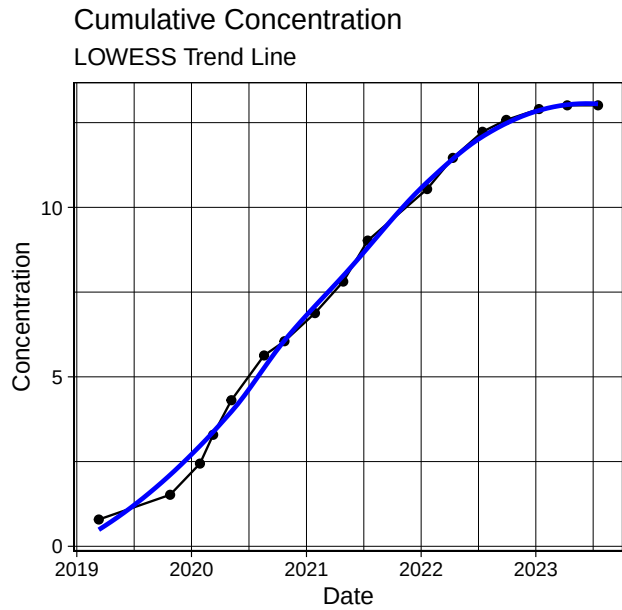
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW140D and Analyte : PFOS+PFHxS



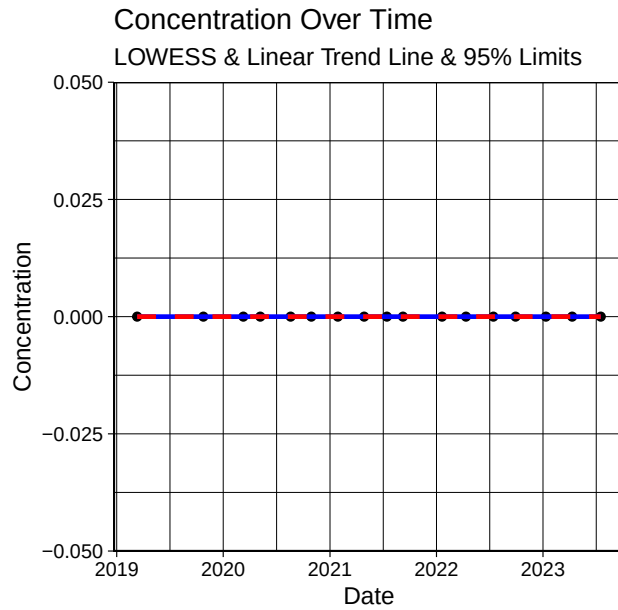
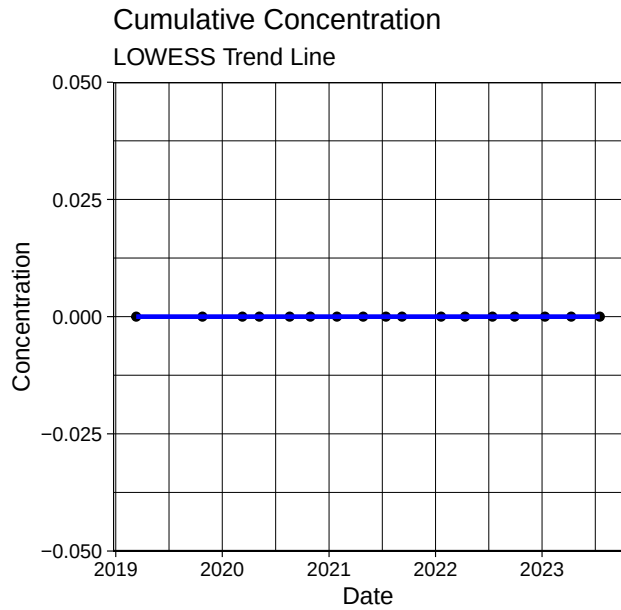
Kendall Trend Test Results Continuous	
n	17
z	-1.65
p	0.1
S	-41
varS	588.33
tau	-0.3
mean	0.77
sd	0.41
cov	0.54
results	POSSIBLY DECREASING

Report for ID : MW141S and Analyte : PFOS+PFHxS



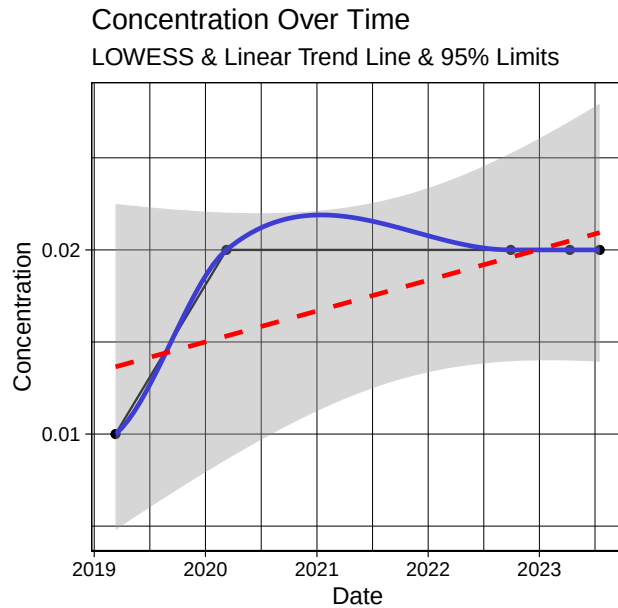
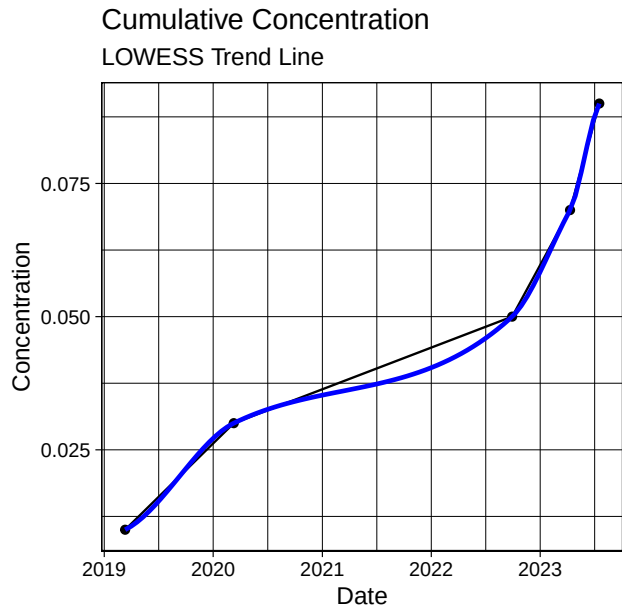
Kendall Trend Test Results Continuous	
n	17
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW142S and Analyte : PFOS+PFHxS



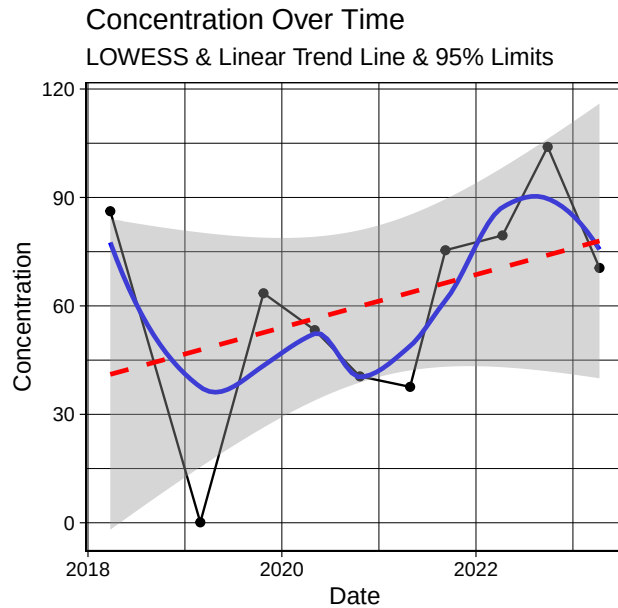
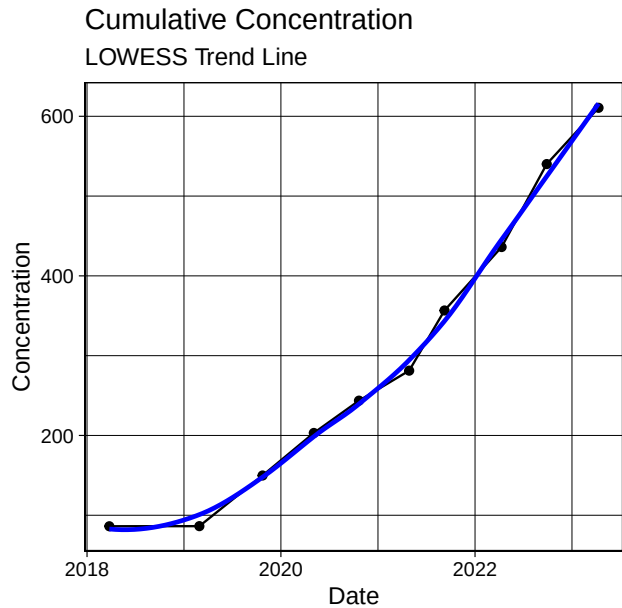
Kendall Trend Test Results Continuous	
n	5
z	1.06
p	0.29
S	4
varS	8
tau	0.63
mean	0.02
sd	0
cov	0.25
results	NO CLEAR TREND

Report for ID : MW143S and Analyte : PFOS+PFHxS



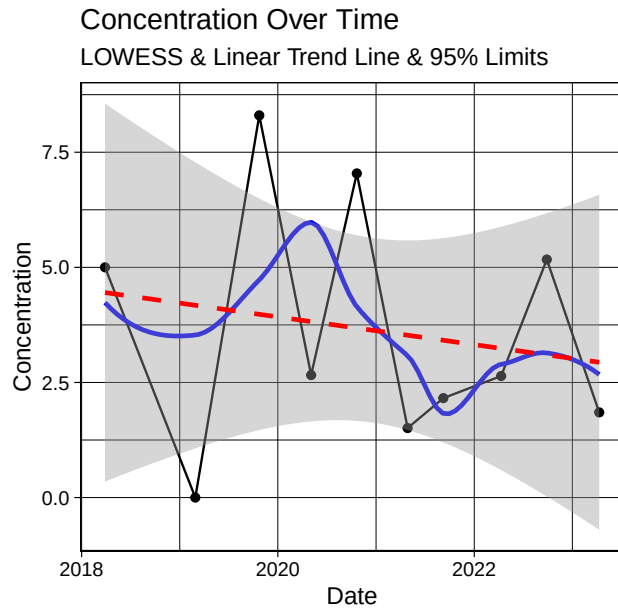
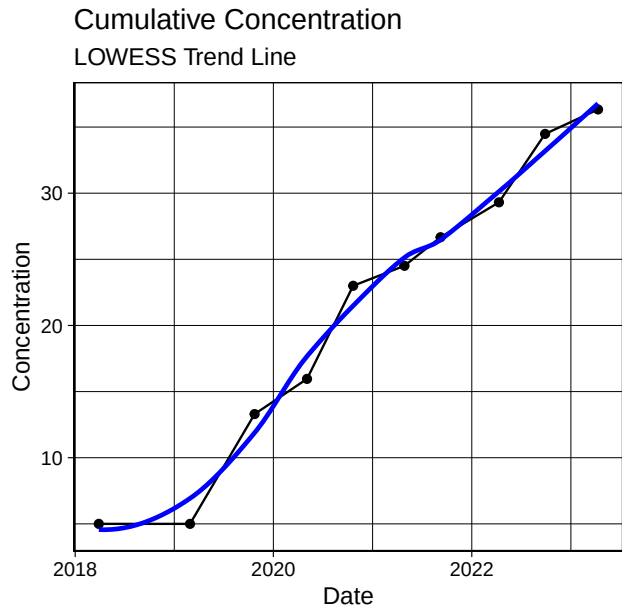
Kendall Trend Test Results Continuous	
n	10
z	0.89
p	0.37
S	11
varS	125
tau	0.24
mean	61.06
sd	29.56
cov	0.48
results	NO CLEAR TREND

Report for ID : MW301 and Analyte : PFOS+PFHxS



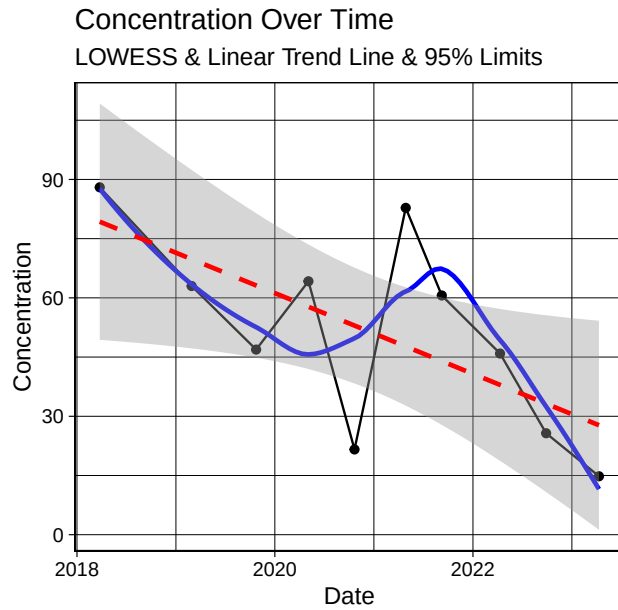
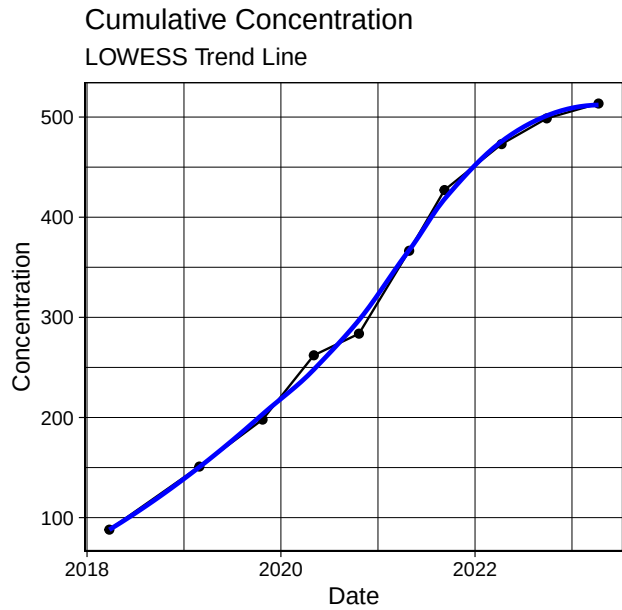
Kendall Trend Test Results Continuous	
n	10
z	-0.36
p	0.72
S	-5
varS	125
tau	-0.11
mean	3.63
sd	2.64
cov	0.73
results	STABLE

Report for ID : MW302 and Analyte : PFOS+PFHxS



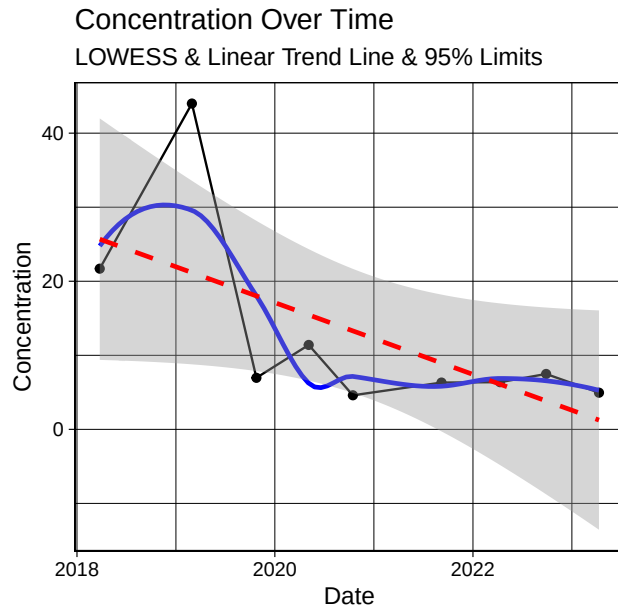
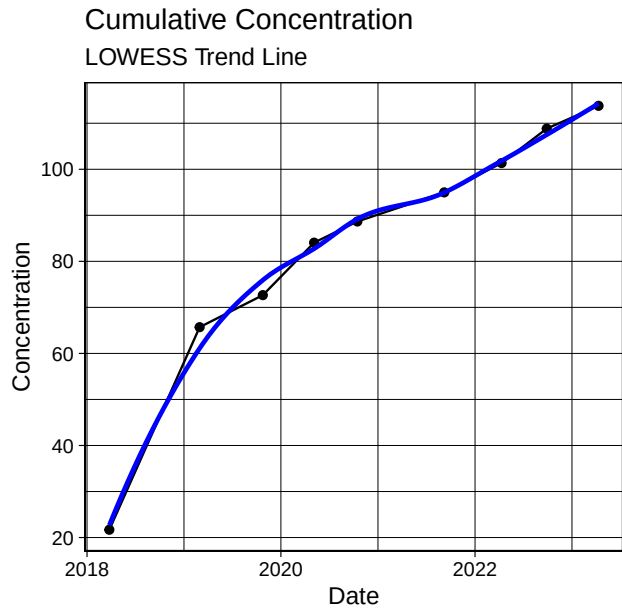
Kendall Trend Test Results Continuous	
n	10
z	-2.15
p	0.03
S	-25
varS	125
tau	-0.56
mean	51.35
sd	25.05
cov	0.49
results	DECREASING

Report for ID : MW303 and Analyte : PFOS+PFHxS



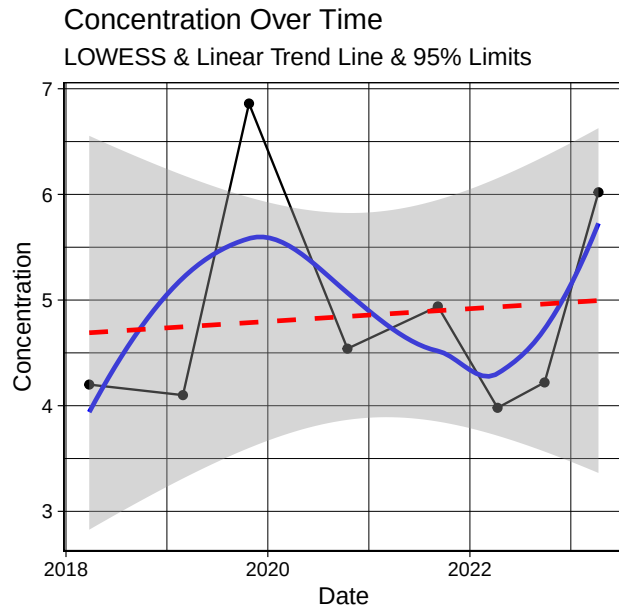
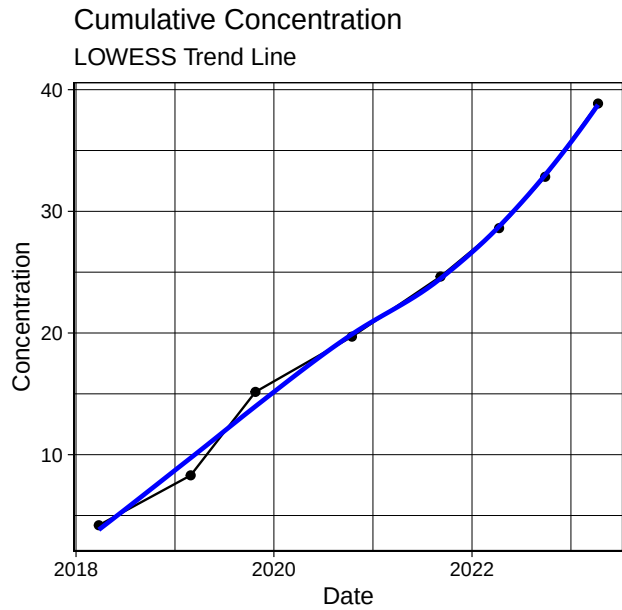
Kendall Trend Test Results Continuous	
n	9
z	-1.56
p	0.12
S	-16
varS	92
tau	-0.44
mean	12.64
sd	12.89
cov	1.02
results	NO CLEAR TREND

Report for ID : MW304 and Analyte : PFOS+PFHxS



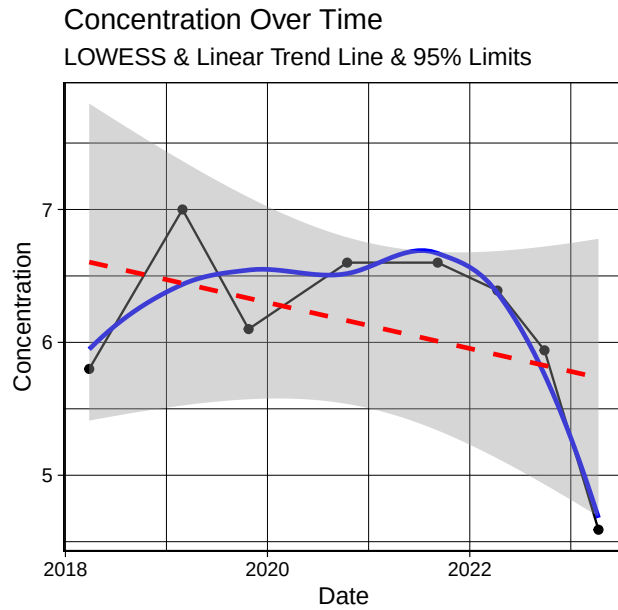
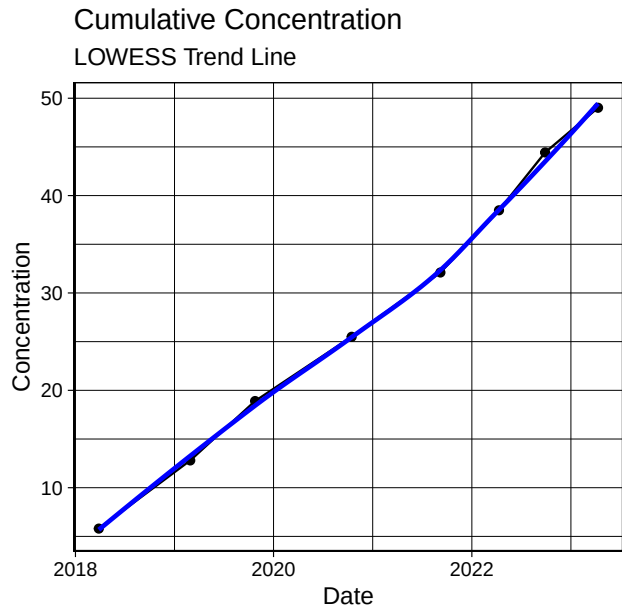
Kendall Trend Test Results Continuous	
n	8
z	0.37
p	0.71
S	4
varS	65.33
tau	0.14
mean	4.86
sd	1.05
cov	0.22
results	NO CLEAR TREND

Report for ID : MW305 and Analyte : PFOS+PFHxS



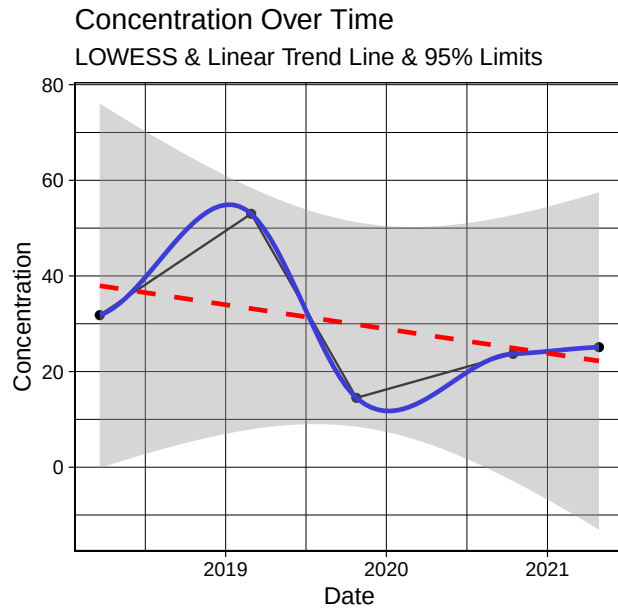
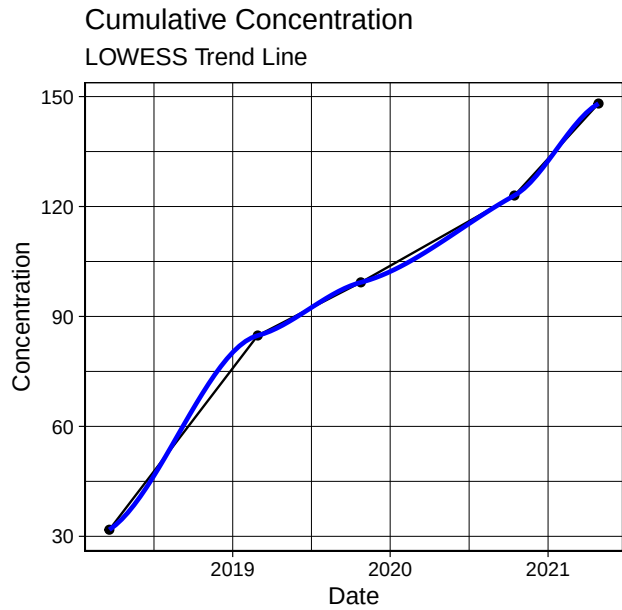
Kendall Trend Test Results Continuous	
n	8
z	-1
p	0.32
S	-9
varS	64.33
tau	-0.33
mean	6.13
sd	0.74
cov	0.12
results	STABLE

Report for ID : MW306 and Analyte : PFOS+PFHxS



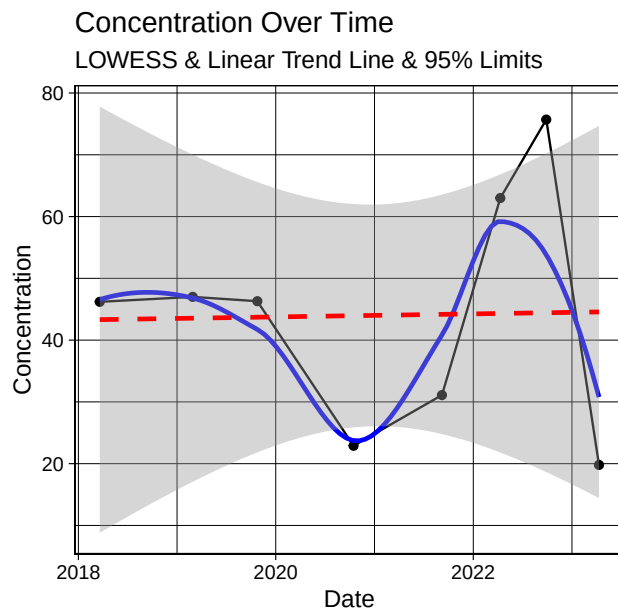
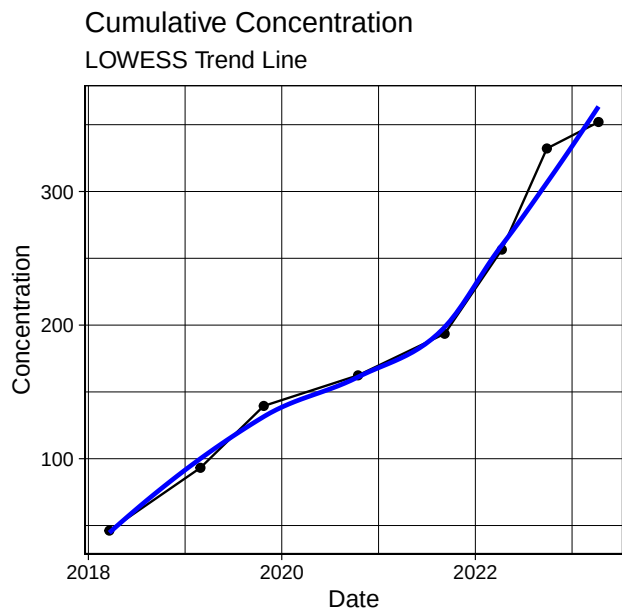
Kendall Trend Test Results Continuous	
n	5
z	-0.24
p	0.81
S	-2
varS	16.67
tau	-0.2
mean	29.62
sd	14.45
cov	0.49
results	STABLE

Report for ID : MW307 and Analyte : PFOS+PFHxS



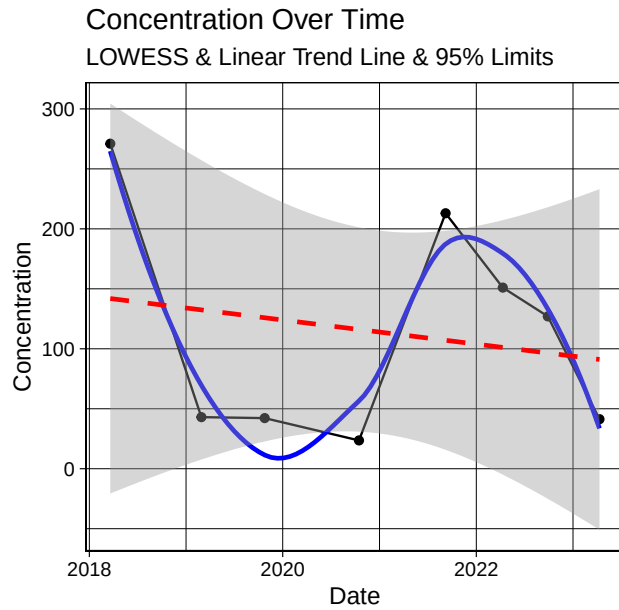
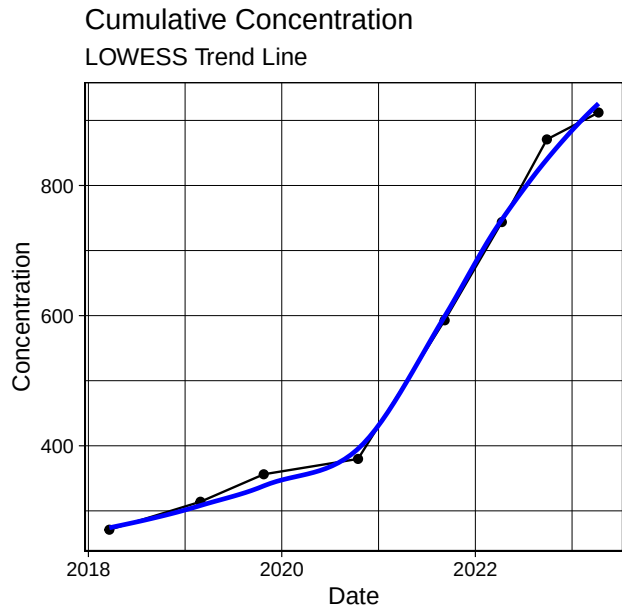
Kendall Trend Test Results Continuous	
n	8
z	0
p	1
S	0
varS	65.33
tau	0
mean	44
sd	19.21
cov	0.44
results	STABLE

Report for ID : MW308 and Analyte : PFOS+PFHxS



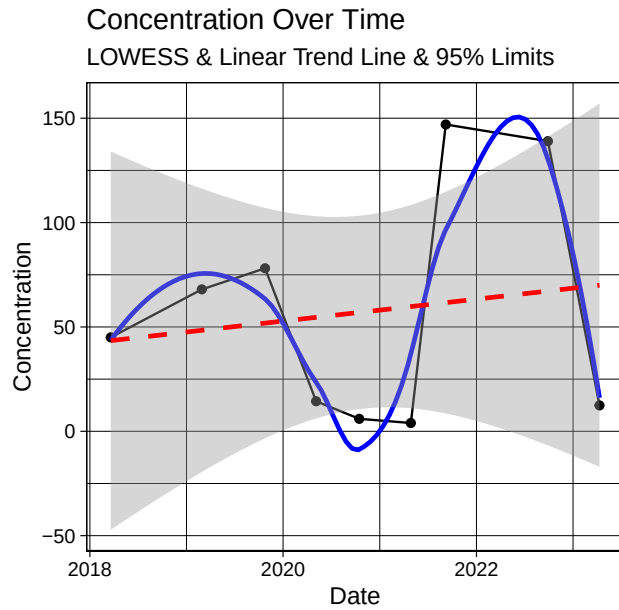
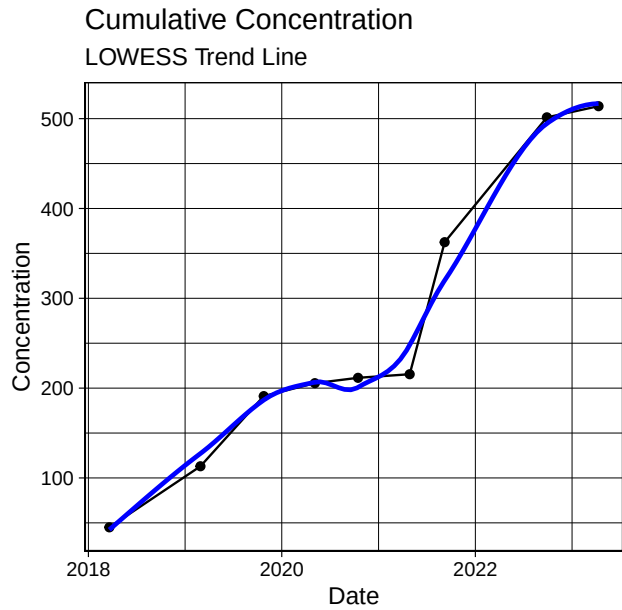
Kendall Trend Test Results Continuous	
n	8
z	-0.87
p	0.39
S	-8
varS	65.33
tau	-0.29
mean	114.01
sd	92.31
cov	0.81
results	STABLE

Report for ID : MW309 and Analyte : PFOS+PFHxS



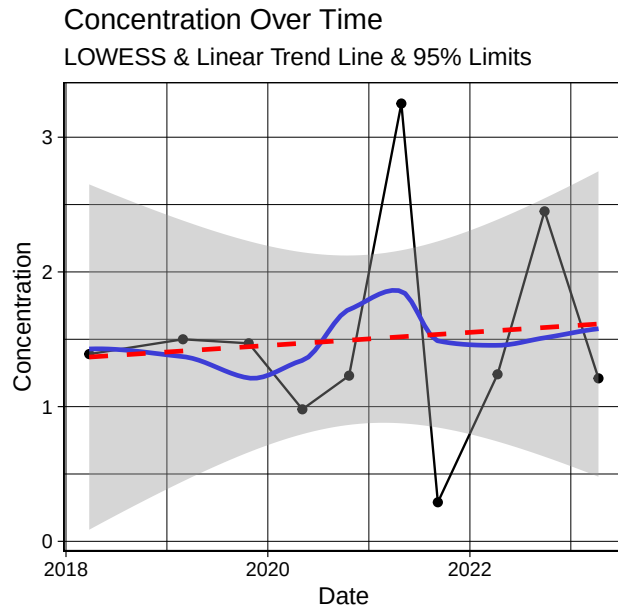
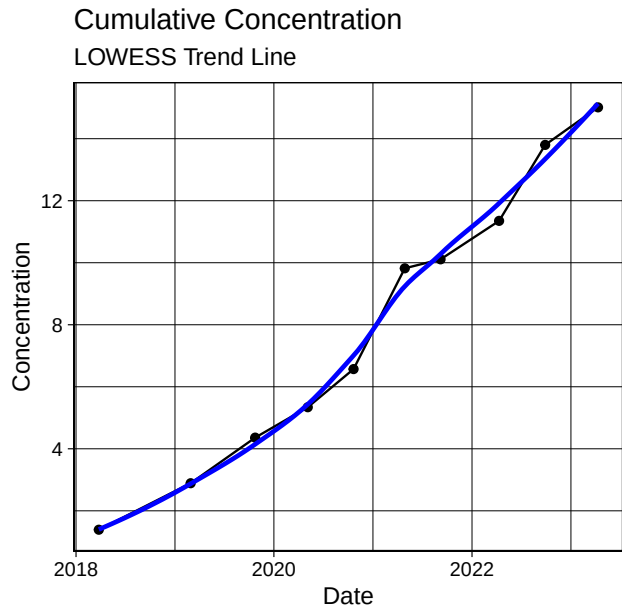
Kendall Trend Test Results Continuous	
n	9
z	-0.1
p	0.92
S	-2
varS	92
tau	-0.06
mean	57.1
sd	55.62
cov	0.97
results	STABLE

Report for ID : MW310 and Analyte : PFOS+PFHxS



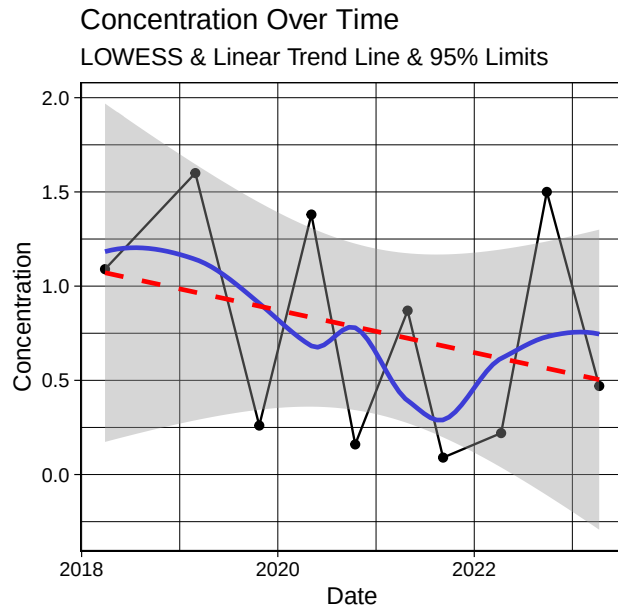
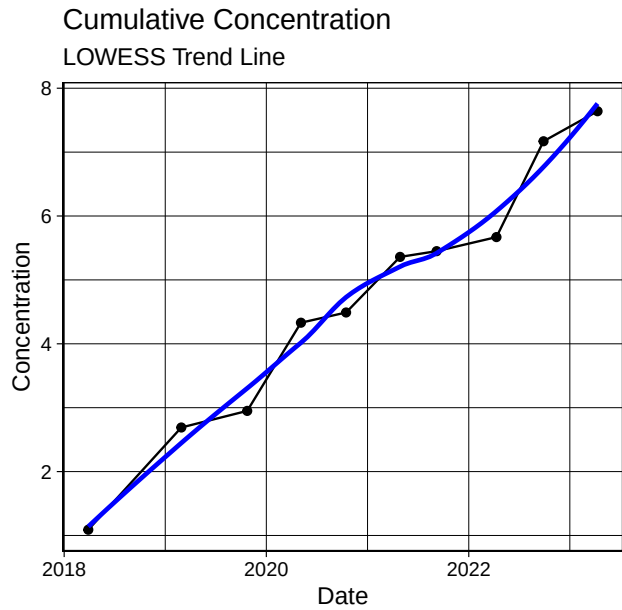
Kendall Trend Test Results Continuous	
n	10
z	-0.36
p	0.72
S	-5
varS	125
tau	-0.11
mean	1.5
sd	0.81
cov	0.54
results	STABLE

Report for ID : MW312 and Analyte : PFOS+PFHxS



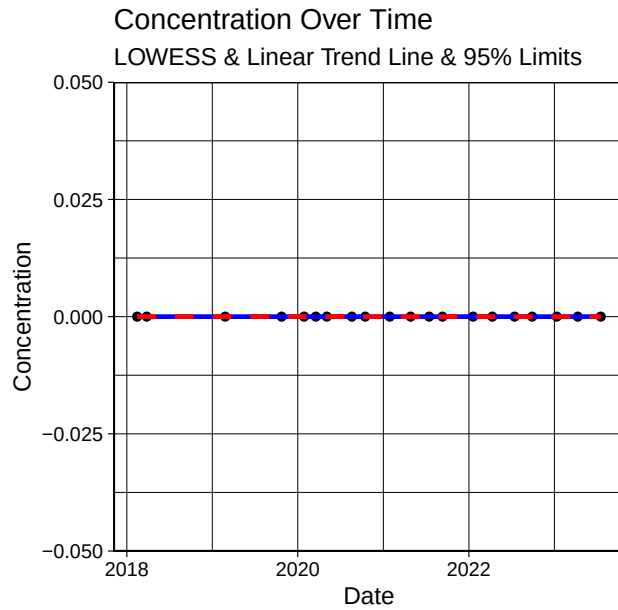
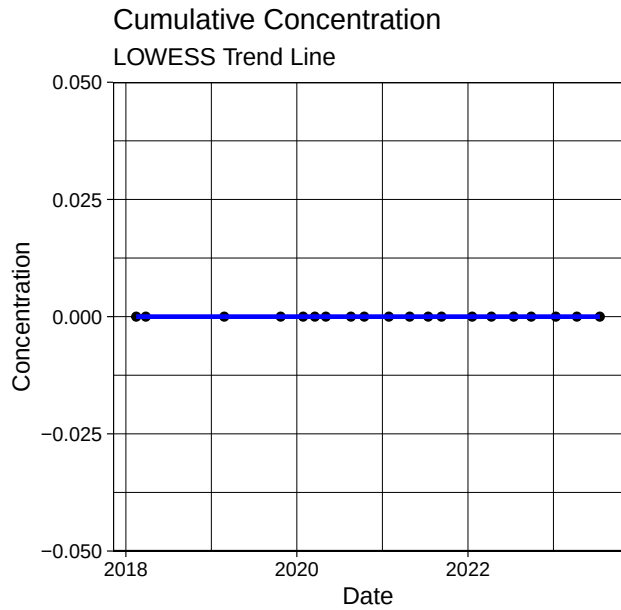
Kendall Trend Test Results Continuous	
n	10
z	-0.72
p	0.47
S	-9
varS	125
tau	-0.2
mean	0.76
sd	0.6
cov	0.78
results	STABLE

Report for ID : MW313 and Analyte : PFOS+PFHxS



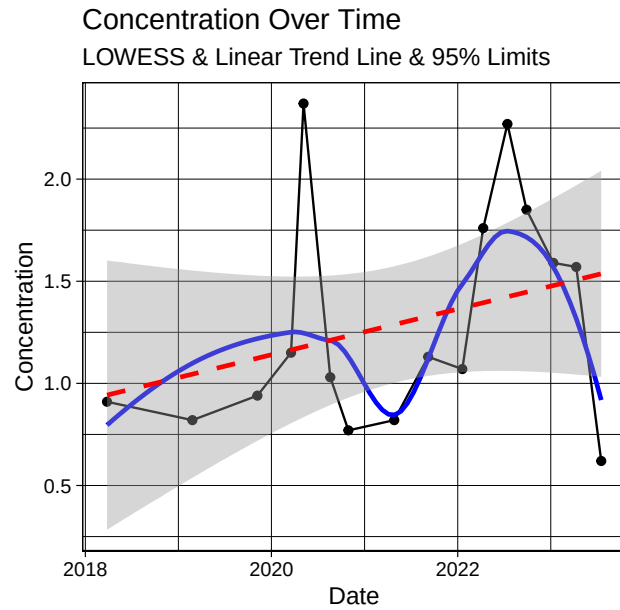
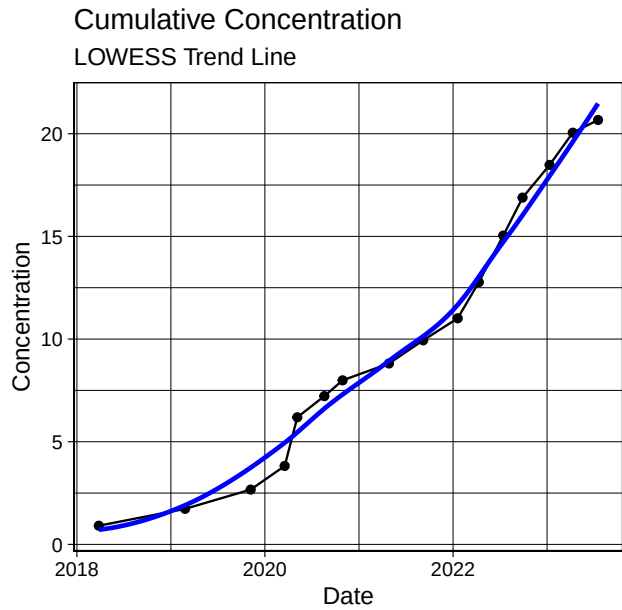
Kendall Trend Test Results Continuous	
n	20
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW401 and Analyte : PFOS+PFHxS



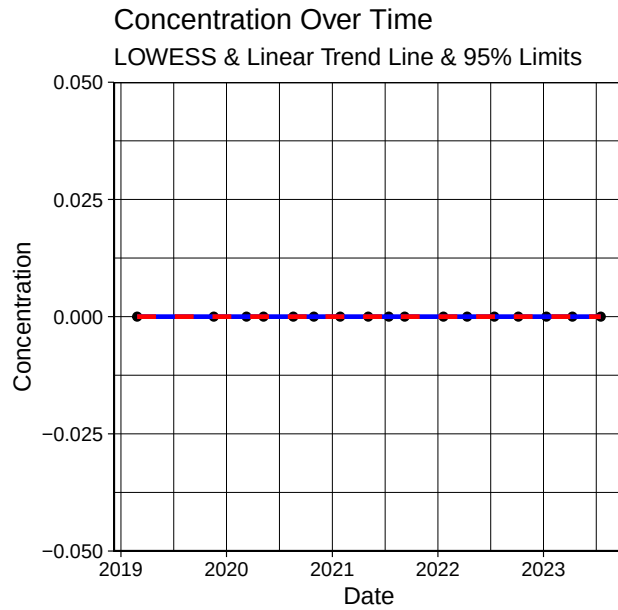
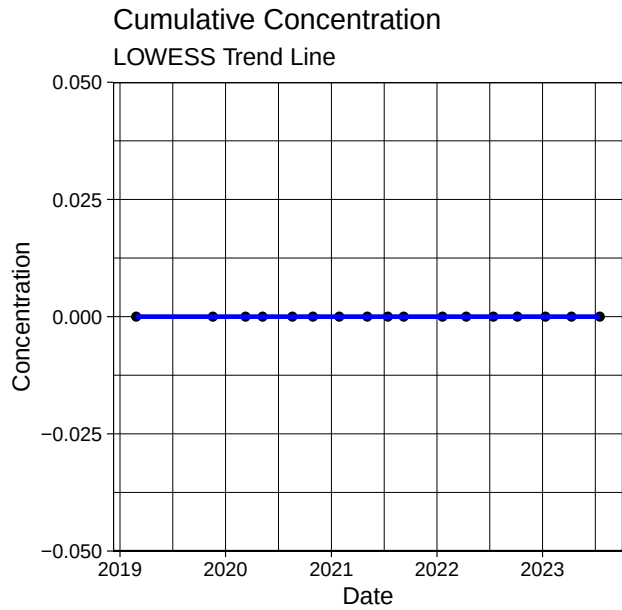
Kendall Trend Test Results Continuous	
n	16
z	1.08
p	0.28
S	25
varS	492.33
tau	0.21
mean	1.29
sd	0.54
cov	0.42
results	NO CLEAR TREND

Report for ID : MW402 and Analyte : PFOS+PFHxS



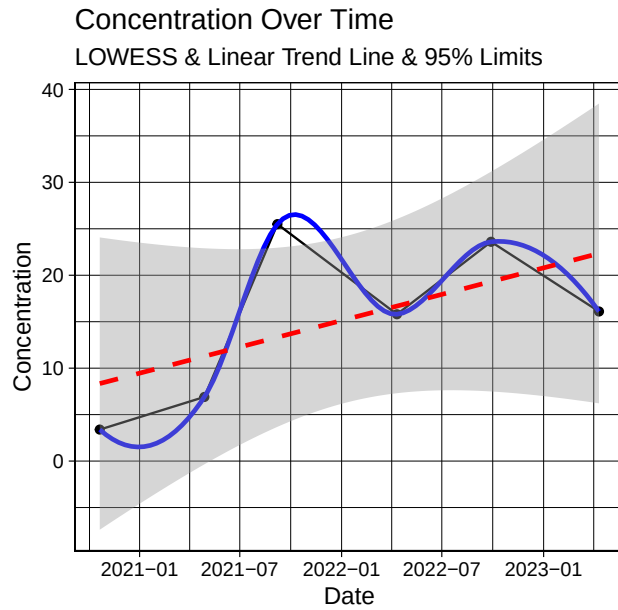
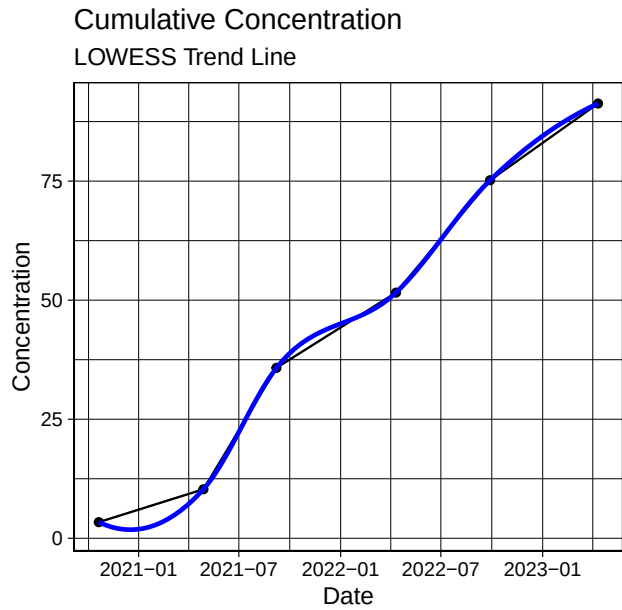
Kendall Trend Test Results Continuous	
n	17
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	NaN
results	NA

Report for ID : MW403 and Analyte : PFOS+PFHxS



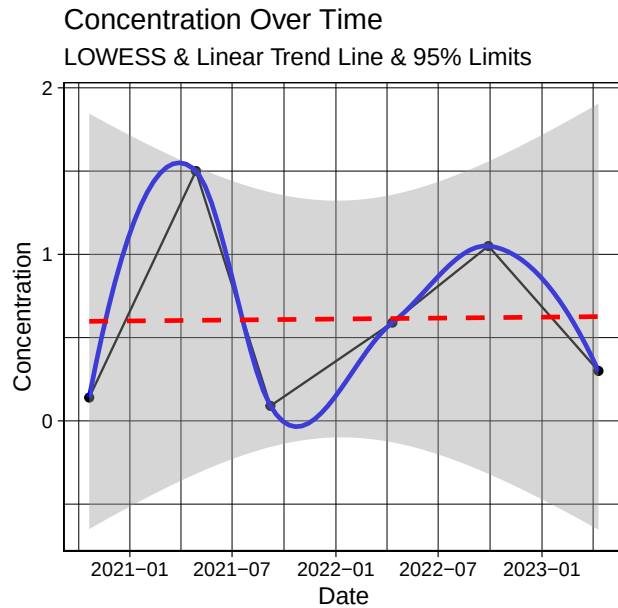
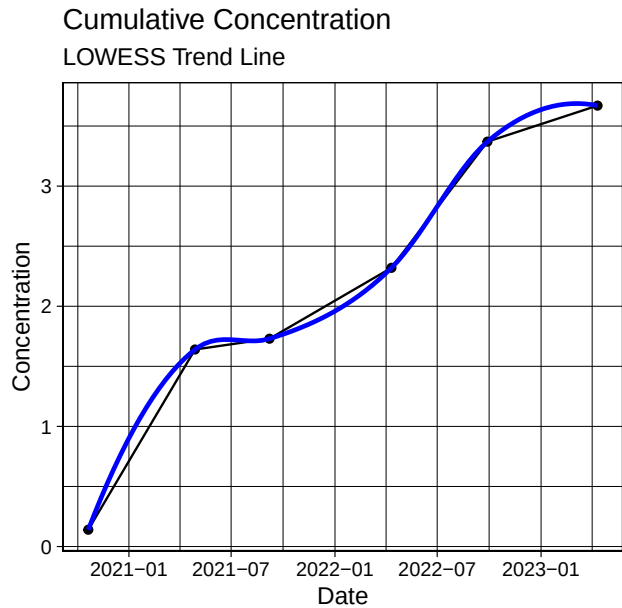
Kendall Trend Test Results Continuous	
n	6
z	1.13
p	0.26
S	7
varS	28.33
tau	0.47
mean	15.21
sd	8.79
cov	0.58
results	NO CLEAR TREND

Report for ID : MW504 and Analyte : PFOS+PFHxS



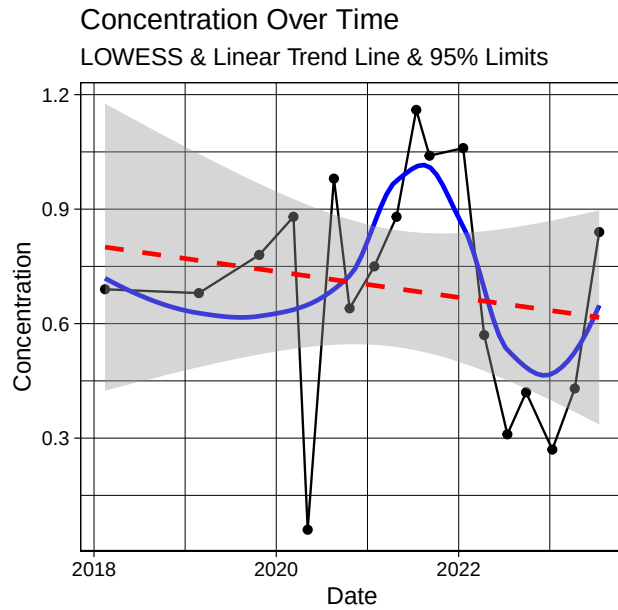
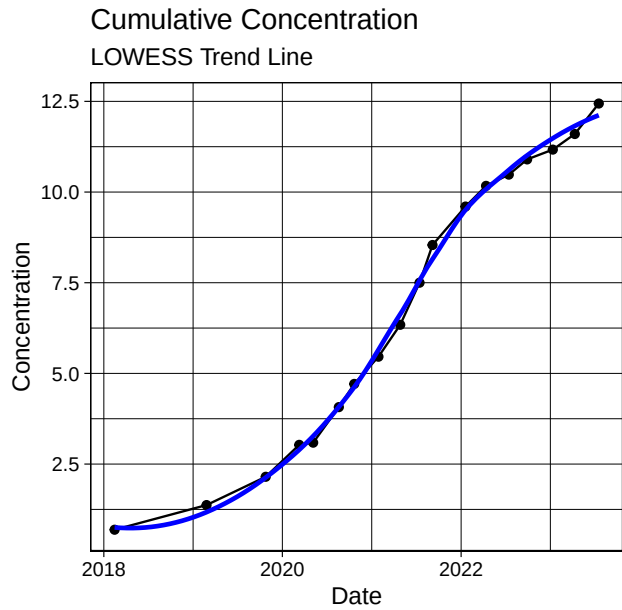
Kendall Trend Test Results Continuous	
n	6
z	0
p	1
S	1
varS	28.33
tau	0.07
mean	0.61
sd	0.56
cov	0.92
results	NO CLEAR TREND

Report for ID : MW505 and Analyte : PFOS+PFHxS



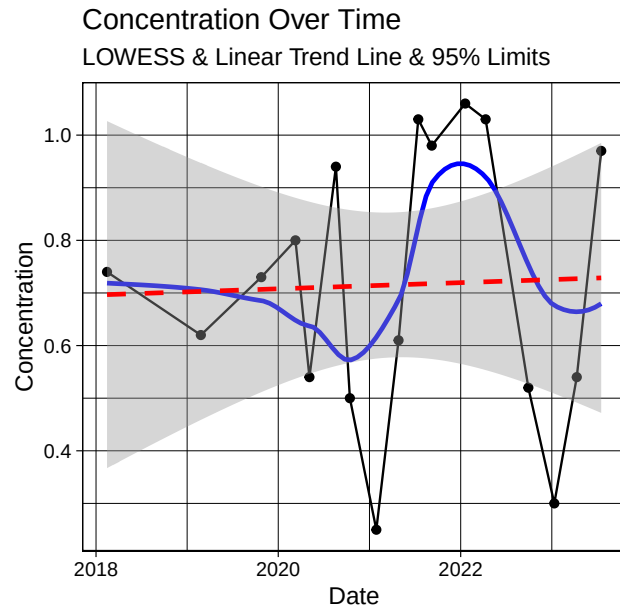
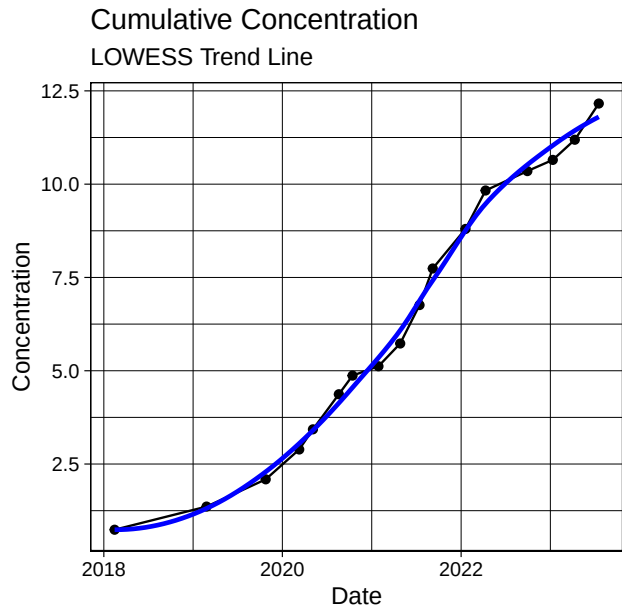
Kendall Trend Test Results Continuous	
n	18
z	-0.49
p	0.62
S	-14
varS	696
tau	-0.09
mean	0.69
sd	0.3
cov	0.44
results	STABLE

Report for ID : POT102 and Analyte : PFOS+PFHxS



Kendall Trend Test Results Continuous	
n	17
z	0.21
p	0.84
S	6
varS	587.33
tau	0.04
mean	0.72
sd	0.26
cov	0.36
results	NO CLEAR TREND

Report for ID : POT103 and Analyte : PFOS+PFHxS



Kendall Trend Test Results Continuous	
n	18
z	-0.08
p	0.94
S	-3
varS	695
tau	-0.02
mean	0.76
sd	0.34
cov	0.45
results	STABLE

Report for ID : POT104 and Analyte : PFOS+PFHxS

