

Ongoing Monitoring Interpretive Report (September 2021 - August 2022

Gingin Satellite Airfield

Prepared for
Department of Defence

19 July 2024



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Executive Summary

Introduction

Cardno, now Stantec, 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).

The OMP 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 Monitoring Area comprises both on-site and off-site areas. The on-site area is also identified as the Management Area (Department of Defence 2018b)², as shown in Figure 1 in Appendix A of this report). The off-site area incorporates the Yeal Swamp Nature Reserve to the south, north and west. Risks from PFAS contamination within this area are considered low and are not actively managed. The Monitoring Area is shown on Figure 1 of Appendix A.

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 PFAS Management Area Plan (PMAP) to monitor the amount of PFAS leaving the site through the groundwater. 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).

Monitoring Scope

The September 2021 – July 2022 monitoring period comprised four monitoring events conducted in general accordance with the Sampling and Analysis Quality Plan (SAQP), 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 2021 (post-winter) and April 2022 (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 selected taps (on-base), abstraction bores (on and off-base) and selected off-base groundwater monitoring wells was also conducted on a quarterly basis, in September 2021, January 2022, April 2022 and July 2022.

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 were consistent with results from previous monitoring rounds. Information from previous monitoring rounds can be found in the 2021 Annual Interpretive Report (AIR) and Detailed Site Investigation (DSI)².

PFAS Concentrations in Groundwater

PFAS concentrations in groundwater remained within an order of magnitude of the data collected at the locations during previous monitoring rounds.

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.

¹ The OMP is publicly available at www.defence.gov.au/Environment/PFAS/gingin, and is found as Attachment 1 of the PMAP

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) concentrations in groundwater during the monitoring period ranged from below the laboratory limit of reporting (LOR) (0.01 µg/L) to 147 µg/L (powerhouse; shown in Figure 2 of Appendix A).

As identified during the DSI, PFAS contaminant plumes are present in some locations across the site. PFAS contaminant plumes are identified as localised areas of PFAS contamination that slowly moves with the groundwater away from the source areas (Figure 2, Appendix A).

To determine the stability and extent of potential PFAS plume migration in groundwater, statistical analysis (Mann-Kendal) was

undertaken within the Monitoring Area. This showed that the PFAS plume is generally stable and, in some instances, decreasing in concentration. The Heads of EPA's (HEPA (2020)) PFAS National Environmental Management Plan (NEMP) Human Health Drinking Water guideline of 0.07 µg/L was generally exceeded at monitoring wells positioned in the immediate vicinity of site locations where PFAS was historically stored or used in training exercises. Overall, the groundwater monitoring results do not suggest a change in the understanding of contamination or risk within the Management Area.

PFAS 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 have been impacted by PFAS in groundwater and are monitored as part of the ongoing monitoring program. During the monitoring period, all tap water results were above the adopted HEPA (2020) Drinking Water guidelines, but below the recreational guidelines. PFAS concentrations in tap water remained within one order of magnitude of the historical data.

Based on the tap water results, no clear trends in PFAS concentrations were identified, however, no first-time detects or maximum concentrations were found. These locations are not used for potable water (with "not for drinking water use" signage) and it is noted that a number of these buildings are in the process of being demolished. As a result, there is no change in the understanding of the contamination or risk at these sampling locations.

Risk Summary

A review of the sources, pathways and receptors presented in the PMAP has been undertaken within this report. No new sources of PFAS contamination, transport pathways or potential receptors were identified during this monitoring period. Abstracted groundwater is currently not used for drinking purposes on-site and this management measure should remain in place to prevent potential risk to human health.

PFAS concentrations were consistently reported above the HEPA (2020) drinking water criterion at a boundary monitoring well downgradient of the on-site source areas (MW136D), and an off-site monitoring well (MW141S). This indicates a possible off-site migration pathway to the south-west. However, no detects have been reported to date at MW403 further downgradient, and the potential risk to off-site receptors therefore remains unchanged.

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

Conclusions

The September 2021 – August 2022 monitoring results met the objective of the OMP and work was carried out in general 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 Mann-Kendall trend analysis indicate that the PFAS plume generally displays a stable or statistically insignificant trend, with the exception of some monitoring wells that are trending higher ('increasing' or 'probably increasing') and others that are trending lower ('decreasing' or 'probably decreasing'). These will be reviewed over the next monitoring rounds to determine if any identified trends continue.

PFAS concentrations across the tap water network on-site generally displayed a stable or statistically insignificant trend except for a 'probably increasing' trend reported at the air traffic control tower and at the fire house kitchenette. 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 and tap water off-site has not changed from the understanding presented in the 2021 AIR and the PMAP. Based on the current available data there is no significant change to the risk profile of the Monitoring Area.

Given the remaining PFAS concentrations within the Monitoring Area, it is recommended that the ongoing monitoring program of groundwater and tap water is continued to monitor the extent of PFAS, potential migration, and any associated risk changes.

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Technical Terms & Abbreviations

AFFF	Aqueous Film Forming Foam
AHD	Australian Height Datum
AIR	Annual Interpretive Report
ANZECC	Australian and New Zealand Environment and Conservation Council
AS	Australian Standard
BGL	Below Ground Level
COC	Chain of Custody
CSM	Conceptual Site Model
DSI	Detailed Site Investigation
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
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
PSI	Preliminary Site Investigation
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
RWL	Reduced water level
SAQP	Sampling and Analysis Quality Plan
SWL	Standing Water Level

Units

ha	Hectares
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
µS/cm	Micro Siemens per Centimetre (Electrical Conductivity - Water)

Chemical Names

DOC	Dissolved Organic Carbon
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)
TSS	Total Suspended Solids

Site Specific

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

1 Introduction

The Australian Department of Defence ('the Client' or 'Defence') engaged Cardno Pty Ltd (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 (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 objective of the OMP is to *"set out a program of monitoring of groundwater (on and off-site), tap water (non-potable) and existing Abstraction Bore 2 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 AFFF"*.

The scope of the monitoring specified in the OMP is to:

- > Evaluate the nature and extent of PFAS in groundwater beyond the southern boundary of the site.
- > Assess variability inherent in laboratory methods, sampling processes or seasonal variability in groundwater conditions.
- > Assess any changes in concentrations of PFAS in groundwater migrating from source areas and being abstracted from the underlying aquifer since the discontinued use of legacy Aqueous Film-Forming Foam (AFFF).
- > Assess seasonal fluctuations in the groundwater PFAS concentrations.
- > Characterise the stability of the reported PFAS plume in the superficial aquifer and understand the dynamics of groundwater migration pathways around the perimeter of the site.
- > Fulfil the recommendations outlined in the PMAP to provide supporting data to inform the ongoing management requirements for the impacted superficial aquifer.

The purposes of the Ongoing Monitoring Interpretive Report (OMIR) 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.
- > Confirm the monitoring has met the objectives of the Sampling and Analysis Quality Plan (SAQP) and overall OMP; and
- > Identify if a review of the OMP is required.

1.3 Scope of Work

The ongoing monitoring program was carried out between September 2021 and August 2022 in accordance with the scope and limitations presented in the SAQP, Appendix B:

- > Cardno, 15 June 2021, Reference: DEF19009, 'PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Gingin Satellite Airfield'.

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

The assessment included the following main components:

- > Biannual monitoring (gauging and sampling) of all on-site groundwater wells.
- > Sampling from selected taps and abstraction bores at the site 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)³; and
 - Four shallow groundwater monitoring wells located between the Water Corporation bores and the site boundary.

Biannual sampling was undertaken post-winter (September 2021), and post-summer (April 2022) with additional quarterly events in January 2022 and July 2022.

1.4 Standards of Assessment and Limitations

This OMIR 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.

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 & Validation (SRV) report.
- > A Site Management Plan (SMP).

³ 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 includes firefighting services, operated by a Defence contractor, Broadspectrum (now Ventia). 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); and
- > Radio tower and associated buildings.

2.1 Site Definition and Planning

The site location is presented on 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 Gnangara Underground Water Pollution Control Area (UWPCA).

2.3 Monitoring Area Description

The OMP includes sampling and analysis not only from the site (Management Area), but also from six surrounding (off-site) groundwater monitoring wells (Monitoring Area). 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 beyond ongoing monitoring is not considered necessary.

For the purposes of this report:

- > The Management Area was defined as the site (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 (Figure 1, Appendix A).

2.4 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 Metrology (BoM) indicate that the highest volume of rainfall typically occurs during the month of July with a mean monthly rainfall amount of 145 mm (BoM, 2023). The mean annual rainfall is recorded as 737.8 mm.</p> <p>February is the hottest month of the year with a mean temperature of 33.2°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 m Australian Height Datum (AHD), with the runway at 75 m AHD.</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>

Setting	Description
	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.
Acid Sulfate Soil	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).
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 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 where off-site migration of stormwater occurrences are rare.</p>
	<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 m bgl 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 m bgl which is inferred to be in the Leederville aquifer. <p>Groundwater Elevation</p>

Setting	Description
	<p>During the post-summer sampling event, groundwater elevations were recorded between 56.62 mAHD (MW128D) and 65.556 mAHD (MW303).</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-west, with a component of groundwater flow to the south observed in the southern portion of the site as displayed in Figures 4A, 4B, 5A and 5B, Appendix A.</p>
Environmental Sensitive Areas	<ul style="list-style-type: none"> ▪ The Yeal Nature Reserve and Gngara-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.

Further information can be found in the OMP (Defence, 2018a) and Jacobs DSI (Jacobs 2018c).

2.5 Source Areas

The primary PFAS source areas identified based on the previous investigation reports (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 located at 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; and
- > 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.

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
2021 post-winter biannual monitoring	Groundwater monitoring (sampling and gauging) Tap sampling	6 to 10 September 2021
First quarterly monitoring	Limited groundwater monitoring (sampling and gauging) Tap sampling	19 and 20 January 2022
2022 post-summer biannual monitoring	Groundwater monitoring (sampling and gauging) Tap sampling	11 to 13 April 2022
Second quarterly monitoring	Limited groundwater monitoring (sampling and gauging) Tap sampling	15 July 2022

3.2 Groundwater Sampling Network

Sampling of selected groundwater monitoring locations was generally performed in accordance with the SAQP (Cardno 2021, Appendix B), applying methods set out in Section 6.3.3 of the SAQP. The groundwater wells monitored as part of the OMP are presented in Table 3-2 and are shown on Figures 3A and 3B, Appendix A.

Table 3-2 Groundwater Monitoring Locations

Monitoring Area	Monitoring Well / Bore 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 Landfills - MW106S, MW107S, MW108S, MW109S, MW110S
On-site – Secondary Sources	Sewage system and leach field (SA04): MW114S Site Drainage - MW115S Water Supply Infrastructure – MW312, MW313, MW111S, MW505 Abstraction bore 1 - MW401 Abstraction bore 2 - MW402
On-site - Other	Airside perimeter – MW116S, MW117I, MW118D, MW119S, MW120I, MW121D, MW122S, MW123I, MW124D Site boundary – MW125S, MW126I, MW128D, MW129S, MW130D, MW131S, 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) These are 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)

3.3 Tap Water Sampling Locations

Tap water samples were collected from the monitoring locations listed in Table 3-3 and shown on 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, 2021, Appendix B).

Table 3-3 Tap Water Monitoring Locations

Monitoring Area	Location ID
On-site	POT102, POT103 POT104
Notes:	
Tap water 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 2021 (post-winter)		
MW101I, MW107S, MW108S, MW111S, MW119, MW143S	Not sampled	These monitoring wells were found dry.
January 2022		
MW143S		These monitoring wells were found dry.
MW402	Not sampled	Access denied by Broadspectrum, due to presence of Amoeba.
April 2022 (post-summer)		
MW108S, MW107S, MW111S, MW114S, MW134D, MW143S, MW403, MW305, MW306, MW308, MW309	Not sampled	These wells were found dry
July 2022		
MW143S		Well was found dry
MW402	Not sampled	Unable to unscrew pipe lid to collect sample.
POT103	Not sampled	Unable to access the building

3.5 Changes to the Monitoring Network Condition

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

- > Groundwater monitoring well MW307 was found destroyed during the post-winter 2021 monitoring event.
- > The buildings where tap water monitoring locations POT101 and POT105 were located were decommissioned and demolished. These tap water locations were subsequently removed from the SAQP.
- > Tap water location POT103 was not accessible for sampling during the Q3 2022 quarterly monitoring event due to the building where it is located being no longer in use and locked.

4 Quality Assurance / Quality Control

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 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 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 sulfonic acid

6 Contextual and Ancillary Information

6.1 Additional Analytical Data

All data available at the time of reporting on the 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 (PSI and DSI) results.

6.2 Remediation Projects

None completed.

6.3 Infrastructure Projects

No infrastructure projects that could affect the interpretation of monitoring results were undertaken at the site during the monitoring period. However, it is noted that POT101 and POT105 could not be accessed as the building has been decommissioned and is no longer accessible.

6.4 Climate

Rainfall is potentially the most significant meteorological factor that can influence PFAS migration. Monthly rainfall for all months between January 2018 and April 2023 [measured at Bureau of Meteorology (BoM) gauge 9178, Gingin Aero] are displayed in Figure 6-1.

It is noted during the September 2021 – August 2022 monitoring period that rainfall levels were generally below the mean rainfall, except for August 2022 where significantly 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 2022 are consistent with mean monthly maximum results, with no significant variations recorded (Figure 6-2) (BoM, 2022).

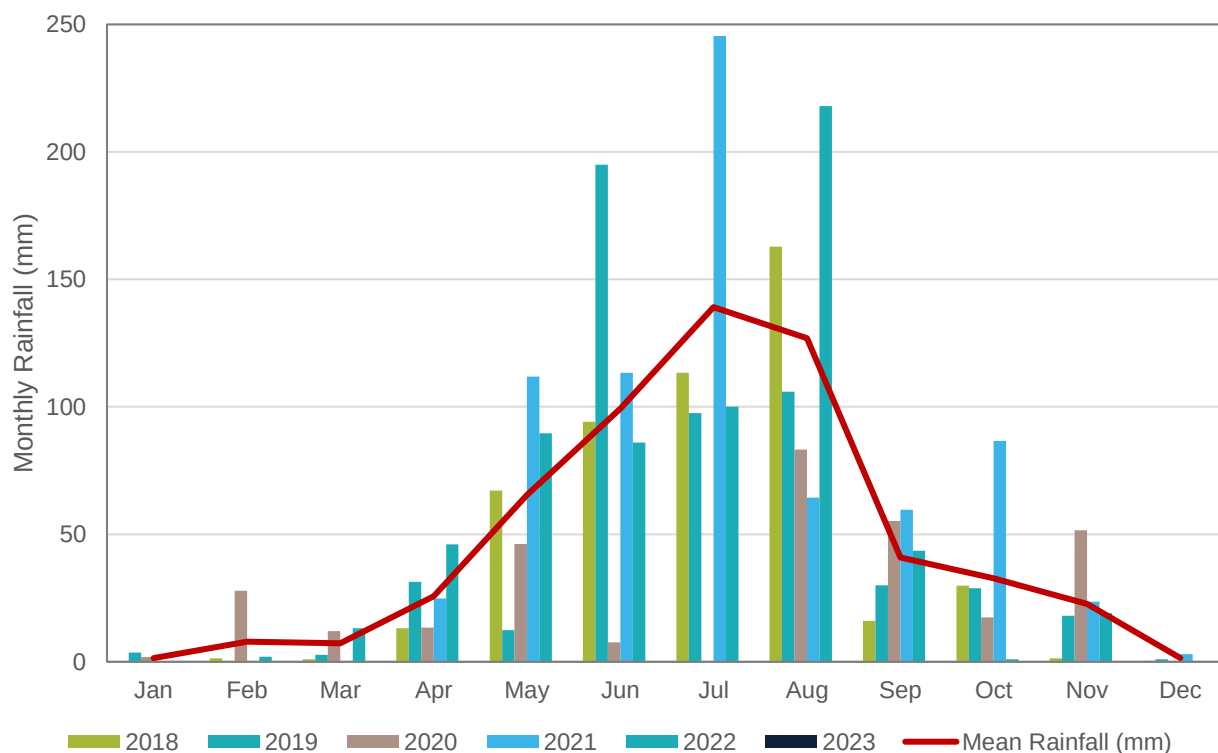


Figure 6-1 Rainfall data 2018 – 2023 and Long-term Mean Monthly Rainfall for Gingin Aero (Station 9178) (BOM, 2022)

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

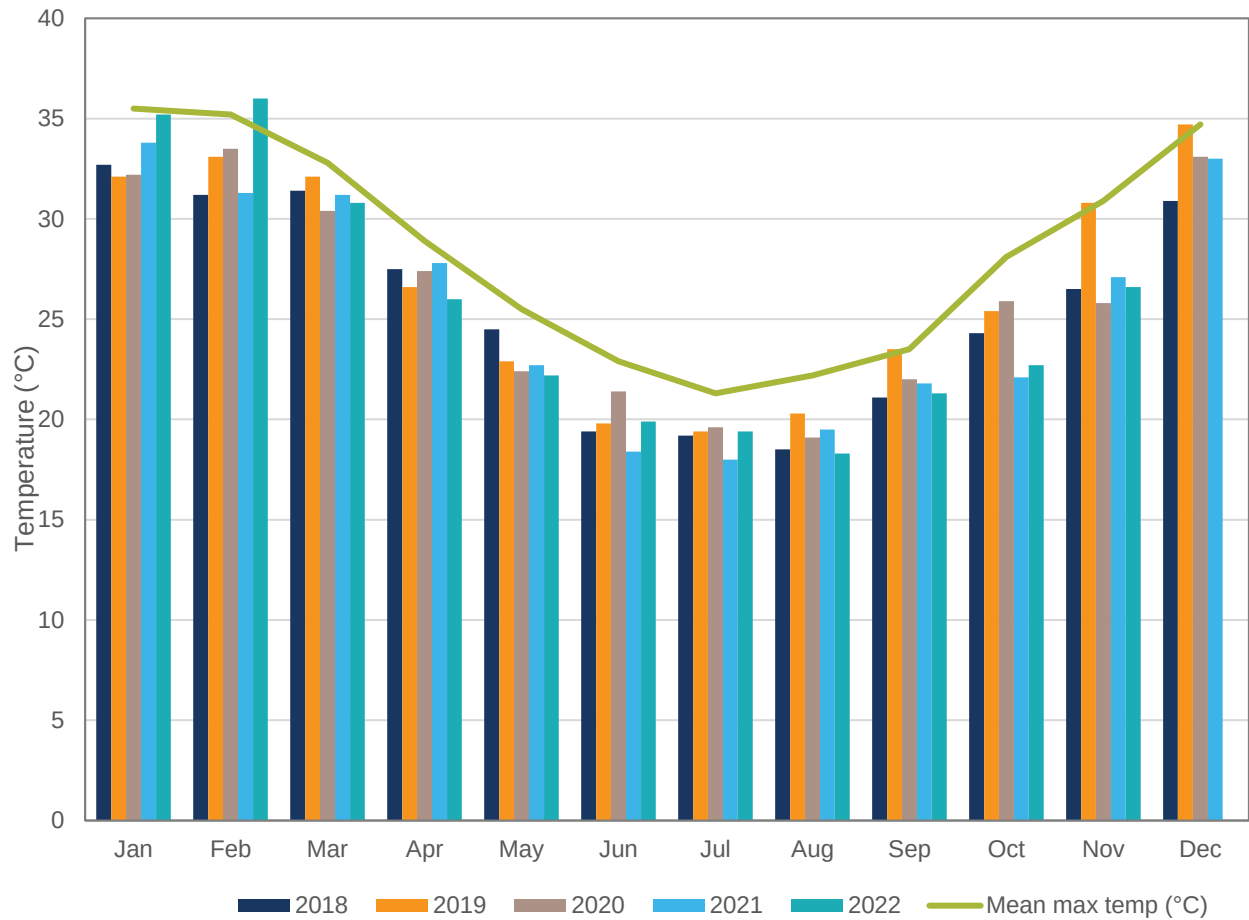


Figure 6-2 Monthly Mean Maximum Temperature 2018 – 2022 and Long-term for Gingin Aero (Station 9178) (BOM, 2022)

7 Monitoring Data Summary

7.1 Groundwater

Groundwater information is presented as follows:

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

7.1.1 Groundwater Geochemical Parameters

Groundwater geochemical parameters recorded during the post-winter 2021 and post-summer 2022 monitoring events are summarised in Table 7-1 and provided in Appendix D. Geochemical parameters recorded during the quarterly monitoring events have not been summarised below as only a limited number of bores are monitored during these events.

Table 7-1 Groundwater Geochemical Parameters

Parameter	Post-winter 2021 (September 2021)	Post-summer 2022 (April 2022)
DO	0.78 mg/L (MW123I) – 5.97 mg/L (MW313) <i>Aerobic conditions</i>	0.52 (MW124D) –9.39 (MW112S) <i>Aerobic conditions</i>
EC	92.7 µS/cm (MW120I) – 897 µS/cm (MW402)	61 µS/cm (MW504) –676 µS/cm (MW140D)
TDS	60.45 mg/L (MW120I) – 585 mg/L (MW402) <i>Fresh to brackish conditions</i>	39.65 mg/L (MW504) – 442 mg/L (MW140D) <i>Fresh conditions</i>
pH	3.53 (MW137S) – 7.25 (MW140D) <i>Acidic to neutral conditions</i>	3.41 (MW106S) – 9.62 (MW105D) <i>Acidic to alkaline conditions</i>
ORP	-157.3 mV (MW141S) – 87 mV (MW106S) <i>Reducing to oxidising conditions</i>	-62 mV (MW101I) – 337 mV (MW142S) <i>Reducing to oxidising conditions</i>

Groundwater geochemical parameters recorded during the September 2021 - August 2022 monitoring period were comparable to historical field data range.

7.1.2 Groundwater Elevations and Migration Contours

Groundwater gauging data measured during the post-winter 2021 and post-summer 2022 monitoring events are presented within Appendix D. Inferred groundwater contours are presented on Figures 4A, 4B, 5A and 5B, Appendix A. A summary is provided in Table 7-2. The groundwater characteristics are consistent with historical records.

Table 7-2 Groundwater Levels and Flow Direction

Item	September 2021 (post-winter)	April 2022 (post-summer)
Depths to groundwater	5.07 mbTOC (MW115S) – 21.69 mbTOC (MW136D)	5.62 mbTOC (MW115S) – 21.67 mbTOC (MW136D)
Groundwater elevation	52.52 mAHD (MW403) – 67.02 mAHD (MW114S)	52.42 mAHD (MW403) – 66.28 mAHD (MW114S)
Inferred direction of groundwater flow	Groundwater flow direction is inferred to flow from the site in a west-southwesterly direction, with wells in the southern portion of the site indicating a south direction, which is consistent with previous monitoring rounds.	
Seasonal difference in groundwater elevation	Groundwater levels were on average 0.26 m shallower during the post-winter event.	

The groundwater elevations and inferred contours and flow direction were consistent with historical data.

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 were of the same order of magnitude as historical data (Table 7-3).

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

Well ID		Sample Date				
Historical range		Sep - 21	April-22	Historical range	Sep-21	April-22
PFOA (µg/L)				PFHxS+PFOS (µg/L) ¹		
Former Fuel Farm						
MW101I	<0.01 – 0.02	0.01	0.02	0.25 – 0.60	0.53	0.58
MW102D	<0.01 - 0.01	<0.01	<0.01	<0.01 – 0.49	0.26	0.08
MW112S	<0.01	<0.01	<0.01	0.04 – 0.14	<0.01	0.02
MW113S	<0.01	<0.01	<0.01	<0.01 - 0.03	0.05	<0.01
MW301	0.02 - 1.60	1.42	2.39	0.12 – 63.5	67.1	79.5
MW302	<0.01 - 0.46	0.10	0.14	<0.01 – 8.30	2.16	2.64
MW303	0.68 – 3.0	0.41	0.60	21.6 – 82.8	60.6	45.9
Fire House and Refuelling Area						
MW504	0.25 – 0.25	0.69	0.49	0.04 – 6.90~	25.5	15.8
MW104I	<0.01 – 0.06	0.03	0.03	0.08 – 2.65	0.87	0.88
MW105D	<0.01 – 0.08	0.02	0.02	0.09 – 2.46	0.87	0.39
MW304	0.16 – 0.45	0.20	0.18	6.69 – 41.0	6.32	6.37
MW305	0.15 – 0.99	0.15	0.08	4.1 – 6.86	4.94	3.98
MW306	0.22 – 0.34	0.18	0.20	5.8 – 7.0	6.60	6.39
Powerhouse						
MW307	0.28 - 1.51	0.42	0.41	14.5 – 53.0	23.7	16.5
MW308	0.15 – 1.6	0.30	1.26	46.2 – 47.0	31.1	48.1
MW309	0.22 - 5.0	0.39	2.76	42.2 – 271.0	213.0	151.0
MW310	0.25 – 2.27	Dry	Dry	14.4 – 78.1	Dry	Dry
Landfills						
MW106S	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW107S	<0.01*	Dry	Dry	<0.01*	Dry	Dry
MW108S	<0.01*	Dry	Dry	<0.01*	Dry	Dry
MW109S	<0.01 - 0.16	<0.01	0.01	0.25 – 1.90	0.12	0.79
MW110S	<0.01	<0.01	<0.01	0.01 - 0.14	0.07	0.09
New Maximum		New Minimum			New Exceedance	

Notes:

1. PFHxS were not analysed prior to 2018

* Only sampled once in March 2018.

The Sum of PFHxS and PFOS concentrations were higher than PFOA concentrations across the monitoring network. Concentration trends for the Sum of PFOS and PFHxS for the Former Fuel Farm, Fire House and Refuelling Area, the Powerhouse and the Landfills are presented in Figure 7-1 to Figure 7-4. A logarithmic scale is used for the vertical axis. Non-detectable concentrations were replaced by half of the LOR value (0.005 µg/L).

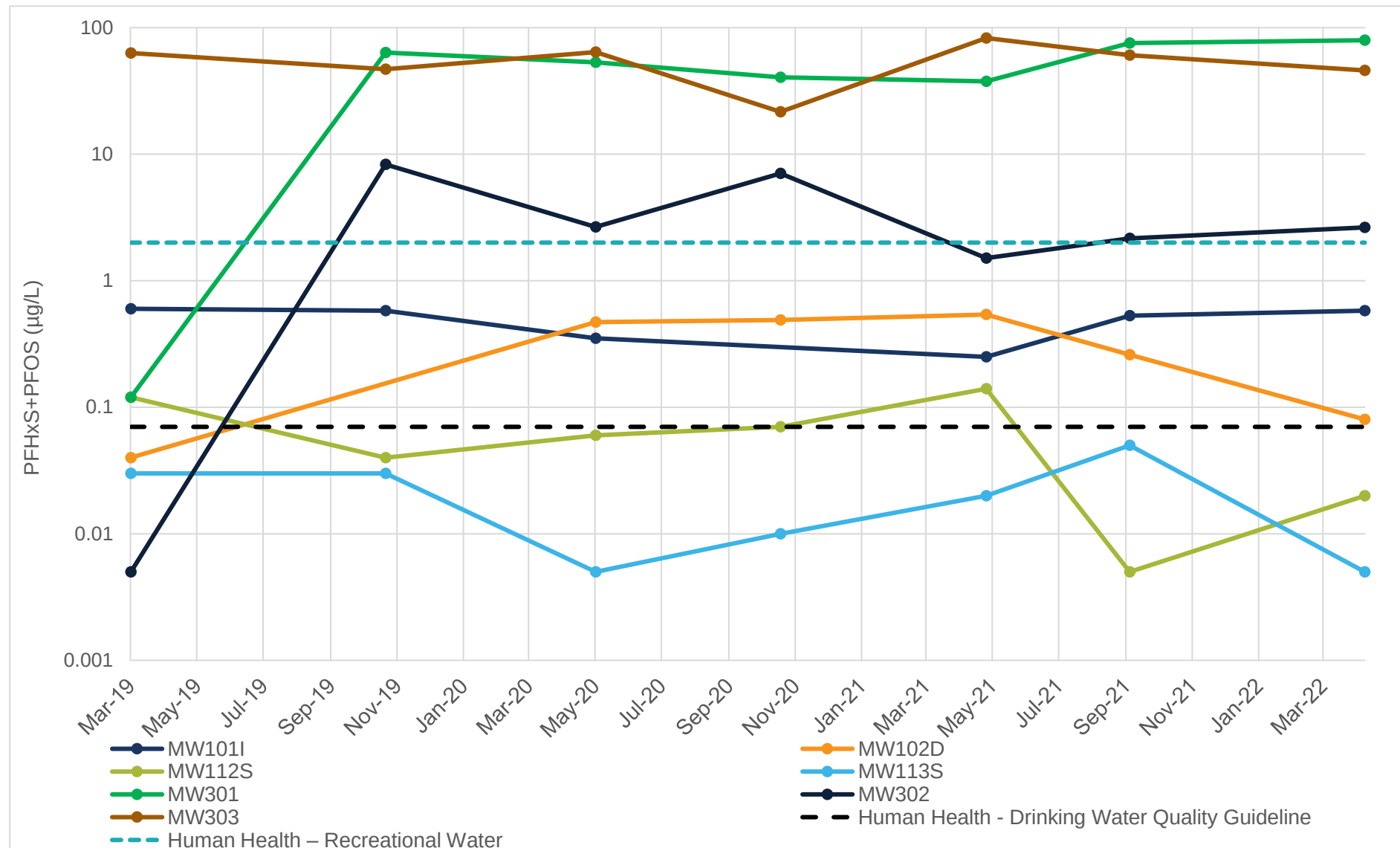


Figure 7-1 Former Fuel Farm Area PFHxS+PFOS Concentration Trends

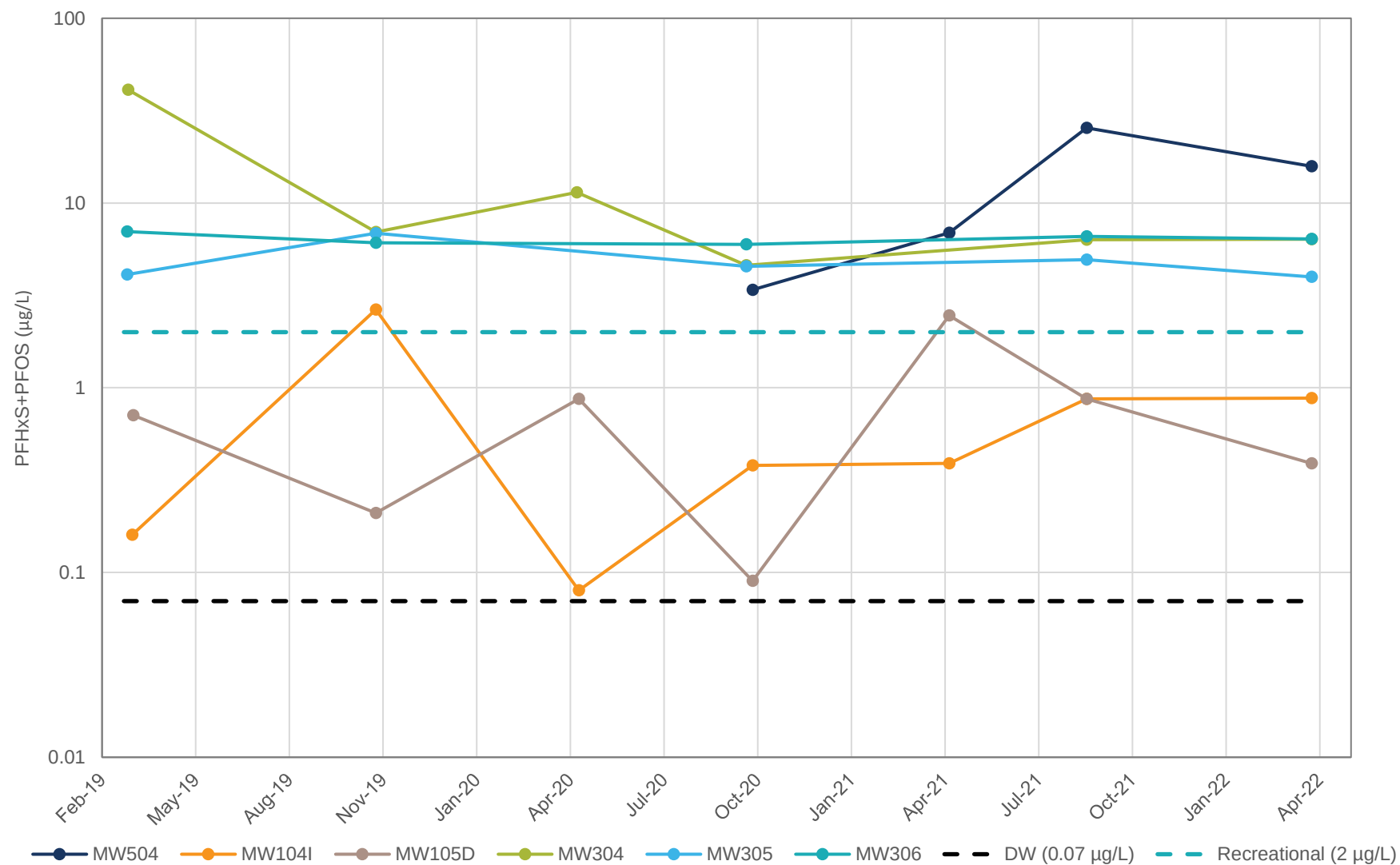


Figure 7-2 Fire House and Refuelling Area PFHxS+PFOS Concentration Trends

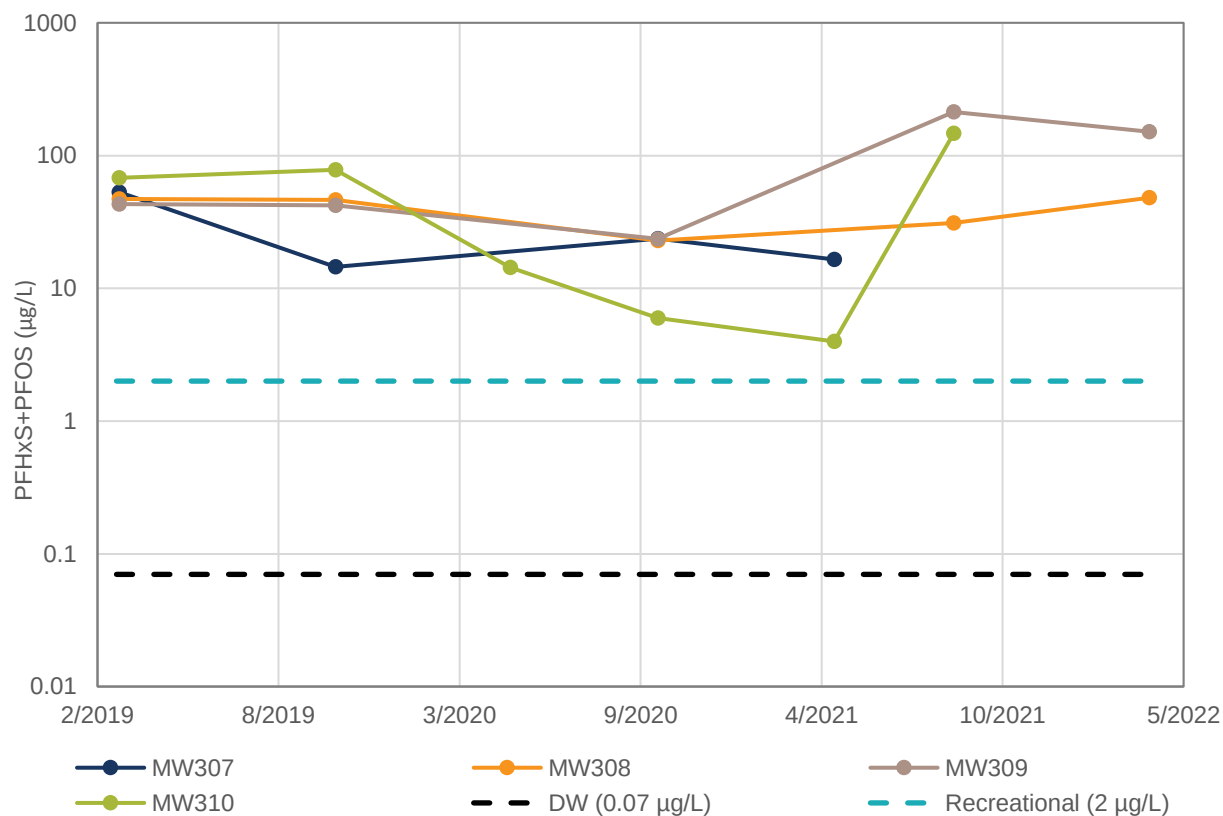


Figure 7-3 Powerhouse PFHxS+PFOS Concentration Trends

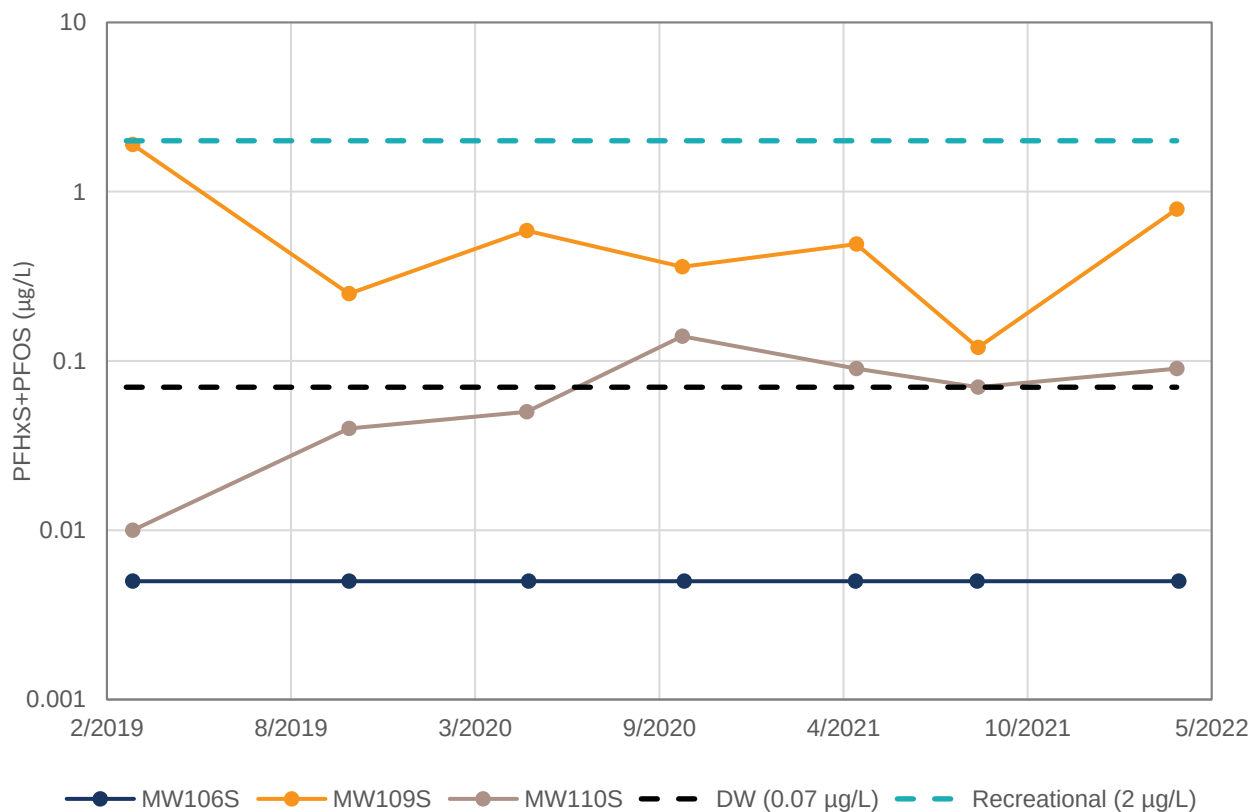


Figure 7-4 Landfills PFHxS+PFOS Concentrations Trends

7.1.3.2 On-site – Secondary Sources

There are five areas identified as on-site secondary sources, the well details associated with each source area are provided below:

- > Sewage system and leach field (SA04): MW114S.
- > Site Drainage - MW115S.
- > Water Supply Infrastructure –MW505, MW312, MW313, MW111S.
- > Abstraction bore 1 - MW401; and
- > Abstraction bore 2 – MW402.

Similar to the 2021 monitoring period, concentrations of PFOA were reported below the drinking water criteria of 0.56 µg/L at all monitoring wells.

The Sum of PFHxS and PFOS exceeded the Recreational criteria of 2 µg/L for the first time at MW402. Concentrations were below this criterion in all other samples but remained above the drinking water criteria for the most part.

PFAS concentrations at MW401 continued to be reported below the LOR.

The results for PFOA and the Sum of PFHxS and PFOS for the on-site secondary sources are displayed in Table 7-4.

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

Well ID	Historical Range	Sept-21	Apr-22	Historical Range	Sept-21	Apr-22
PFOA (µg/L)			PFHxS+PFOS (µg/L) ¹			
MW111S	0.06*	Dry	Dry	2.39*	Dry	Dry
MW114S	<0.05 – 0.03	0.02	0.02	0.78 – 1.80	0.78	1.26
MW115S	<0.01	<0.01	<0.01	0.01 - 0.35	0.03	0.14
MW505	<0.01 - 0.03	<0.01	0.01	0.09 – 1.50~	0.09	0.59
MW312	0.02 – 1.06	<0.01	0.02	0.98 – 3.25	0.29	1.24
MW313	<0.01 – 1.64	<0.01	<0.01	0.13 – 1.4	0.09	0.22
MW401	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW402	0.02 - 0.07	0.60	0.10	0.77 – 2.26	1.76	2.27
New Maximum			New Minimum		New Exceedance	

Notes:

1. PFHxS were not analysed prior to 2018.

NS – Not sampled.

~Historical range for MW311 – MW505 is a replacement well for MW311.

* only previously analysed in March 2018

A concentration trend graph for the Sum of PFHxS and PFOS for the on-site secondary sources is presented in Figure 7-5.

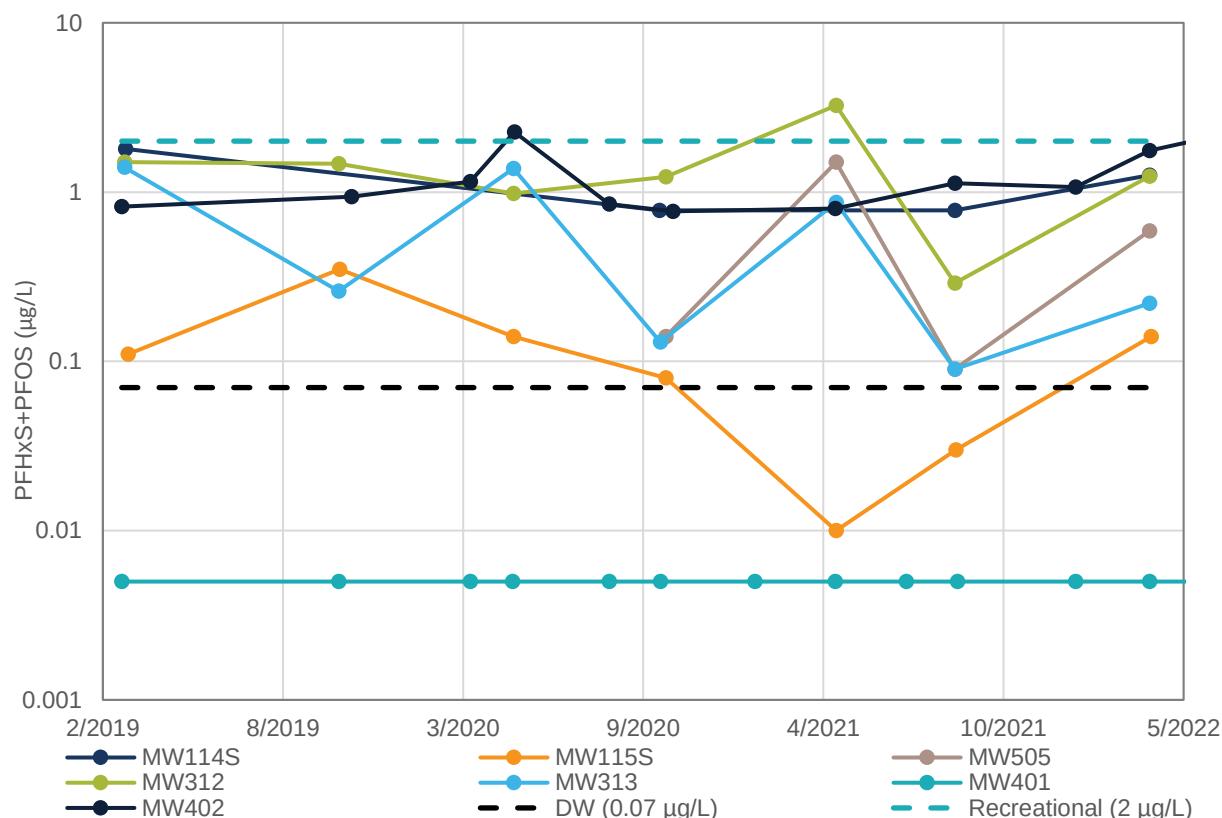


Figure 7-5 On-site Secondary Source Areas PFHxS+PFOS Concentration Trends

7.1.3.3 On-site – Other

This 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; and
- > A singular off-site 'background well': MW137S.

Similar to the 2021 monitoring period, concentrations of PFOA were reported below the drinking water (0.56 µg/L) and recreational (2 µg/L) criteria at all monitoring wells during 2022.

Concentrations reported across the boundaries well network during the September 2021 to August 2022 monitoring events were consistent (i.e., within the same order of magnitude) with historical ranges. Monitoring wells MW118D, MW121D, MW124D, MW125S, MW126I, MW128D, MW129S, MW130D, MW135I, MW137S, MW139I, MW140D possessed concentrations of PFOA and the Sum of PFHxS and PFOS below the LOR during both sampling events.

A new exceedance of Sum of PFHxS and PFOS was identified at MW122S during September 2021, however, concentrations decreased to below the drinking water criteria in April 2022. The Sum of PFHxS and PFOS was also detected above the LOR for the first time at MW136D in April 2022, albeit the concentration was marginal (0.01 µg/L) and no criteria were exceeded.

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

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

Well ID	Historical Range	Sept-21	Apr-22	Historical Range	Sept-21	Apr-22
		PFOA (µg/L)		PFHxS+PFOS (µg/L)		
Inner Perimeter						
MW116S	<0.01	<0.01	<0.01	<0.01 – 0.07	0.04	0.04
MW117I	<0.01	<0.01	<0.01	<0.01 – 0.03	<0.01	0.02
MW118D	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW119S	<0.01	<0.01	<0.01	<0.01 – 0.06	0.02	0.08
MW120I	<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 – 0.02	0.11	0.06
MW123I	<0.01	<0.01	<0.01	0.09 – 0.14	0.13	0.09
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
MW131S	<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	0.03	0.03
MW133D	<0.01	<0.01	<0.01	<0.01 – 0.04	<0.01	0.01
MW134D	NS	NS	NS	NS	NS	NS
MW135I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW136D	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
MW138S	<0.01 – 0.01	<0.01	<0.01	0.08 – 0.44	0.16	0.08
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
Background						
MW137S	<0.01	<0.01	<0.01	<0.01 – 0.06	<0.01	<0.01
New Maximum		New Minimum		New Exceedance		

Notes:

1. PFHxS were not analysed prior to 2018.

NS – Not sampled

Based on the concentrations recorded being mostly below LOR, a trend graph has not been developed for the boundaries well network.

7.1.3.4 Off-site

Monitoring wells MW141S, MW142S and MW143S are sampled on a regular basis as part of the OMP to provide an indication of any change in the nature or magnitude of PFAS migrating off-site (if any), and the data is used to assess seasonal fluctuations and recommend management measures if required. The DWER bore MW403 located further south of the site is also monitored quarterly to provide an early indication of PFAS migrating off-site (if any).

Concentrations of PFOA and Sum of PFHxS and PFOS were reported below the LOR at MW403 and MW142S. However, elevated concentrations of PFOA and Sum of PFHxS and PFOS were identified at MW141S where the latter consistently exceeded the drinking water criteria. It is noted that concentrations decreased throughout the September 2021 – August 2022 monitoring period.

MW143S was found dry during all sampling events of the monitoring period.

Defence has been advised that the Water Corporation has undertaken sampling for PFAS at production bores Pinjar bore 140 (Superficial aquifer) and Pinjar bore 145 (Leederville aquifer) on a quarterly basis since March 2020. The Water Corporation has advised that, to date, PFAS concentrations reported in groundwater have been below the Australian Drinking Water Guidelines 2011 (as amended March 2021).

The results for PFOA and Sum of PFHxS and PFOS are displayed in Table 7-6.

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

Well ID	Historical Range	Sept-21	Jan-22	Apr-22	Jul-22	Historical Range	Sept-21	Jan-22	Apr-22	Jul-22
PFOA (µg/L)						PFHxS+PFOS (µg/L)				
MW141S	0.02 – 0.05	0.04	0.05	0.04	0.03	0.42 – 1.32	1.06	1.52	0.92	0.72
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	NS	NS	NS	NS	0.01 – 0.02	NS	NS	NS	NS
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			

A concentration trend graph for Sum of PFHxS and PFOS for the off-site wells is presented in Figure 7-6.

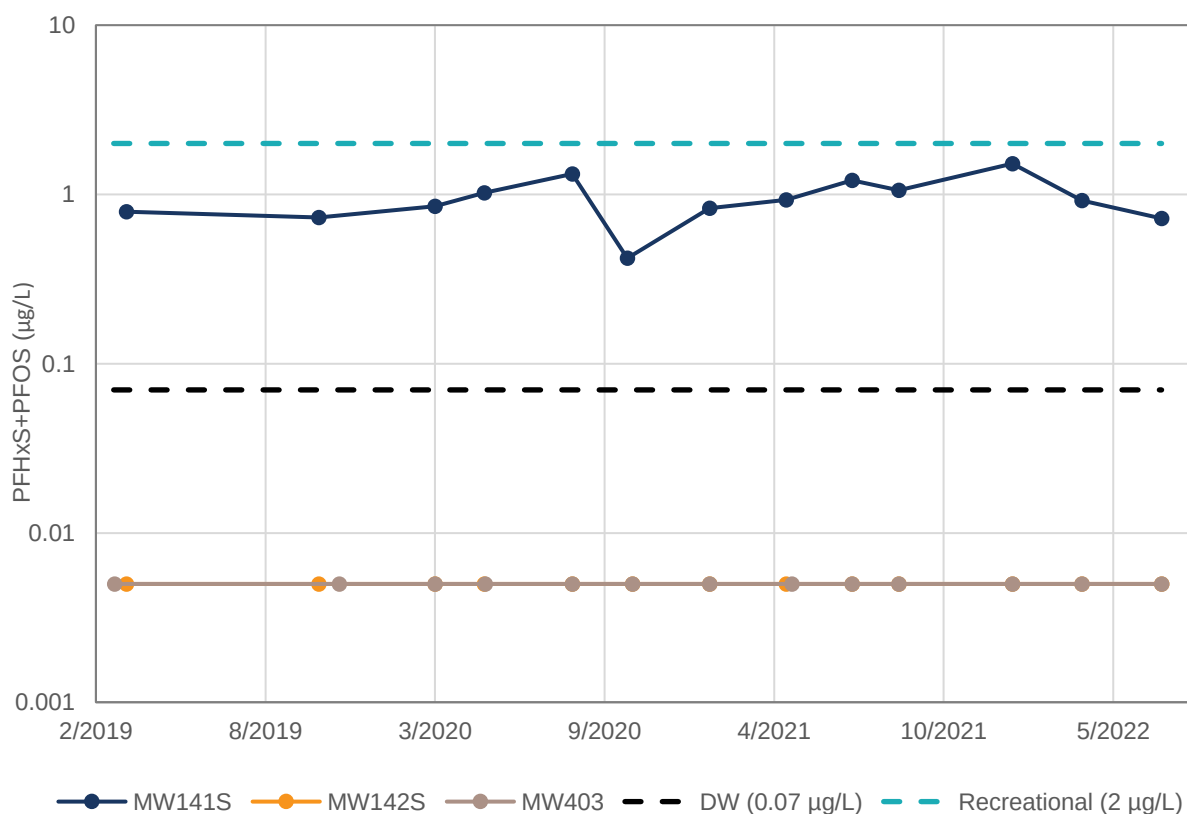


Figure 7-6 Off-site wells PFHxS+PFOS Concentration Trends

7.2 Tap Water

7.2.1 Tap Water Geochemical Parameters

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

Table 7-7 Tap Water Geochemical Parameters

Parameter	Post-winter 2021 (September 2021)	Q1 2021	Post-summer 2022 (April 2022)	Q3 2021
EC	538.9 µS/cm (POT103) – 647 µS/cm (POT101)	679 µS/cm (POT104) – 787 µS/cm (POT102)	873 µS/cm (POT103) – 1,074 µS/cm (POT104)	849 µS/cm (POT102) – 891 µS/cm (POT104)
TDS	350.1 mg/L (POT103) – 422.5 mg/L (POT101) <i>Fresh conditions</i>	399.1 mg/L (POT104) – 453 mg/L (POT102) <i>Fresh conditions</i>	615 mg/L (POT103) – 720 mg/L (POT102) <i>Fresh conditions</i>	624 mg/L (POT102) – 652 mg/L (POT104) <i>Fresh conditions</i>
pH	5.96 (POT101) – 6.96 (POT103) <i>Slightly acidic to neutral conditions</i>	5.73 (POT104) – 6.40 (POT102) <i>Slightly acidic to neutral conditions</i>	6.09 (POT102) – 6.97 (POT104) <i>Slightly acidic to neutral conditions</i>	5.98 (POT104) – 6.03 (POT102) <i>Acidic to slightly acidic conditions</i>
ORP	-52.3 mV (POT101) – 117.7 mV (POT105) <i>Reducing to oxidising conditions</i>	125.8 mV (POT103) – 367.5 mV (POT102) <i>Oxidising conditions</i>	159.1 mV (POT102) – 567.3 mV (POT103) <i>Oxidising conditions</i>	43 mV (POT104) – 131.6 mV (POT102) <i>Oxidising conditions</i>

7.2.2 Tap Water Results Summary

The tap water analytical results are provided in Table 1, Appendix D.

New exceedances of the criteria or new maximum concentrations were identified during the September 2021 – August 2022 monitoring period where PFAS was consistent with previous magnitudes. The recreational criteria for the Sum of PFHxS and PFOS and PFOA of 2 µg/L and 10 µg/L, respectively, were not exceeded at any time. Similar to the 2021 monitoring period, Sum of PFHxS and PFOS concentrations regularly exceeded the drinking water criteria at all wells.

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

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

ID	Sample Date									
	Historical Range	Sept- 21	Jan- 22	Apr -22	Jul- 22	Historical Range	Sept- 21	Jan-22	Apr- 22	Jul- 22
PFOA (µg/L)						PFHxS+PFOS (µg/L)				
POT102	< 0.01 – 0.04	NS	NS	NS	NS	0.06 – 1.16	NS	NS	NS	NS
POT103	0.01 – 0.04	0.03	0.04	0.04	NS	0.25 – 1.03	0.63	0.67	0.66	NS
POT104	< 0.01 – 0.05	0.03	0.05	0.03	0.02	0.8 – 1.28	0.96	1.22	0.69	0.27
New Maximum		New Minimum					New Exceedance			

A concentration trend for the Sum of PFHxS and PFOS for tap water samples is presented in Figure 7-7.

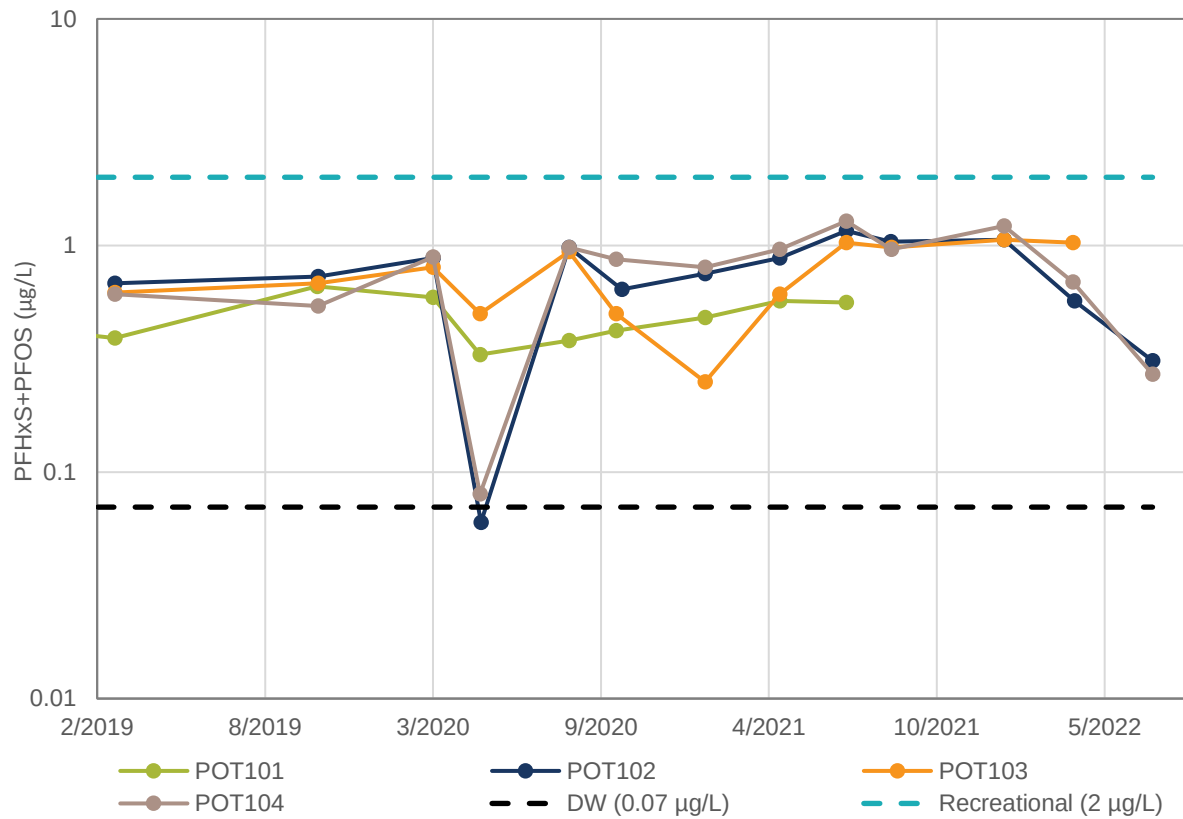


Figure 7-7 Tap Water PFHxS+PFOS Concentration Trends

8 Interpretive Analysis

This section discusses the results of the post-winter 2021, post-summer 2022, first quarterly and second quarterly monitoring events conducted during the September 2021 – August 2022 monitoring period.

Potential trends in concentrations, including Mann-Kendall analysis, and plume migration are discussed in the following sections.

Trends in concentrations over time have been assessed using the publicly available GSI Environmental Mann-Kendall toolkit (GSI, 2012). 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 of three statistical metrics (GSI, 2012), as follow:

- > 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"; and
- > 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 (PFHxS+PFOS) and Figures 10A and 10B (PFOA) for the September 2021 event.
- > Figure 7 (PFHxS+PFOS) and Figure 11 (PFOA) for the January 2022 event.
- > Figures 8A and 8B (PFHxS+PFOS) and Figures 12A and 12B (PFOA) for the April 2022 event; and
- > Figure 9 (PFHxS+PFOS) and Figure 13 (PFOA) for the July 2022 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 the Sum of PFHxS and PFOS concentrations over time.

PFAS concentrations recorded during the monitoring period were generally within historical range. The following exceptions are noted:

- > New maximum concentrations:
 - MW301: Concentrations of PFOA were identified at a new maximum of 2.39 µg/L during April 2022 and exceeded the drinking water criteria. The new maximum concentration is within the magnitude of historical concentrations.
 - MW504: Concentrations of PFHxS+PFOS reached a new maximum during September 2021 with a concentration of 25.5 µg/L.
 - MW308: A new maximum concentration of PFHxS+PFOS (48.1 µg/L) was identified during April 2022.
 - MW402: New maximum concentrations of PFOA and PFHxS+PFOS were identified during April 2022.
 - MW120I and MW136D: Concentrations of PFHxS+PFOS were detected above the LOR for the first time (0.01 µg/L). Previous concentrations were reported below the LOR.
 - MW141S: A new maximum concentration of PFHxS+PFOS (1.52 µg/L) was identified during September 2021, however, continued to decrease during subsequent sampling events during April and July 2022.
- > New minimum concentrations:

- MW313: A new minimum concentration of PFHxS+PFOS occurred during September 2021 (0.09 µg/L), however, increased to 0.22 µg/L in April 2022.

Plume stability (using Mann-Kendall analysis) has been calculated for each well that has sufficient temporal data [i.e. a minimum of four (4) results]. Groundwater monitoring data recorded between February 2018 and July 2022 was used for the assessment, with outputs of the Mann-Kendall analysis presented in Appendix D. Statistical trend analysis outcomes for PFOA and Sum of PFHxS and PFOS 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 (%)	PFHxS+PFOS Trend	Confidence Factor (%)
Former Fuel Farm	MW101I	Stable	39	Stable	43
	MW102D	No clear trend	0	No trend	10
	MW112S	-	-	-	-
	MW113S	-	-	Stable	17
	MW301 ⁽¹⁾	Increasing	95	No clear trend	83
	MW302 ⁽¹⁾	Stable	52	Stable	74
	MW303	Possibly decreasing	93	Stable	24
Fire House and Refuelling Area	MW104I	No clear trend	82	No trend	76
	MW105D	No clear trend	85	No trend	12
	MW304	No clear trend	25	No clear trend	87
	MW305	Possibly decreasing	93	Stable	19
	MW306	No clear trend	63	Stable	12
Powerhouse	MW307	Possibly decreasing	94	Stable	0
	MW308	No clear trend	15	No clear trend	77
	MW309	No clear trend	40	No clear trend	45
	MW310	Stable	0	No clear trend	29
Landfills	MW106S	-	-	NA	NA
	MW109S	No clear trend	68	Stable	0
	MW110S	-	-	Probably increasing	93

Note:

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

NA = Mann Kendall analysis 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 MW101I and MW102D were indicated to have either stable or no clear trends for PFOA and Sum of PFHxS and PFOS. Concentrations of Sum of PFHxS and PFOS remain above the drinking water criteria of 2 µg/L.
- > Mixed trends of PFOA concentrations were indicated at wells positioned within the former fuel farm. For example, the most upgradient bore MW301 had an increasing trend whilst MW302 and MW303 had stable and decreasing trends, respectively.
- > Overall, concentrations of PFOA and Sum of PFHxS and PFOS were indicated to be stable or have no clear trend at the Fire House and Refuelling Area. Downgradient wells MW104I and MW105D exhibited no clear trends where concentrations of Sum of PFHxS and PFOS remained above the drinking water criteria by two orders of magnitude.
- > At the Powerhouse, PFOA and Sum of PFHxS and PFOS concentrations at the upgradient MW307 were indicated to be possibly decreasing and stable, respectively. No clear trends in PFOA or Sum of PFHxS and PFOS were identified at wells MW308, MW309 and MW310, all located in the immediate vicinity of the Powerhouse.

Overall, the groundwater monitoring results do not suggest a change in the understanding of contamination or risk at the source areas. However, indicators of a plume depletion are noted at the former fuel farm and powerhouse source areas. 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.

8.1.2 On-site - Secondary Sources

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

- > Overall, PFAS concentrations were indicated to be stable or decreasing across the well network and no change to the risk profile is considered to have occurred. Generally, the drinking water criteria are continually exceeded.
- > Decreasing trends in PFOA and Sum of PFHxS and PFOS were identified at MW313 (water supply infrastructure) and MW402 (abstraction bore 2). PFOA at MW402 were indicated to be possibly increasing with a low level of statistical confidence.
- > PFOA and Sum of PFHxS and PFOS continue to be reported below the LOR at MW401 (abstraction bore 1).

Groundwater monitoring well trends for PFOA and the Sum of PFHxS and PFOS are summarised in Table 8-2.

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

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFHxS+PFOS Trend	Confidence Factor (%)
Site Drainage	MW115S	-	-	Stable	88
Water Supply Infrastructure	MW312	No clear trend	82	Stable	45
	MW313	Possibly decreasing	94	Decreasing	97
Abstraction Bore 1	MW401	-	-	NA	NA
Abstraction Bore 2	MW402	Possibly increasing	93	No clear trend	20

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

8.1.3 On-site – Other

Groundwater monitoring well trends for PFOA and Sum of PFHxS and PFOS are summarised in Table 8-3.

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

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFHxS+PFOS Trend	Confidence Factor (%)
Airside Perimeter	MW116S	NA	NA	Stable	49
	MW117I	NA	NA	No clear trend	10
	MW118D	NA	NA	NA	NA
	MW119S	NA	NA	No clear trend	0
	MW120I	NA	NA	No clear trend	85
	MW121D	NA	NA	No clear trend	20
	MW122S	NA	NA	No clear trend	64
	MW123I	NA	NA	Stable	55
	MW124D	NA	NA	No clear trend	62
Boundary	MW125S	NA	NA	NA	NA
	MW126I	NA	NA	NA	NA
	MW128D	NA	NA	NA	NA
	MW129S	NA	NA	NA	NA

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFHxS+PFOS Trend	Confidence Factor (%)
	MW130D	NA	NA	NA	NA
	MW131S	NA	NA	NA	NA
	MW132I	NA	NA	No clear trend	50
	MW133D	NA	NA	No clear trend	25
	MW134D	NA	NA	NA	NA
	MW135I	NA	NA	NA	NA
	MW136D	NA	NA	No clear trend	79
	MW138S	NA	NA	Decreasing	96
	MW139I	NA	NA	NA	NA
	MW140D	NA	NA	NA	NA

Notes:

NA = Mann Kendall analysis 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 for PFOA concentrations since concentrations were reported below the LOR at all monitoring wells. Therefore, concentrations are considered to be stable.
- > Sum of PFHxS and PFOS concentrations were also indicated to be stable, either by their magnitude being lower than the LOR or no clear trend being identified.
- > MW136D possessed a first-time detection of PFHxS+PFOS (0.01 µg/L) during April 2022.
- > Of the wells in the monitoring network, only MW138S possessed concentrations of Sum of PFHxS and PFOS that exceeded the drinking water criteria.

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

8.1.4 Off-site

Groundwater monitoring well trends for PFOA and Sum of PFHxS and PFOS are summarised in Table 8-4.

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

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFHxS+PFOS Trend	Confidence Factor (%)
Off-site	MW141S	No clear trend	31	No clear trend	39
	MW142S	NA	NA	NA	NA
	MW403	NA	NA	NA	NA
Background	MW137S	NA	NA	No clear trend	0

Notes:

NA = Mann Kendall analysis 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 Sum of PFHxS and PFOS are considered to be stable at well MW142S and MW403 given their reporting below the LOR.
- > The only monitoring well where PFOA and Sum of PFHxS and PFOS concentrations were detected above the LOR was MW141S, which is generally consistent with previous investigations. However, the trend analysis was unable to ascertain a decreasing or increasing trend and concentrations of Sum of PFHxS and PFOS remain above the drinking water criteria by two orders of magnitude.

Overall, the 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 Sum of PFHxS and PFOS concentrations in tap water are shown in Appendix A:

- > Figures 6A and 6B (PFHxS+PFOS) and Figures 10A and 10B (PFOA) for the September 2021 event.
- > Figure 7 (PFHxS+PFOS) and Figure 11 (PFOA) for the January 2022 event.
- > Figures 8A and 8B (PFHxS+PFOS) and Figures 12A and 12B (PFOA) for the April 2022 event; and
- > Figure 9 (PFHxS+PFOS) and Figure 13 (PFOA) for the July 2022 event.

No new or maximum concentrations of PFOA and PFHxS+PFOS were identified during the September 2021 – August 2022 monitoring period. PFOA concentrations did not exceed the assessment criteria. Although Sum of PFHxS and PFOS concentrations exceeded the drinking water criteria at POT102, POT103 and POT104 by up to three orders of magnitude, no clear trend was identified.

Mann-Kendall trend analysis has been calculated for each location that has sufficient temporal data. Tap water monitoring data recorded between February 2018 and July 2022 was used for the assessment, with outputs presented in Appendix D. Trends in tap water for PFOA and Sum of PFHxS and PFOS are summarised in Table 8-5.

Table 8-5 Mann-Kendall Trend Analysis – Tap Water

Source Area	Location	PFOA Trend	Confidence Factor (%)	PFHxS+PFOS Trend	Confidence Factor (%)
Air Traffic Control Tower (Outdoor)	POT102	No clear trend	28	NA	NA
Crew Huts Kitchenette (Indoor)	POT103	No clear trend	84	NA	NA
Fire House Kitchenette (Indoor)	POT104	No clear trend	78	NA	NA

These locations are not used for potable water (with “not for drinking water use” signage) and it is noted that a number of these buildings are in the process of being demolished. As a result, there is no change in the understanding of the contamination or risk at these sampling locations.

9 Conceptual Site Model

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 inferred from previous data.

The understanding of on-site sources and secondary on-site source areas presented in the investigation phase (Jacobs, 2018c) is supported by the OMP monitoring data presented in this report. The predominant stability in PFAS trends in groundwater at the other on-site wells and off-site wells also suggests the risk profile of these locations is not changing significantly.

The pathways for PFAS exposure and risks to human health and ecological receptors presented in the investigation phase (Jacobs, 2018c) are considered to be relevant and data presented in this report does not suggest any significant changes to these mechanisms or risks.

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

10 Discussion

10.1 Risk Profile

The findings of the first two years of OMP implementation at the site presented in the 2020 AIR (Cardno, April 2021) and 2021 AIR (Cardno, 2023) supported the outcomes of the Tier 2 Human Health Risk Assessment (HHRA) - Offsite Receptors (Jacobs, 2018d) and Tier 3 Human Health Risk Assessment - Onsite Receptors (Jacobs, 2018e).

These risk assessments 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 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 current available data, including one additional year of ongoing monitoring, indicates that no significant change to this risk profile can be established based on the following:

- > The groundwater characteristics and flow direction have been consistent since the start of the groundwater investigations.
- > Plume stability, evaluated through Mann-Kendall analysis, does not indicate evidence of plume migration or significant increase in concentrations that would warrant a revision of the risk assessment; and
- > Groundwater abstracted on-site is not used for potable water (with “not for drinking water use” signage at each tap outlet) and it is noted that several buildings have been either demolished or locked, which reduces the number of accessible taps on-site.

However, it is noted that Sum of PFHxS and PFOS concentrations were detected at some south and southwest boundary monitoring wells, downgradient of the on-site source areas, along with off-site monitoring well MW141S. Consistent with previous findings, this suggests an off-site migration pathway (i.e., plume movement) with groundwater flow to the southwest. There were no significant increases in concentrations observed this monitoring period, however, ongoing monitoring at these locations is recommended.

The data evaluated in this report does not indicate changes to the nature and extent of PFAS in groundwater which would lead to an increasing or decreasing risk. The risk profile for the Management Area remains low and acceptable.

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; and
- > The requirements of a post-remediation Site Management Plan.

The September 2021 to August 2022 monitoring results did not identify a change in the risk profile for the Management Area or further management actions that would trigger the need for an OMP review. However, updated guidance has been published since the development of the OMP and updated assessment criteria should be amended in the next revision of the OMP.

11 Conclusions

Groundwater and tap water monitoring were completed at the site between September 2021 and August 2022 in general accordance with the SAQP (Cardno, 2021). The monitoring conducted during September 2021 – August 2022 is considered to have met the OMP objectives outlined in Section 1.2.

Groundwater Network

The concentrations of PFAS in the groundwater recorded during the September 2021 – August 2022 monitoring period generally displayed similar concentrations to historical monitoring results. The drinking water criteria of 0.07 µg/L were generally exceeded at monitoring wells positioned in the immediate vicinity of operational areas.

A new exceedance of PFHxS+PFOS was identified at MW122S during September 2021, however, concentrations decreased to below the drinking water criteria in April 2022. PFHxS+PFOS was also detected above the LOR for the first time at MW136D, albeit the concentration was marginal (0.01 µg/L) and no criteria were exceeded.

The presence of elevated PFHxS+PFOS at off-site monitoring well MW141S suggests a potential migration pathway to the southwest. Concentrations were not shown to be increasing during the monitoring period and ongoing monitoring should continue to provide more confidence in concentration trends. The risk to off-site receptor (Water Corporation production bores and Gnangara aquifer) remains low and acceptable as PFAS concentrations in MW403 located further downgradient were consistently below the LOR.

Tap Water Network

PFAS concentrations across the tap water network on-site generally display a stable or no statistically significant trend. No new or maximum concentrations of PFOA and PFHxS+PFOS were identified during the monitoring period. PFOA concentrations did not exceed the assessment criteria. Although PFHxS+PFOS concentrations exceeded the drinking water criteria at POT102, POT103 and POT104 by up to three orders of magnitude, no clear trend was identified.

These locations are not used for potable water (with “not for drinking water use” signage) and it is noted that a number of these buildings are in the process of being demolished. As a result, there is no change in the understanding of the contamination or risk at these sampling locations. 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 doesn’t identify the need for a CSM update. The September 2021 – August 2022 monitoring results did not identify a change in the risk profile for the Monitoring Area (including the Management Area) that would trigger the need for an OMP review or further management actions.

12 References

General References

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7. Department Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*.
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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 2021) National Water Quality Management Strategy Australian Drinking Water Guidelines 6, March 2021.
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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

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2. Cardno, May 2020, PFAS OMP Quarterly Sampling Event Factual Report – March 2020.
3. Cardno, June 2020, Biannual Monitoring Factual Report – post-summer 2020.
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5. Cardno, December 2020, PFAS OMP Biannual Monitoring Factual Report – post-winter 2020.
6. Cardno, March 2021, PFAS OMP Quarterly Sampling Event Factual Report – January 2021.
7. Cardno, April 2021, PFAS OMP – 2020 Annual Interpretive Report.
8. Cardno, August 2021, PFAS OMP Biannual Monitoring Factual Report – post-summer 2021.
9. Cardno, August 2021, PFAS OMP Quarterly Sampling Event Factual Report – July 2021
10. Cardno, August 2021, PFAS OMP Sampling and Analysis Quality Plan (SAQP) Rev5.
11. Department of Defence, 2018a, Gingin Satellite Airfield PFAS Ongoing Monitoring Plan.
12. Department of Defence, 2018b, Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan.
13. Jacobs, 2018a, Preliminary Conceptual Site Model - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0001).

14. Jacobs, 2018b, Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0002).
15. Jacobs, 2018c, Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-003).
16. Jacobs, 2018d, Tier 2 Human Health Risk Assessment – Offsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0005).
17. Jacobs, 2018e, Tier 3 Human Health Risk Assessment – Onsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0006).
18. 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

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-08-15 | 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, 2019)

FIGURE 2

1:12,000 Scale at A3

Metres

0200400

Management Area

2022 ANNUAL INTERPRETIVE REPORT

GINGIN SATELLITE AIRFIELD

DEPARTMENT OF DEFENCE



Map Produced by Cardno WA

Date: 2022-12-05 | Project: DEF19009

Coordinate System: GDA 1994 MGA Zone 50

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

Aerial Imagery Supplied by Aerometrex





FIGURE 3B
1:1,700 Scale at A3

Metres
0 50 100

Monitoring Locations

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
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Aerial Imagery Supplied by Aerometrex & Nearmap

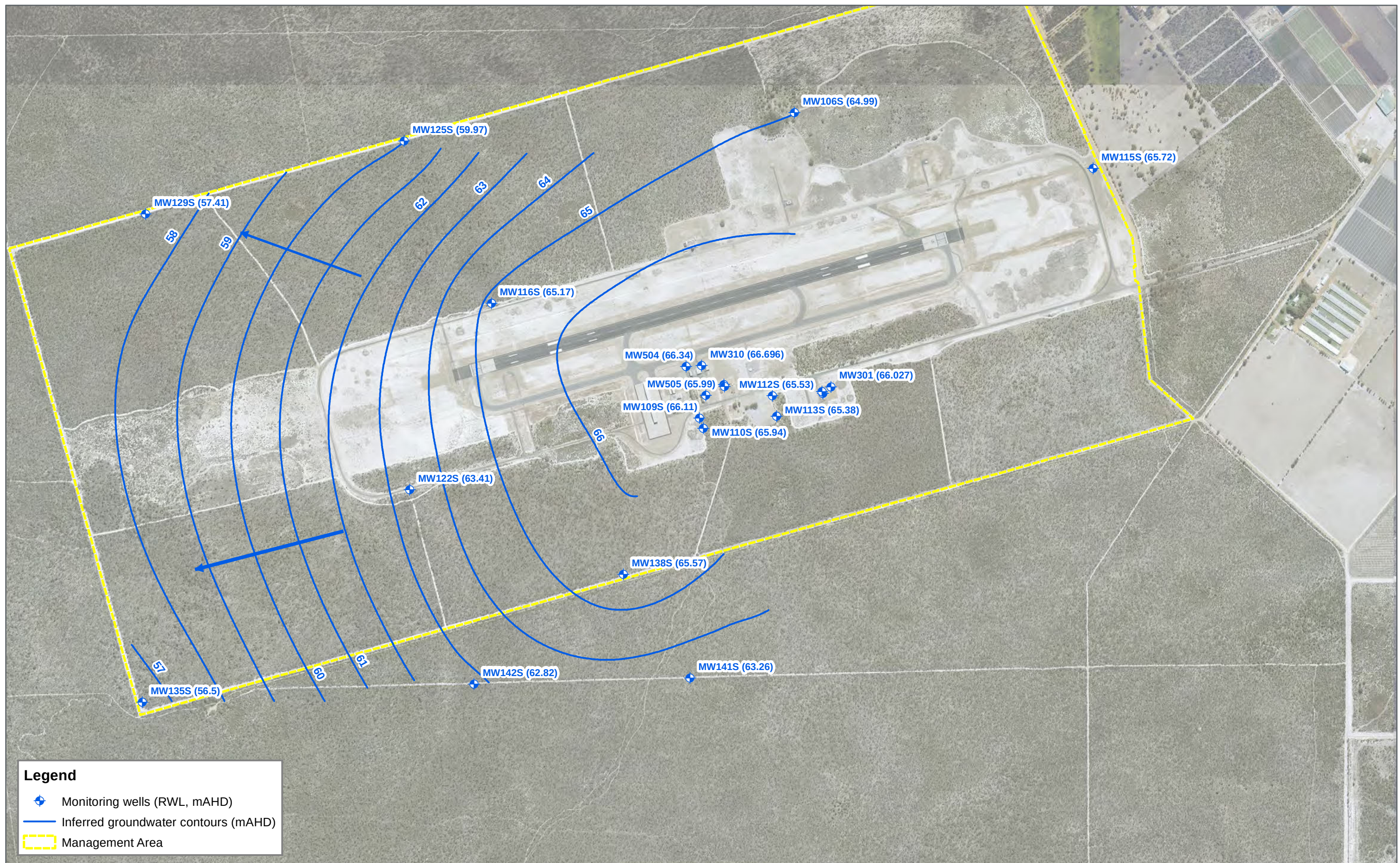


FIGURE 4A
1:13,000 Scale at A3

Metres
0 200 400

September 2021 Groundwater Contours (Shallow Aquifer)

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Cardno

Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-004A_Sep-21ShallowGroundwaterContours 01.mxd
Aerial Imagery Supplied by Aerometrex

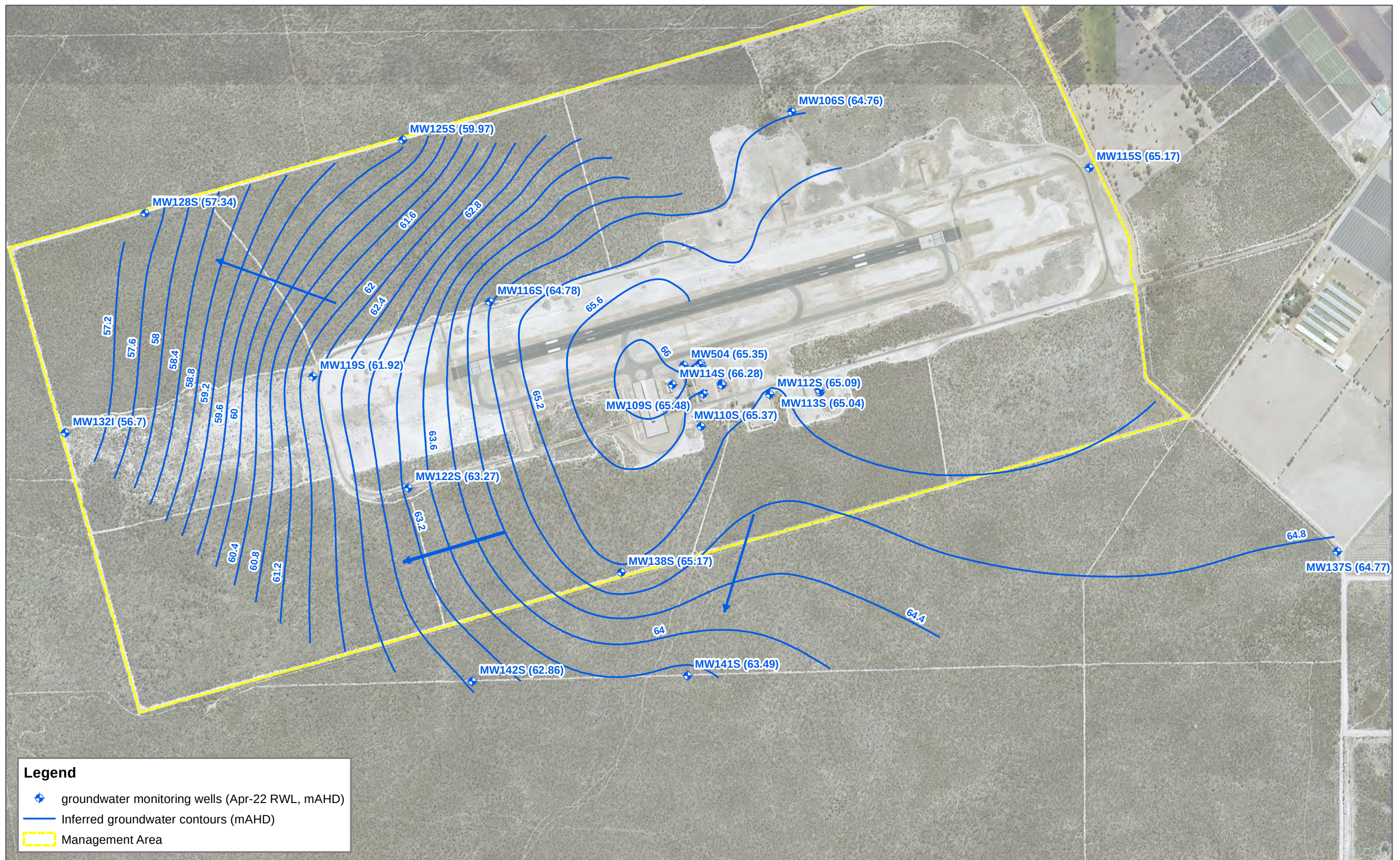


FIGURE 4B
1:13,000 Scale at A3

Metres
0 200 400

April 2022 Groundwater Contours (Shallow Aquifer)

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Cardno

Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-004B_Apr-22ShallowGroundwaterContours 01.mxd
Aerial Imagery Supplied by Aerometrex

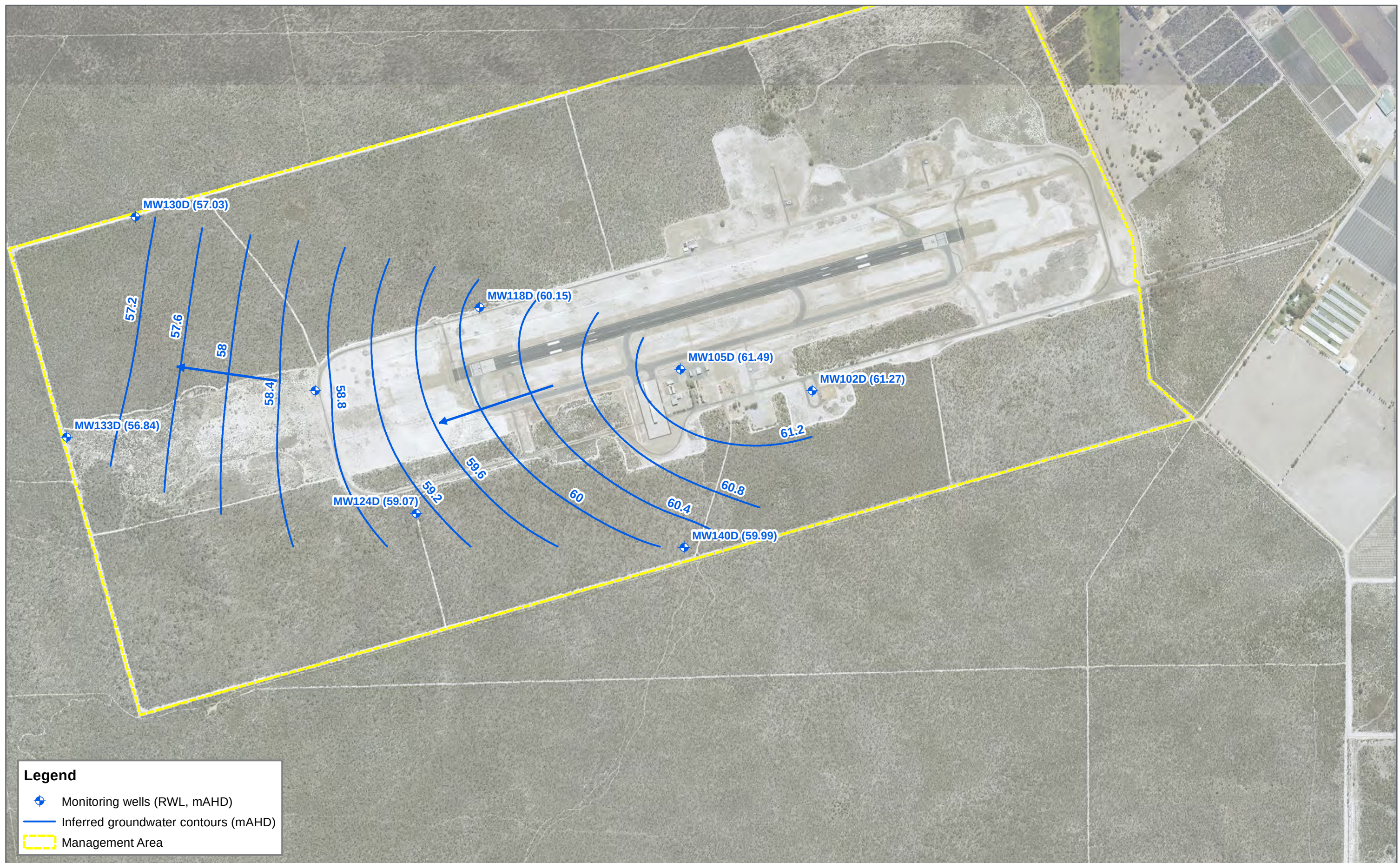


FIGURE 5A
1:13,000 Scale at A3

Metres
0 200 400

September 2021 Groundwater Contours (Deep Aquifer)

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Cardno

Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-005A_Sep-21DeepGroundwaterContours 01.mxd
Aerial Imagery Supplied by Nearmap (May 2019)



FIGURE 5B
1:13,000 Scale at A3

Metres

0 200 400

April 2022 Groundwater Contours (Deep Aquifer)

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Cardno

Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-005B_Apr-22DeepGroundwaterContours 01.mxd
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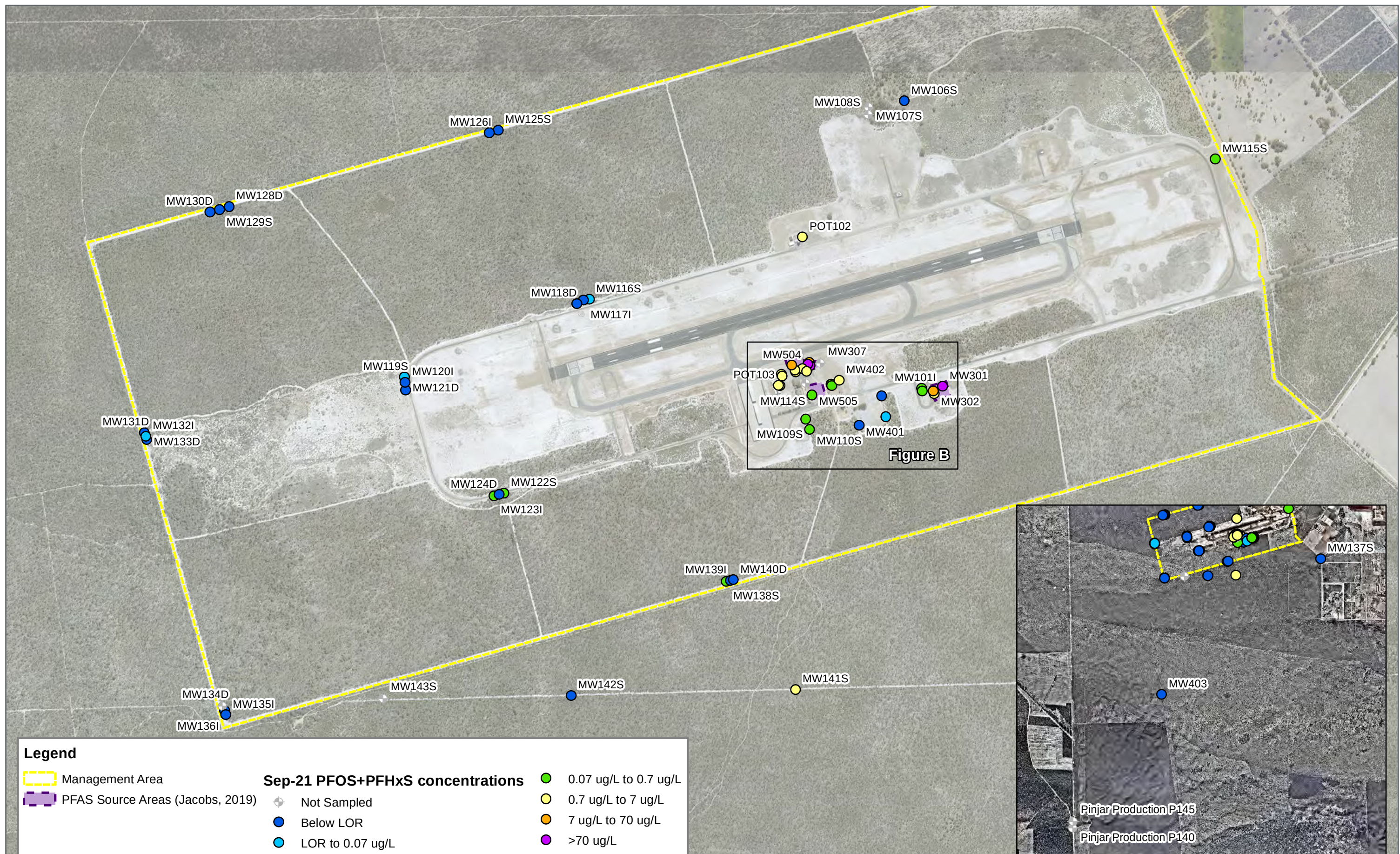


FIGURE 6A
1:12,500 Scale at A3

Metres
0 200 400

PFOS+PFHxS Concentrations in Groundwater - September 2021

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
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Aerial Imagery Supplied by Aerometrex & Nearmap

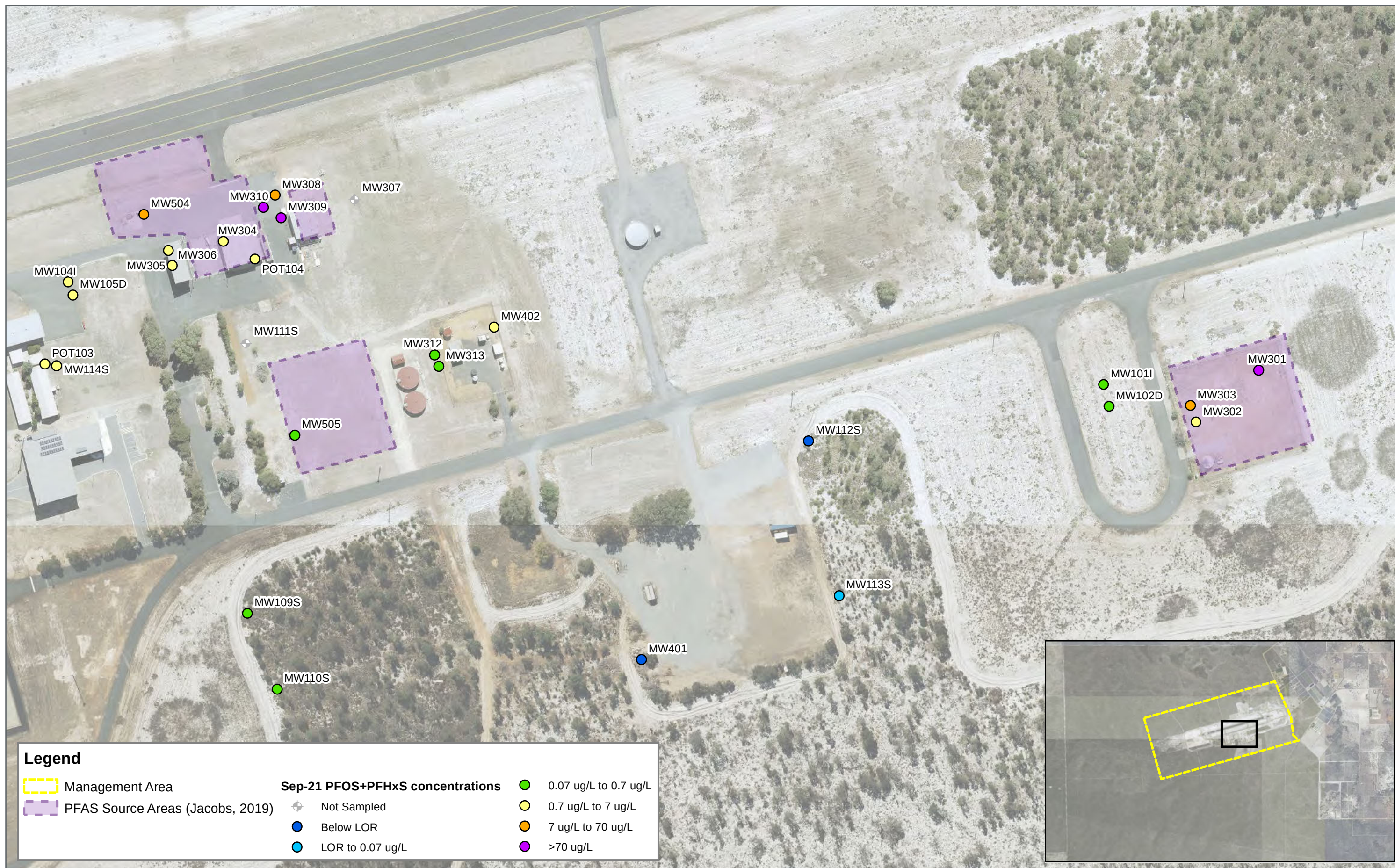
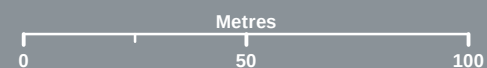


FIGURE 6B
1:1,700 Scale at A3



PFOS+PFHxS Concentrations in Groundwater - September 2021

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-06-09 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-006B_PFOs+PFHxS_Sept-21 01.mxd
Aerial Imagery Supplied by Aerometrex

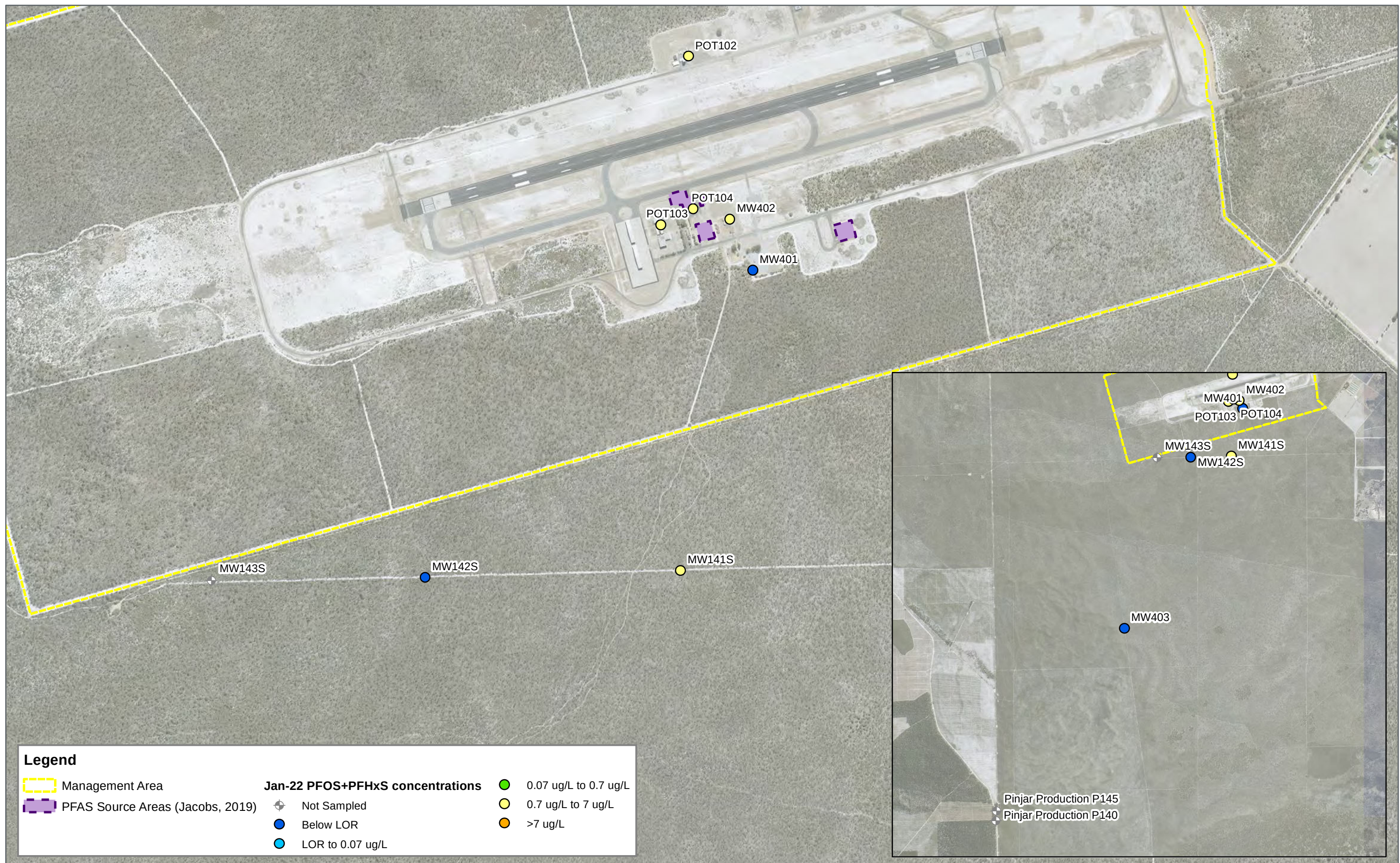


FIGURE 7
1:11,000 Scale at A3

Metres
0 200 400

**PFOS+PFHxS Concentrations
in Groundwater - January 2022**

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-007_PFOs+PFHxS_Jan-22 01.mxd
Aerial Imagery Supplied by Aerometrex

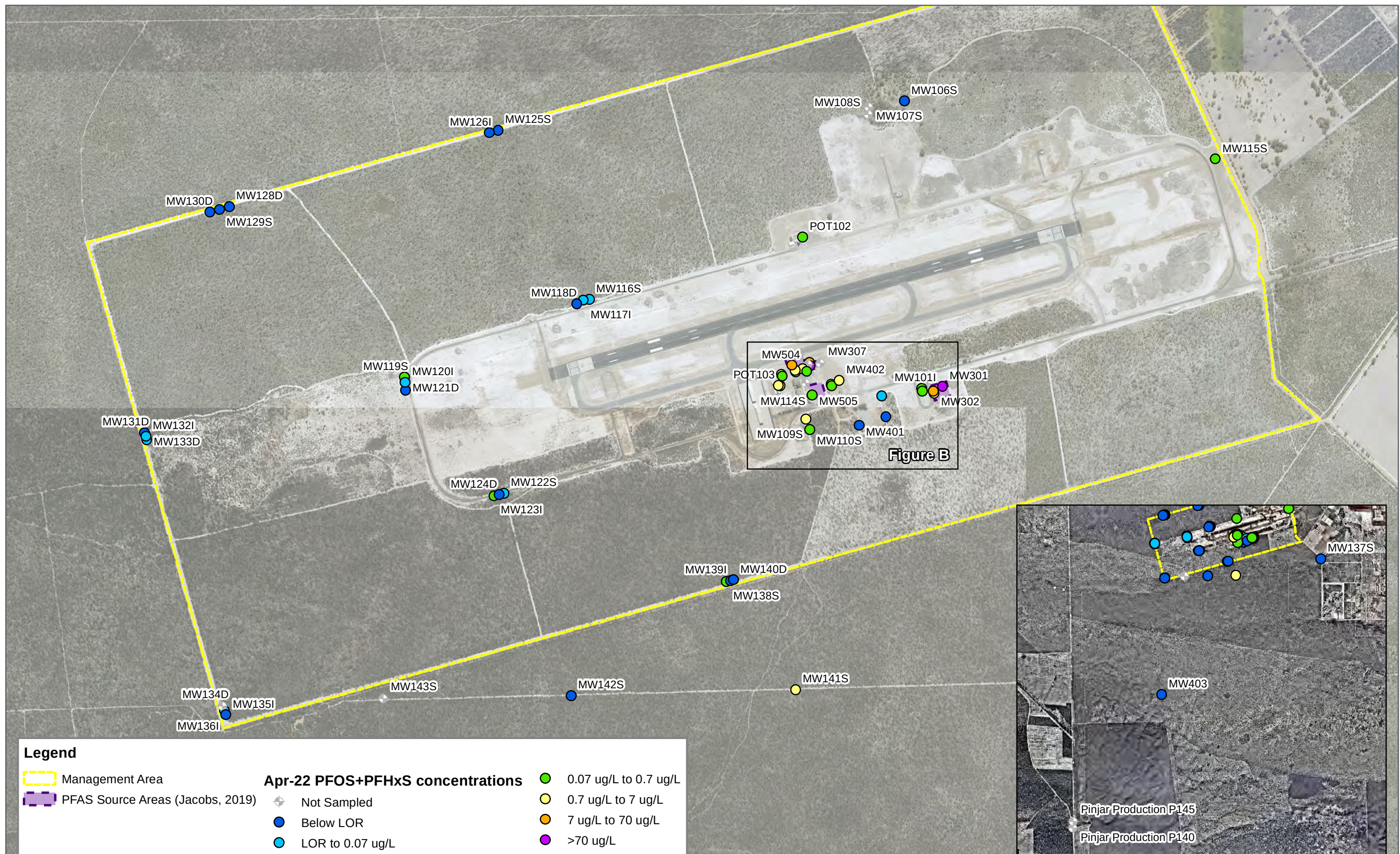


FIGURE 8A
1:12,500 Scale at A3

Metres
0 200 400

PFOS+PFHxS Concentrations in Groundwater - April 2022

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-06-09 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-008A_PFOS+PFHxS_Apr-22 01.mxd
Aerial Imagery Supplied by Aerometrex & Nearmap

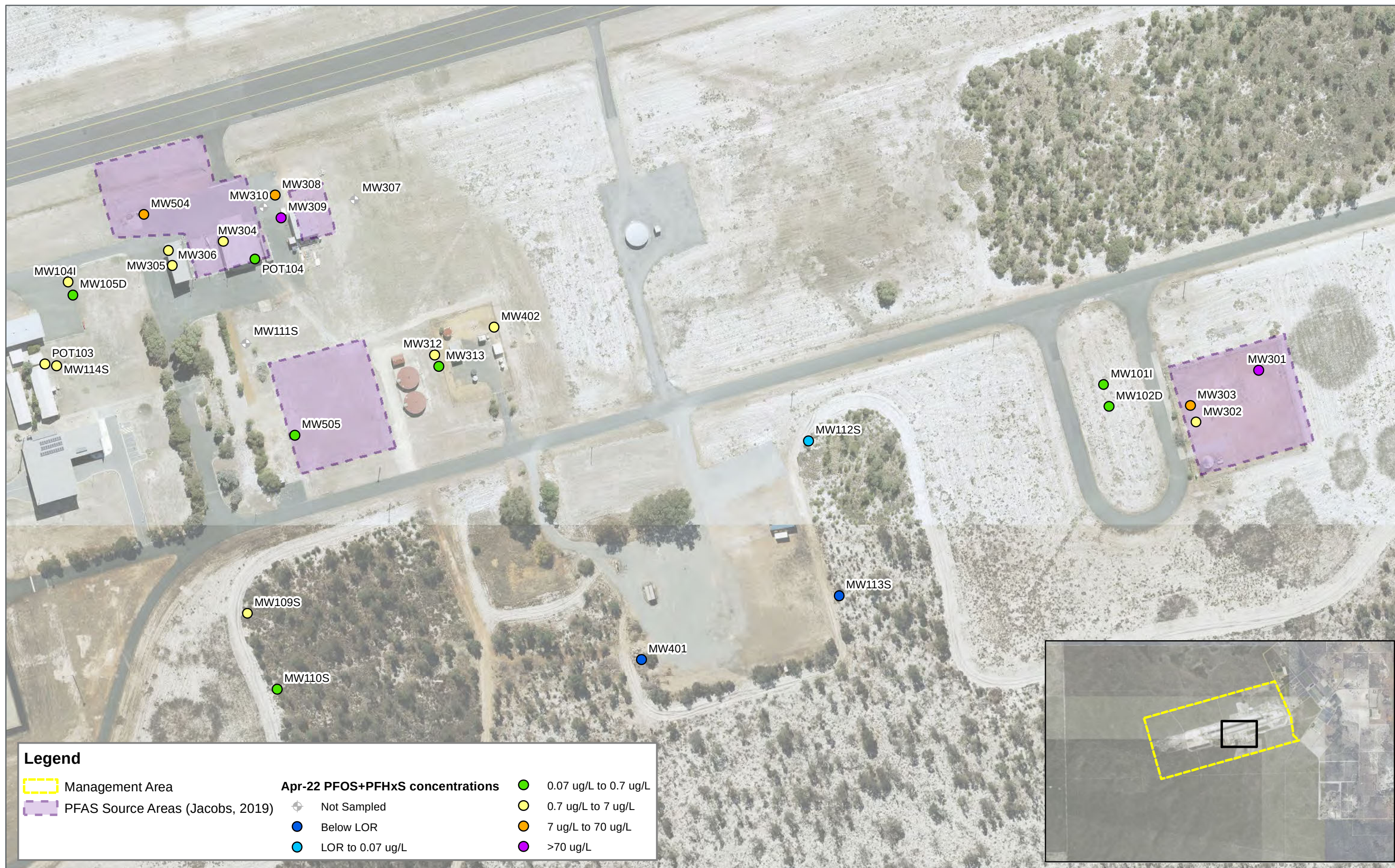
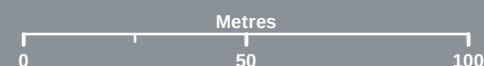


FIGURE 8B
1:1,700 Scale at A3



PFOS+PFHxS Concentrations in Groundwater - April 2022

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-06-09 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-008B_PFOS+PFHxS_Apr-22 01.mxd
Aerial Imagery Supplied by Aerometrex

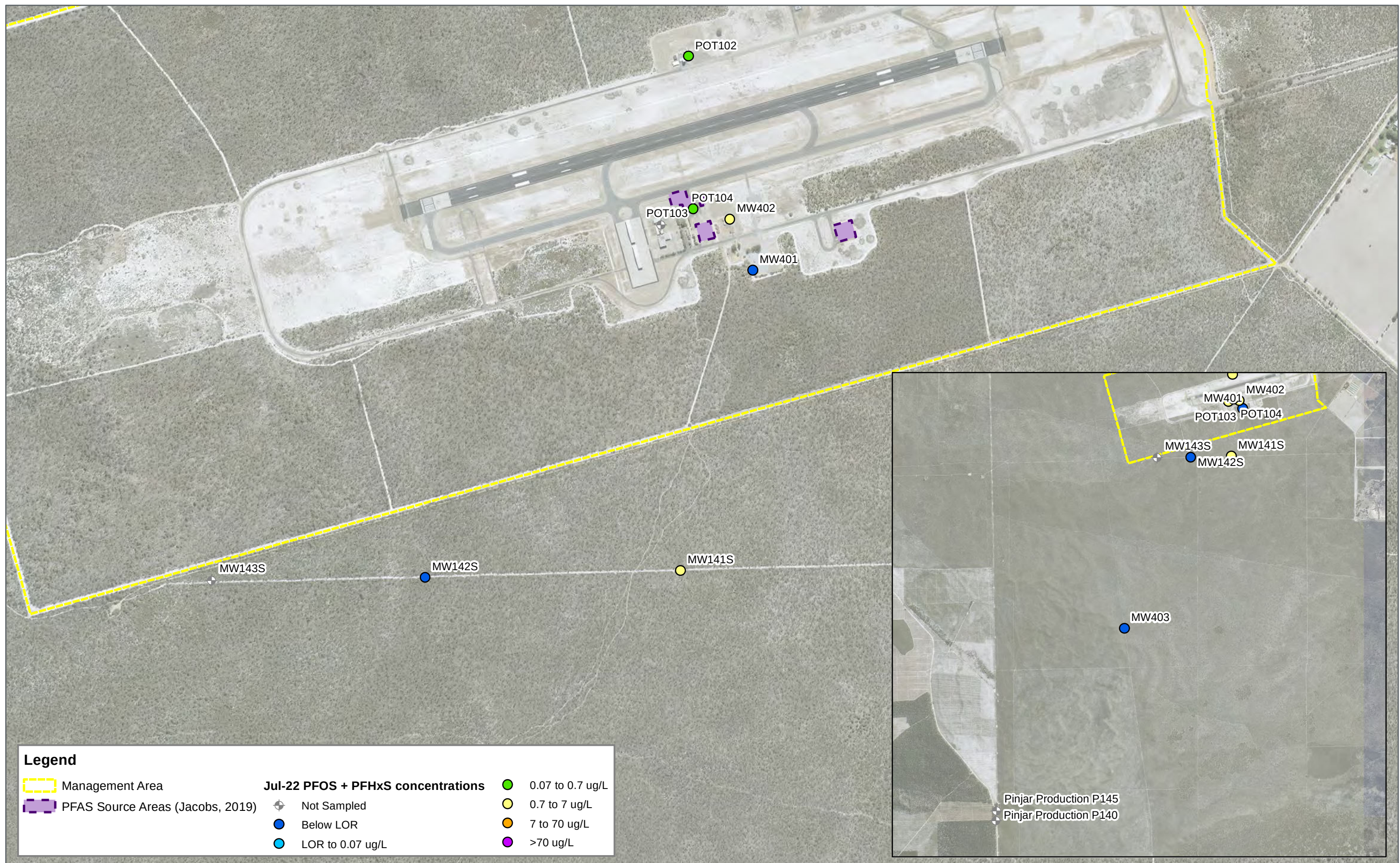


FIGURE 9
1:11,000 Scale at A3

Metres
0 200 400

**PFOS+PFHxS Concentrations
in Groundwater - July 2022**

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE

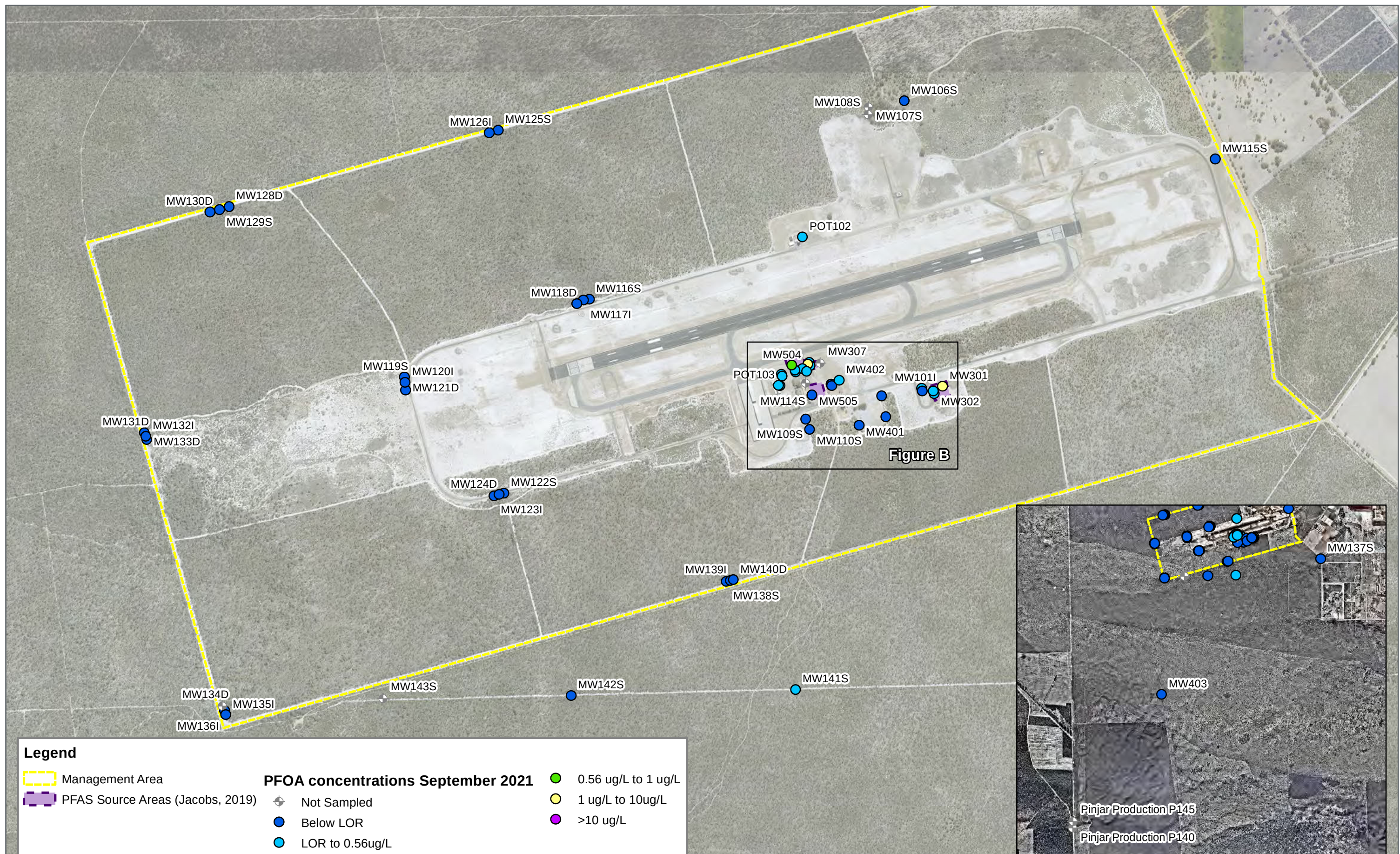


FIGURE 10A
1:12,500 Scale at A3

Metres
0 200 400

PFOA Concentrations in Groundwater - September 2021

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-010A_PFOA_Sept-21 01.mxd
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FIGURE 10B
1:1,700 Scale at A3

Metres
0 50 100

PFOA Concentrations in Groundwater - September 2021

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-06-09 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-010B_PFOA_Sept-21 01.mxd
Aerial Imagery Supplied by Aerometrex

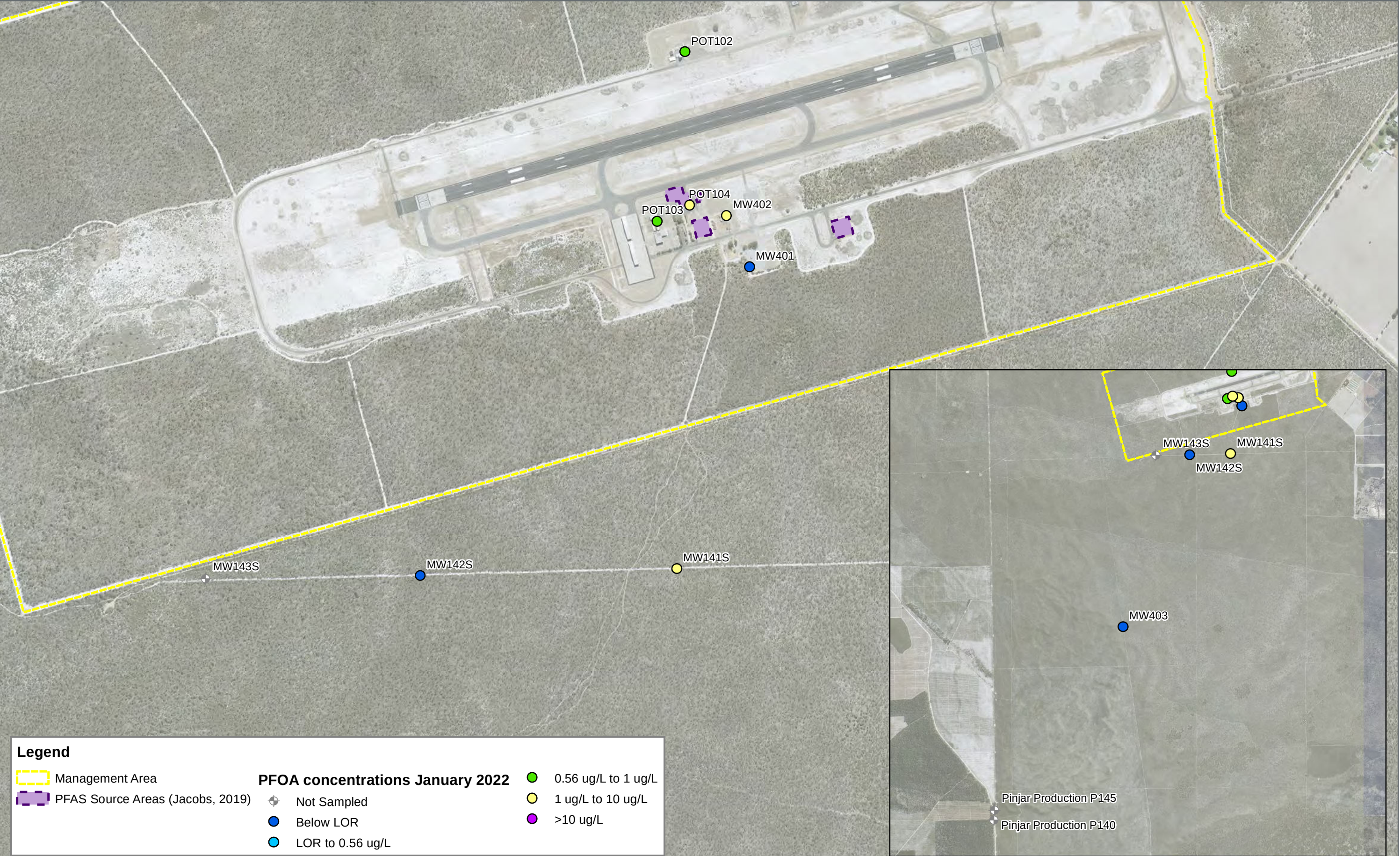


FIGURE 11
1:11,000 Scale at A3

Metres
0 200 400

PFOA Concentrations in Groundwater - January 2022

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE

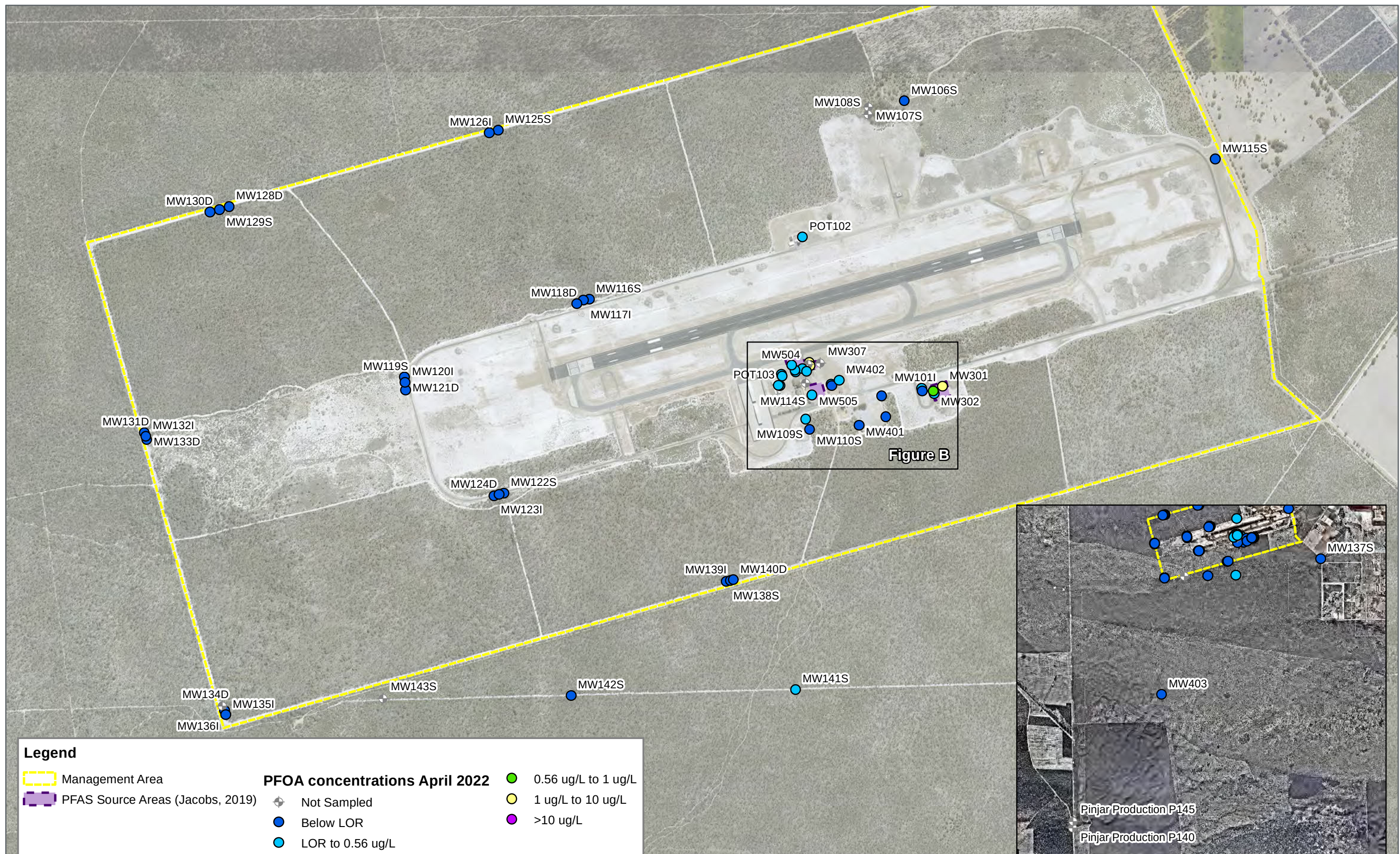


FIGURE 12A
1:12,500 Scale at A3

Metres
0 200 400

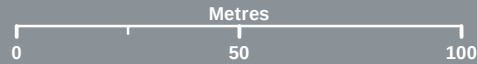
PFOA Concentrations in Groundwater - April 2022 2022 ANNUAL INTERPRETIVE REPORT GINGIN SATELLITE AIRFIELD DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-012A_PFOA_Apr-22 01.mxd
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FIGURE 12B
1:1,700 Scale at A3



**PFOA Concentrations
in Groundwater - April 2022**
2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-06-09 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-012B_PFOA_Apr-22 01.mxd
Aerial Imagery Supplied by Aerometrex

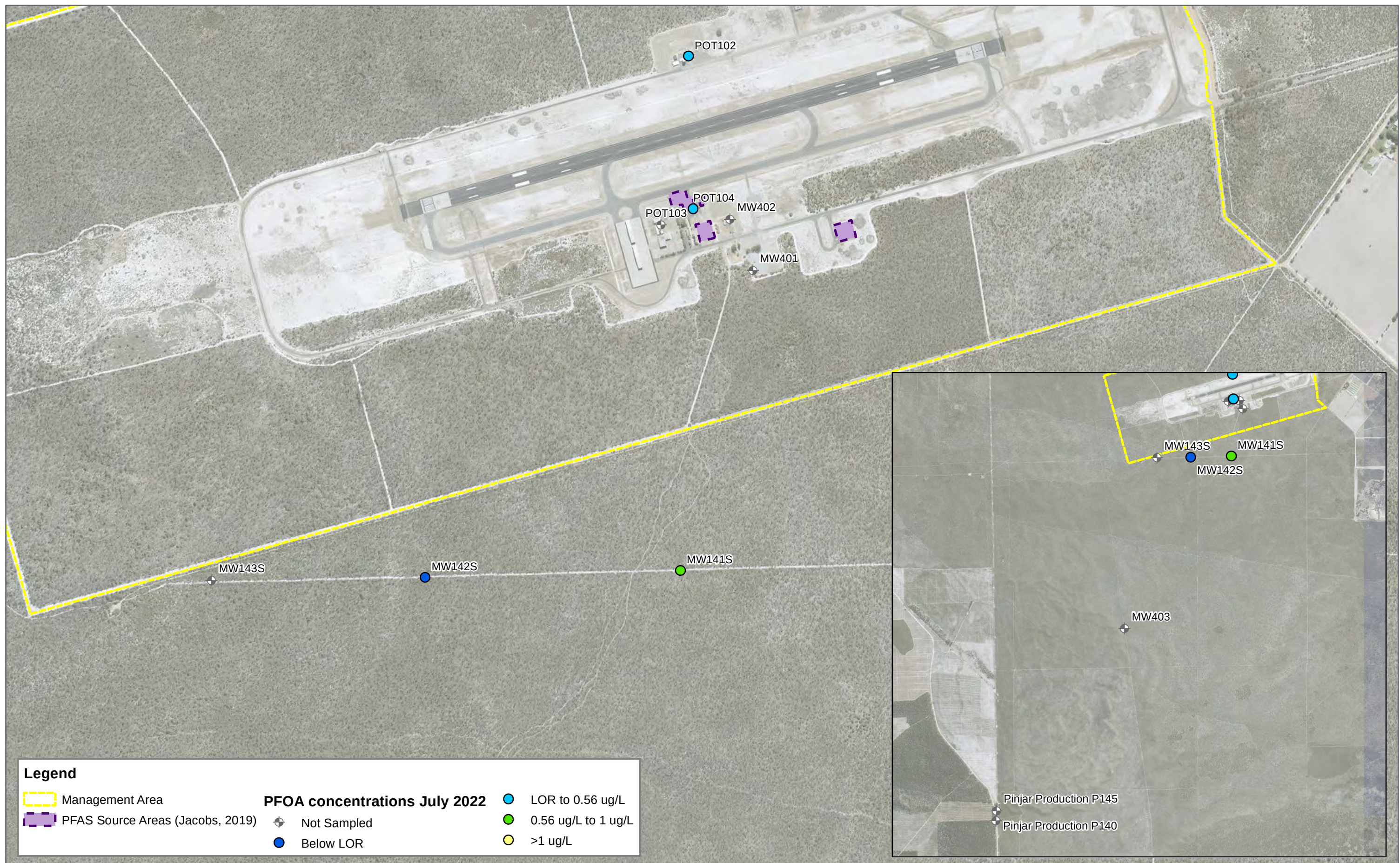


FIGURE 13
1:11,000 Scale at A3

Metres
0 200 400

**PFOA Concentrations
in Groundwater - July 2022**

2022 ANNUAL INTERPRETIVE REPORT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-12-05 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: 304700525_WA_0958-GS-013_PFOA_Jul-22 01.mxd
Aerial Imagery Supplied by Aerometrex

APPENDIX

B

SAQP



now





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

Gingin Satellite Airfield

Prepared for
Department of Defence

11 April 2022



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Rev 1	11 October 2019	Client Submission/Review	■
Rev 2	6 November 2019	Final	■■■
Rev 3	11 May 2020	SAQP review	■
Rev 4	8 April 2021	SAQP review	■■■
Rev 5	23 August 2021	SAQP review	■■■
Rev 6	11 April 2022	SAQP review	■■■

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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 (DoD, 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 for an initial 12-month monitoring period. The 12-month monitoring period consists of biannual groundwater monitoring of all onsite groundwater wells, quarterly monitoring of taps and extraction 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 extraction 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:

- > Evaluate the nature and extent of PFAS in groundwater beyond the southern boundary of the Site;
- > Assess seasonal fluctuations in the groundwater PFAS concentrations;
- > Assess any changes in PFAS concentrations and extent in groundwater migrating from source areas, and being extracted from the underlying aquifer
- > Provide confirmation of the current understanding of risk; and
- > Provide supporting data to inform the ongoing management requirements.

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 Factual Report – Gingin Satellite Airfield.
- > Cardno, May 2020, PFAS OMP Quarterly Sampling event Factual Report March 2020.
- > Cardno, June 2020, PFAS OMP Biannual Sampling Event Factual Report Post-summer 2020.
- > Cardno, December 2020, PFAS OMP Quarterly Sampling Event Factual Report August 2020.
- > Cardno, December 2020, PFAS OMP Biannual Sampling Event Factual Report Post-winter 2020.
- > Cardno, January 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 Sampling Event Factual Report Post-summer 2021.

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 annual 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*.
- > 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*.
- > Australian Standard AS 4482-1999 *Guide to the investigation and sampling of sites with potentially contaminated soils, Part 2 - Volatile substances*.
- > 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 on-Site which includes a fire response vehicle.

¹ It is noted that 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 and Zoning

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 with a mean monthly rainfall amount of 124 mm (BoM, 2019). The mean annual rainfall is recorded as 639.8 mm.</p> <p>February is the hottest month with maximum and minimum temperatures being 31.6°C and 18.3°C respectively. By contrast, winters are cool with July average maximum and minimum temperatures being 18.4°C and 7.7°C respectively.</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 mAHN, with the runway at 75 mAHN.</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 Gngara 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. ▪ Bindar 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 where offsite migration of stormwater occurs are rare.</p>
Hydrogeology	<p>Regional Hydrogeology</p> <p>The Airfield is located on the Gngara groundwater system, which covers approximately 2,200 km² along the coastal plain north of the Swan River to Gingin</p>

Setting	Description
	<p>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 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 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.</p> <p>Groundwater Flow</p> <p>The regional groundwater flow direction is expected to be predominantly westwards. Based on information collected during the monitoring well gauging round completed by Jacobs (2018c), the inferred regional groundwater flow direction was interpreted as to the west-south-west. A component of groundwater flow to the south was observed in the southern portion of the Site. The groundwater gradient was calculated as approximately 0.0004.</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. ▪ There is a regional forest agreement approximately 15 km to the east of the Site.
Further information can be found in the OMP (DoD, 2018a) and Jacobs DSI (Jacobs 2018c).	

4 Source Areas and Risk

The Site has been subject of numerous PFAS investigation, 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 aqueous film forming foam (AFFF).

In general, the greatest PFAS concentrations were typically reported in wells correlating with the source areas identified above. Exceedances of the drinking water criteria and recreational criteria were reported in many of these locations. Additionally, tap water (non-potable) samples collected from various buildings at the Site reported exceedances of drinking water criteria and approximately half of these samples also exceeded the criteria for recreational use.

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	Four primary sources of PFAS contamination were identified at the Site during the DSI undertaken by Jacobs in 2018.
	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.
	Offsite Groundwater Offsite migration of PFAS in the groundwater has been identified in the 2018 DSI, with one exceedance of the investigation criteria reported in a shallow well on the southern boundary of the Site and detections of PFAS above the LOR but below investigation criteria noted in three boundary monitoring wells.
	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.
Identify the decision/principal study question(s)	Most of the sampling locations have only been tested once or twice (i.e. limited time series/seasonal data). 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 CSM in relation to spatial and temporal variability of PFAS concentrations within the Management Area and associated receptors.
	This SAQP is to provide further data to assess the following principal study questions: <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 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?

Data Quality Step	Description
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 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). Previous factual reports by Cardno (April 2020 to January 2021). Draft PFAS OMP 2020 Annual Interpretive Report (Rev 3) (Cardno, April 2021). 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 extraction 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, extraction bores 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 8 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</p>

Data Quality Step	Description
Optimise the Design for Obtaining the Data	<p>necessary to evaluate the significance of the non- conformance and any corrective actions.</p>
	<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 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 for the first 12 months of monitoring is outlined in Section 0. 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 the assessment of contaminated sites (DER 2014).</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	<p>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.</p> <p>For the purpose of assessing accuracy it is required that at least one LCS for each process batch^[2] be analysed (NEPC, 2013).</p>
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.

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	On-Site	0958_MW106S, 0958_MW107S, 0958_MW108S, 0958_MW109S, 0958_MW110S, 0958_MW111S, 0958_MW112S, 0958_MW113S, 0958_MW114S, 0958_MW115S, 0958_MW116S, 0958_MW119S, 0958_MW122S, 0958_MW125S, 0958_MW128S, 0958_MW137S, 0958_MW138S, 0958_MW301, 0958_MW302, 0958_MW303, 0958_MW304, 0958_MW305, 0958_MW306, 0958_MW307, 0958_MW308, 0958_MW309, 0958_MW310, 0958_MW312, 0958_MW313, 0958_MW504, 0958_MW505.	Biannual

Aquifer (total number of monitoring wells)	Average screen interval (mBGL)	Location (on-Site/off-Site)	Monitoring Well / Bore ID	Frequency
Deep groundwater wells (9)	35 - 40	On-Site	0958_MW102D, 0958_MW105D, 0958_MW118D, 0958_MW121D, 0958_MW124D, 0958_MW130D, 0958_MW131D, 0958_MW133D, 0958_MW134D, 0958_MW136D, 0958_MW140D	Biannual
Intermediate depth wells (14)	12 - 16	On-Site	0958_MW101I, 0958_MW104I, 0958_MW117I, 0958_MW120I, 0958_MW123I, 0958_MW126I, 0958_MW129I, 0958_MW132I, 0958_MW135I, 0958_MW139I	Biannual
		Off-Site	0958_MW141S, 0958_MW142S, 0958_MW143S, 0958_MW403 (DWER bore GC19)	Quarterly
Abstraction wells (4)		Off-Site	Pinjar Production P140, Pinjar Production P145	Quarterly
		On-Site	0958_MW401 & 0958_MW402 (Abstraction wells 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 6-3 OMP Groundwater Monitoring Locations

Area	Monitoring Well / Bore ID	Rationale
On-Site – Source Areas	Former fuel farm (SA01) - 0958_MW112S, 0958_MW113S, 0958_MW101I, 0958_MW102D, 0958_MW301, 0958_MW302, 0958_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.
	Fire house and Refuelling area (SA02) - 0958_MW504, 0958_MW104I, 0958_MW105D, 0958_MW304, 0958_MW305, 0958_MW306	
	Powerhouse (SA03) - 0958_MW307, 0958_MW308, 0958_MW309, 0958_MW310	
On-Site – secondary sources	Landfills - 0958_MW106S, 0958_MW107S, 0958_MW108S, 0958_MW109S, 0958_MW110S	The monitoring will also allow refinement or implementation of additional measures to manage exposure to Site personnel working within these impacted areas.
	Sewage system and leach field (SA04): 0958_MW114S	
	Site Drainage - 0958_MW115S	
	Water Supply Infrastructure – 0958_MW505, 0958_MW312, 0958_MW313, 0958_MW111S.	
	Abstraction bore 1 - 0958_MW401	
On-site - other	Abstraction bore 2 – 0958_MW402	Detections of PFAS in exceedance of drinking water guidelines has been recorded in shallow southern boundary bore 0958_MW138_S 9 (Jacobs 2019, Jacobs 2018c). This indicates migration of groundwater offsite. 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 – 0958_MW116S, 0958_MW117I, 0958_MW118D, 0958_MW119S, 0958_MW120I, 0958_MW121D, 0958_MW122S, 0958_MW123I, 0958_MW124D	
	Site boundary – 0958_MW125S, 0958_MW126I, 0958_MW128S, 0958_MW129I, 0958_MW130D, 0958_MW131D, 0958_MW132I, 0958_MW133D, 0958_MW134D, 0958_MW135I, 0958_MW136I, 0958_MW138S, 0958_MW139I, 0958_MW140D	
	Background - 0958_MW137S	
	UWPCA: Pinjar Production P140, Pinjar Production P145	
Off-Site	Public Land: 0958_MW143S, 0958_MW142S, 0958_MW141S, 0958_MW403	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.

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

Initially, the OMP is proposed to be implemented for a twelve-month period, at which point the scope of the ongoing monitoring would be re-evaluated. 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 WA Water Corporation production bores (Pinjar Production Bore P145 and P140)
 - Four shallow groundwater monitoring wells located between the WA Water Corporation bores and the Site boundary (including the three new wells identified for installation in Section 3.3.2)
- > In relation to the two WA Water Corporation production bores, these are currently being sampled by WA Water Corporation. It is anticipated that this will continue to occur on a quarterly basis with this sampling frequency to be reviewed after a two-year period. Results 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.

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. Extraction 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	<p>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.</p> <p>A selection of wells including both shallow and deep will be gauged in a snap gauging event on the first day of sampling for the purpose of inferring the groundwater contours and flow direction..</p>
Groundwater Field Parameters	<p>Groundwater field parameters will be recorded via a down-hole water quality meter (positioned within the mid screen interval) prior to deployment of HydraSleeves® or pre-sample collection. The following field parameters will be 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 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>HydraSleeve will be deployed with top weight sample collection to begin at the lowest point.</p>

Activity	Details
	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).
Retrieval of HydraSleeves (Sample Collection)	<p>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.</p> <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)	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 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. 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 phosphate-free detergent (Decon 90), then double rinsed with clean water before the sample collection.</p>
Sample identification, preservation transport and holding times	<p>Each sample will be labelled with the sample location, date, project identification number and sampler's initials.</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 (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).</p> <ul style="list-style-type: none"> All holding times will comply with the requirements set out in "Australian Standard AS/NZS 5567.1:1998 and AS 4482.1".
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)

Activity	Details
	<ul style="list-style-type: none"> Secondary analysis will be undertaken by Eurofins (Perth). Laboratory LORs will be suitable to meet the relevant adopted assessment levels (0.01 µg/L).

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
0958_POT102	Air Traffic Control Tower: External tap at the air traffic control tower.	Quarterly
0958_POT103	Crew Hut: External tap at the crew huts	
0958_POT104	Fire House: Internal tap at the kitchen sink in the Fire House	

6.4.2 Extraction bores and tap water Sampling Methodology

Water samples from extraction bores 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 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. Detailed Site Investigation (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 	
	<ul style="list-style-type: none"> 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 should 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 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 Interpretative Reporting

Upon completion of each year's monitoring period an interpretative report will be prepared. 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 Quality Assurance/ Quality Control (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

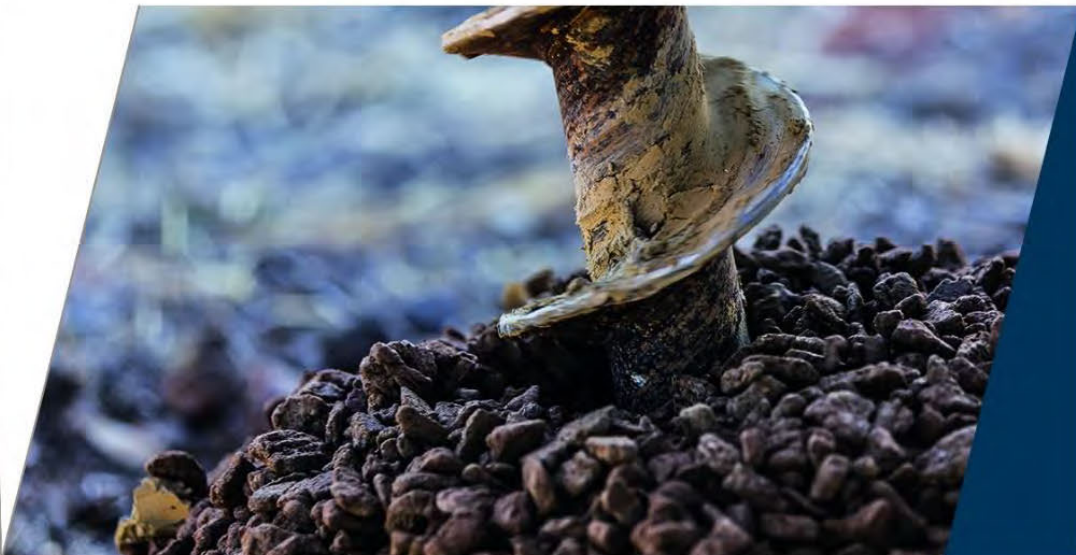
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-
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APPENDIX

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

 **Cardno**

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

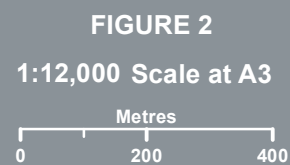
Source Area	Description
SA01	Former Fuel farm
SA02	Firehouse, refuelling area and washdown bay
SA03	Powerhouse
SA04	Eastern Leach Field



Legend

Management Area

PFAS Source Areas (Jacobs, 2019)



Management Area

SAMPLING AND ANALYSIS QUALITY PLAN

GINGIN SATELLITE AIRFIELD

DEPARTMENT OF DEFENCE

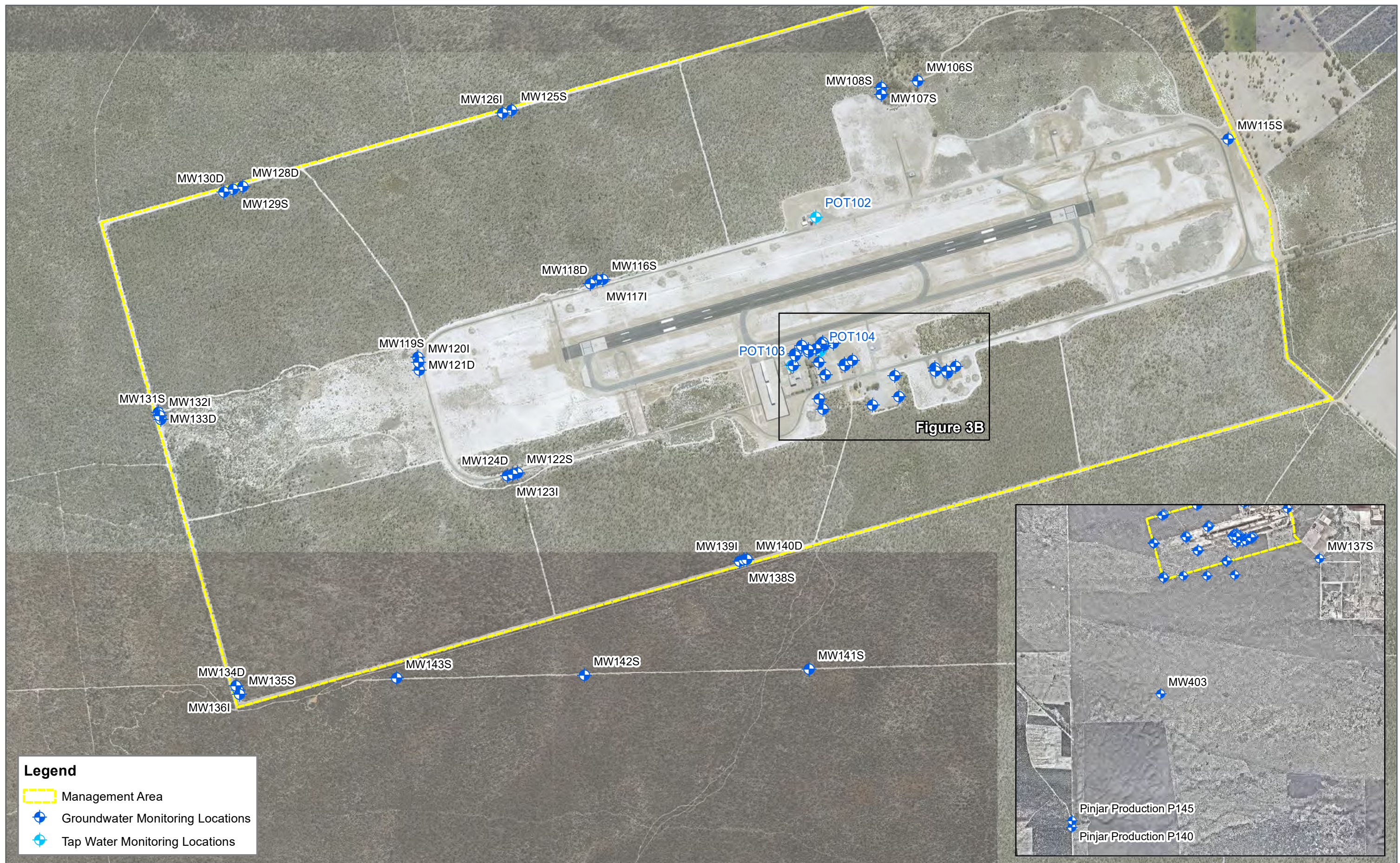
Map Produced by Cardno WA

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)



Legend

- Management Area
- ◆ Groundwater Monitoring Locations
- ◆ Tap Water Monitoring Locations

FIGURE 3A
1:12,500 Scale at A3

Metres

0 200 400

Monitoring Locations

SAMPLING AND ANALYSIS QUALITY PLAN
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



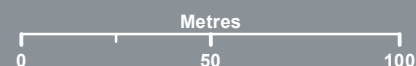
Map Produced by Cardno WA
Date: 2023-02-23 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-003A_GroundwaterMonitoringLocations 03.mxd
Aerial Imagery Supplied by Nearmap (January 2021)



Legend

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

FIGURE 3B
1:2,000 Scale at A3

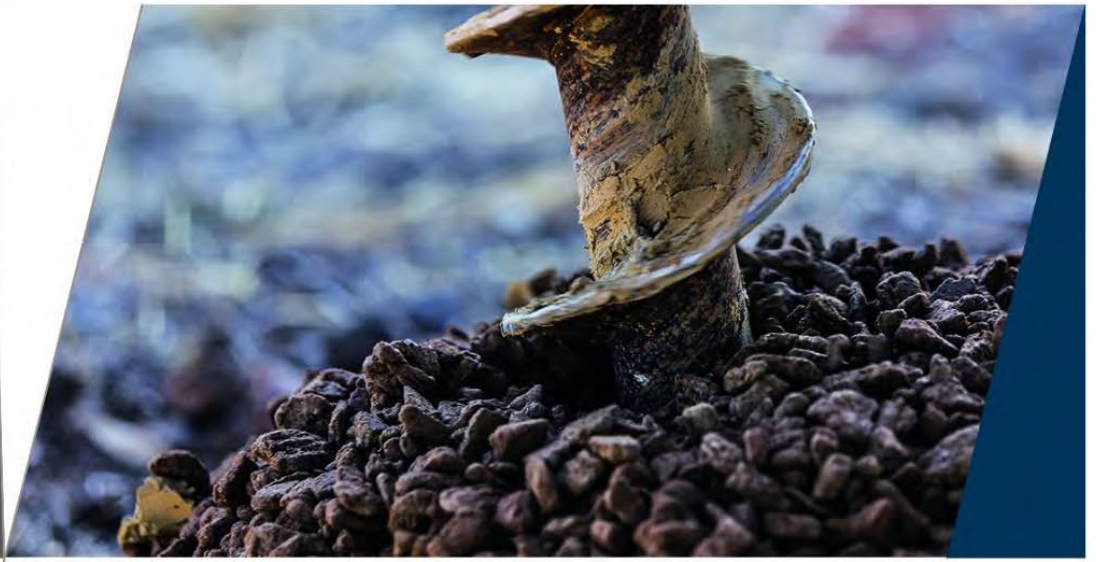


Monitoring Locations

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 (PFTrDA)	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



About Cardno

Cardno is a professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD]



APPENDIX

C

FACTUAL REPORTS



now



PFAS OMP Biannual Sampling Event Factual Report

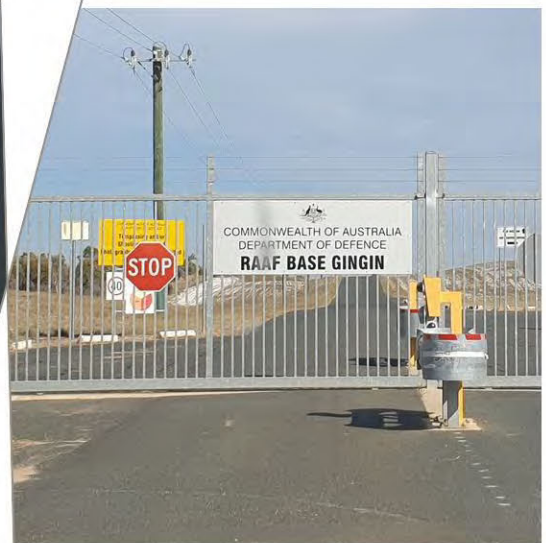
Post-Winter 2021

Gingin Satellite Airfield

DEF19009

Prepared for
Department of Defence

11 November 2021



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Rev 0	27/10/2021	External Draft	■	■
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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
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
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 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 August 2021, Reference: DEF19009, ‘PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Gingin Satellite Airfield’.

The SAQP was reviewed prior to the monitoring event and the following changes were made:

- > Laboratory testing for non-PFAS analytes were removed from the analytical suite for groundwater and tap water.

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 2021 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 Environment and Regulation (DER), 2014, Assessment and Management of Contaminated Sites¹.
- > 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, 2021), 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
On-Site – Source Areas	Former fuel farm (SA01) - 0958_MW112S, 0958_MW113S, 0958_MW101I, 0958_MW102D, 0958_MW301, 0958_MW302, 0958_MW303.
	Fire house and Refuelling area (SA02) - 0958_MW504, 0958_MW104I, 0958_MW105D, 0958_MW304, 0958_MW305, 0958_MW306.
	Powerhouse (SA03) - 0958_MW307, 0958_MW308, 0958_MW309, 0958_MW310.
	Landfills - 0958_MW106S, 0958_MW107S, 0958_MW108S, 0958_MW109S, 0958_MW110S.
On-Site – secondary sources	Sewage system and leach field (SA04): 0958_MW114S
	Site Drainage - 0958_MW115S
	Water Supply Infrastructure – 0958_MW505, 0958_MW312, 0958_MW313, 0958_MW111S
	Abstraction bore 1 - 0958_MW401
On-site - other	Abstraction bore 2 – 0958_MW402
	Airside perimeter – 0958_MW116S, 0958_MW117I, 0958_MW118D, 0958_MW119S, 0958_MW120I, 0958_MW121D, 0958_MW122S, 0958_MW123I, 0958_MW124D
	Site boundary – 0958_MW125S, 0958_MW126I, 0958_MW128S, 0958_MW129I, 0958_MW130D, 0958_MW131S, 0958_MW132I, 0958_MW133D, 0958_MW134D, 0958_MW135I, 0958_MW136D, 0958_MW138S, 0958_MW139I, 0958_MW140D
Off-Site	Background - 0958_MW137S
	Water Corporation Production bores⁽¹⁾: Pinjar Production P140, Pinjar Production P145
	Public land⁽²⁾: 0958_MW143S, 0958_MW142S, 0958_MW141S, 0958_MW403

Note: (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)

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.

2.2 Tap Water Monitoring

Water samples were collected from the tap water monitoring locations listed in Table 2-2 in accordance with the SAQP (Cardno, 2021) 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
On-Site	0958_POT101; 0958_POT102; 0958_POT103; 0958_POT104; 0958_POT105.

2.3 Data Management

All the data included in the 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.

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

2.3.1 Defence ESdat database

Data collected as part of the Post-Winter 2021 OMP monitoring event was uploaded to the ESdat database according to the data management requirements of the DCMM Annex L, including:

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

2.4 Deviations from the OMP SAQP

Deviations from the SAQP for the Post-Winter 2021 monitoring event are presented in Table 2-3 below.

Table 2-3 Deviations from the OMP SAQP

Location	Deviation	Comments
MW107S, MW108S, MW111S, MW134D, MW143S.	Not sampled	These wells were found dry.
MW307		This well was found to be destroyed.

It is noted that monitoring well MW143S has consistently been found dry since the start of the OMP which has prevented collection of ongoing data at this 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	<p>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.</p> <p>A selection of wells including both shallow and deep were gauged in a snap gauging event on the first day of sampling for the purpose of inferring the groundwater contours and flow direction.</p>
Groundwater Field Parameters	<p>Groundwater field parameters were recorded via a down-hole water quality meter (positioned within the mid screen interval) 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 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>
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 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.</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 (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 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 weather event or Site activities that could have impacted the monitoring event or results obtained were noted during the Post-Winter 2021 monitoring event.

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 slightly acidic, water colour was generally clear and, in some instances, cloudy. DO readings indicate aerobic groundwater conditions.

4.2.1.2 Groundwater gauging

Groundwater depth ranged from 55.52 mAHD (MW403) to 67.02 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 detect 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, MW310, MW504	0.56 ²	2.92 (MW310)	52	3
Sum of PFHxS and PFOS	MW101I, MW102D, MW104I, MW105D, MW109S, MW114S, MW122S, MW123I, MW138S, MW141S, MW301, MW302, MW303, MW304, MW305, MW306, MW308, MW309, MW310, MW504, MW505, MW312, MW313, MW402,	0.07 ²	213 (MW309)	52	24

Notes:

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

Findings are summarised as follows:

- > MW122S (inner perimeter) reported a first time exceedance (0.11 µg/L) of the drinking water guideline (0.07 µg/L) for Sum of PFHxS and PFOS.
- > No first time detect of PFOA or Sum of PFOS and PFHxS were reported for the groundwater monitoring locations during Post-Winter 2021.

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 near neutral, water was mostly clear and slightly saline. 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 detect 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	5	0
Sum of PFHxS and PFOS	POT101, POT102, POT103, POT104, POT105	0.07 ²	1.04 (POT102)	5	5

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 detect of PFOA or Sum of PFOS and PFHxS were reported for the tap water locations.
- > All five 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

Groundwater monitoring well MW307 was found destroyed during the Post-Winter 2021 monitoring event.

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 2021 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 five tap water locations. Six groundwater monitoring wells couldn't be sampled as these wells were found to be dry (5) or destroyed (1).

The groundwater laboratory results reported the following:

- > Of the 52 groundwater samples tested, Sum of PFOS and PFHxS (24 samples) and PFOA (3 samples) reported exceedances of the adopted assessment criteria.
- > MW122S (inner perimeter) reported a first time exceedance (0.11 µg/L) of the drinking water guideline (0.07 µg/L) for Sum of PFHxS and PFOS.
- > No groundwater sampling locations reported a first detect of PFOA or Sum of PFOS and PFHxS.
- > Groundwater results were generally consistent with the previous monitoring events.

The tap water laboratory results reported the following:

- > All five (5) 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 five (5) samples reported PFOA concentrations above the laboratory LOR but below the adopted assessment criteria.
- > No first time detect 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 2021 monitoring event were generally of the same order of magnitude as historical events.

The next OMP sampling event for Gingin Satellite Airfield is the quarterly monitoring event (Q1 2022), scheduled for January 2022.

6 References

General References

1. Australian Water Quality Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000).
2. *Contaminated Sites Act 2003*, Western Australia.
3. Department of Environment Regulation (DER), 2014, *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 2018) National Water Quality Management Strategy Australian Drinking Water Guidelines 6, August 2018
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)*'.
11. USEPA, 2002, '*Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8)*'.
12. Department of Environment and Energy, 2017, Defence Contamination Management Manual (DCMM) Annex L, '*OMP Factual Report Writing Guidance*'.

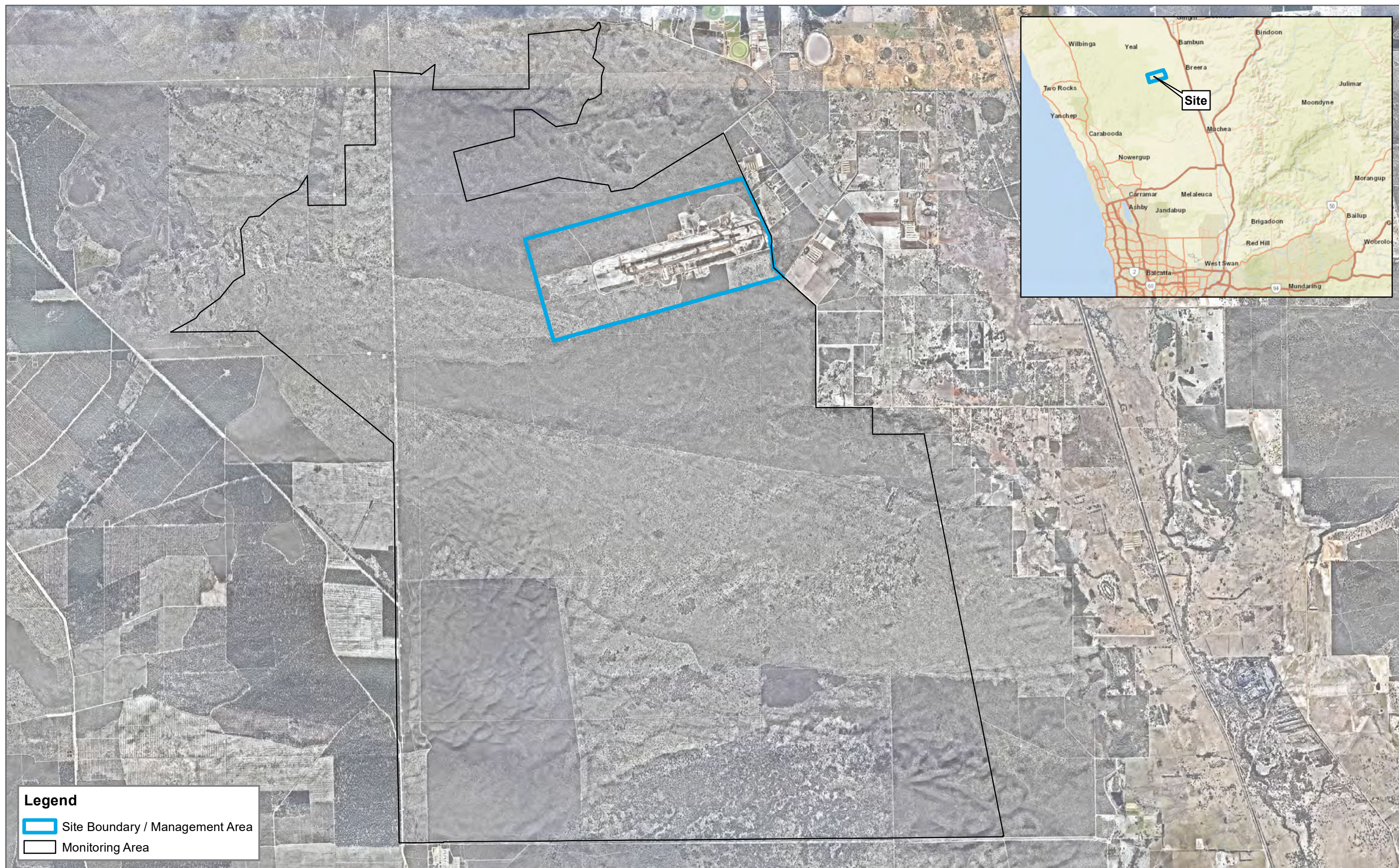
Site Specific References

13. Cardno, 2021, PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan.
14. Cardno, April 2020, PFAS OMP, Biannual Monitoring Factual Report – post-summer 2020.
15. Cardno, December 2020, PFAS OMP, Biannual Monitoring Factual Report - August 2020.
16. Cardno, December 2020, PFAS OMP, Biannual Monitoring Factual Report – post-winter 2020.
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20. Jacobs, 2018b, Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0002).
21. Jacobs, 2018c, Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-003).
22. Jacobs, 2018d, Tier 2 Human Health Risk Assessment – Offsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0005).
23. Jacobs, 2018e, Tier 3 Human Health Risk Assessment – Onsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0006).
24. Jacobs, 2019, PFAS Ongoing Groundwater Monitoring Report (No. IS219200-0000-NP-RPT-0008).

APPENDIX

A

FIGURES



Legend

Site Boundary / Management Area

Monitoring Area

FIGURE 1
 1:60,000 Scale at A3

Meters

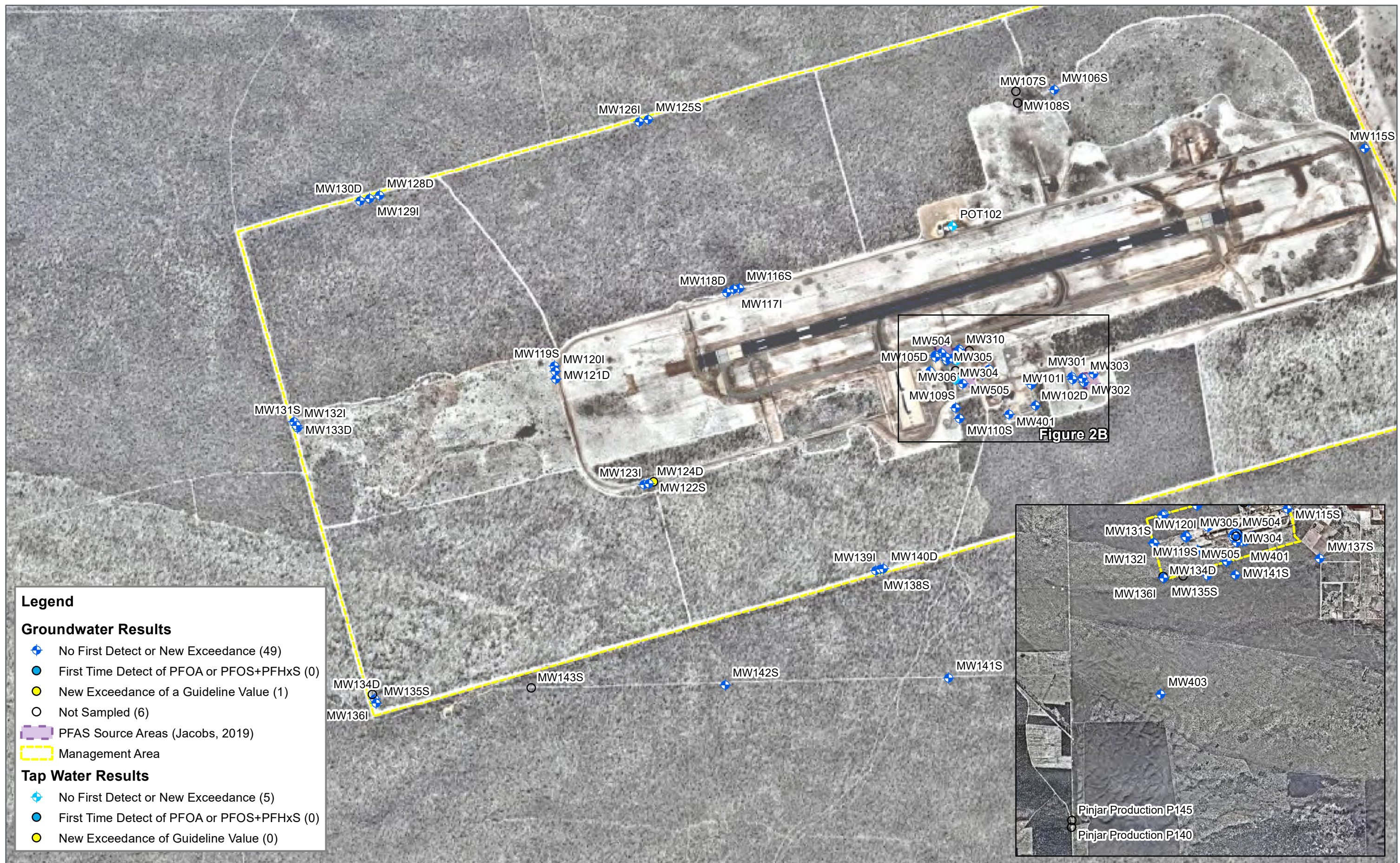
0 1,000 2,000

Site Location

BIANNUAL SAMPLING EVENT
 GINGIN SATELLITE AIRFIELD
 DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
 Date: 2021-10-25 | Project: DEF19009
 Coordinate System: GDA 1994 MGA Zone 50
 Map: DEF19009_WA_0958-GS-001_RegionalLocation 02.mxd
 Aerial Imagery Supplied by Nearmap



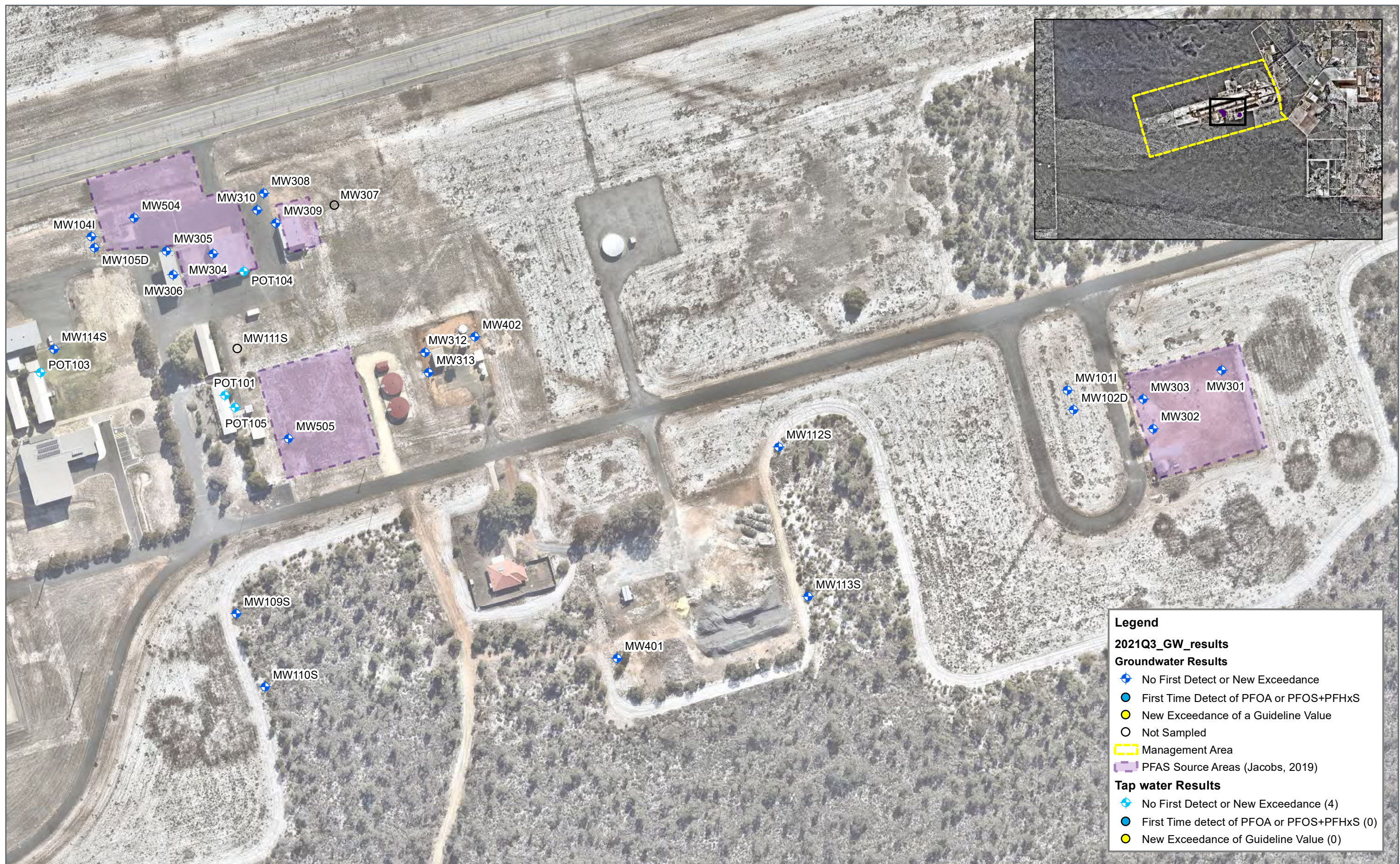


FIGURE 2B
1:1,750 Scale at A3

Meters
0 50 100

Monitoring Locations & Results

BIANNUAL SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2021-10-26 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-002B_2021Q3PFASResults 02.mxd
Aerial Imagery Supplied by Nearmap

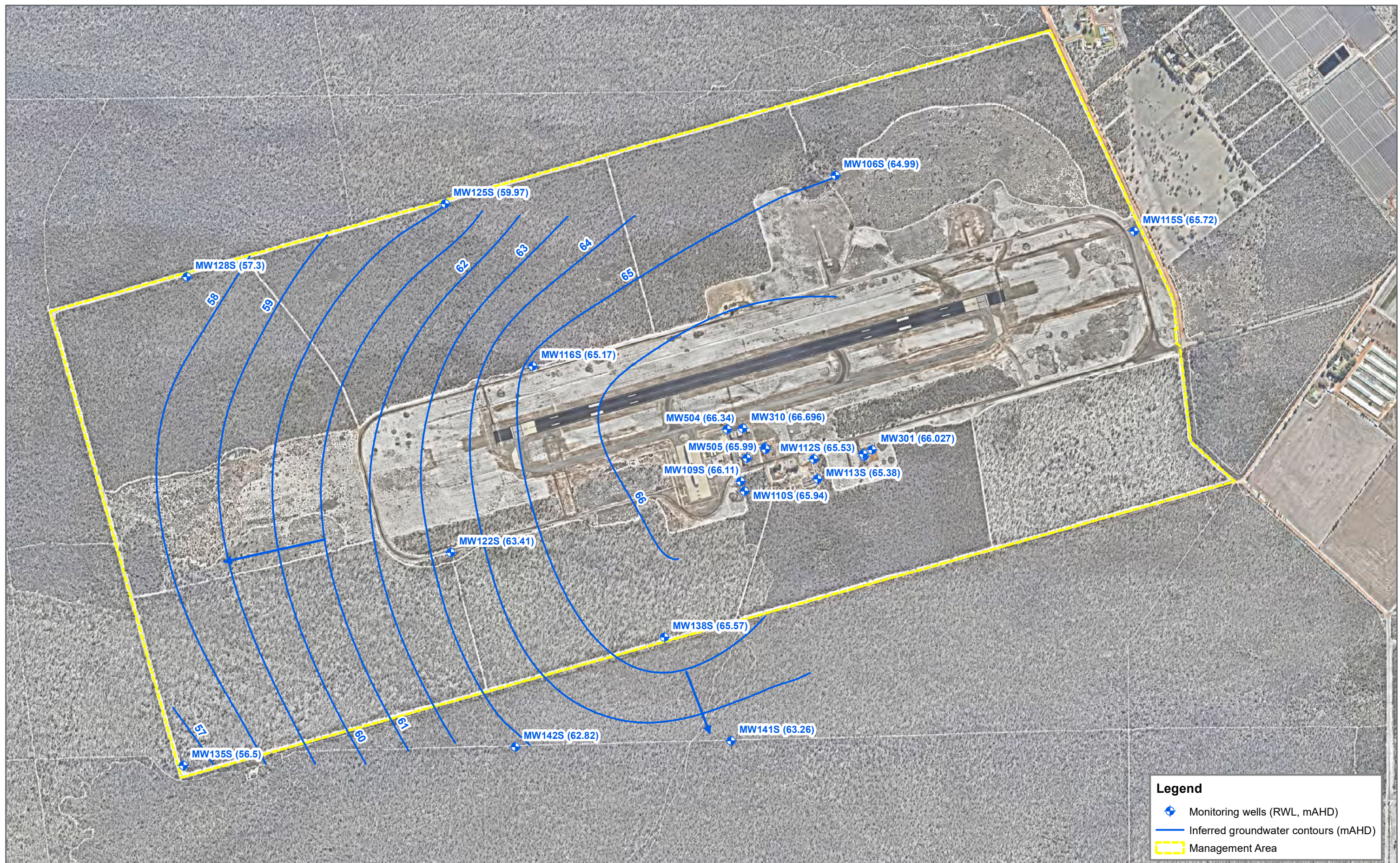


FIGURE 3
1:13,000 Scale at A3

Meters
0 200 400

Inferred Groundwater Contours (Shallow Aquifer)

BIANNUAL SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2021-10-26 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-003_2021Q4ShallowGWContours 01.mxd
Aerial Imagery Supplied by Nearmap (October 2020)



FIGURE 4
1:12,500 Scale at A3

Meters
0 200 400

Inferred Groundwater Contours (Deep Aquifer)

BIANNUAL SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2021-10-26 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-004_2021Q4DeepGWContours 01.mxd
Aerial Imagery Supplied by Nearmap

APPENDIX

B

DATA ASSESSMENT TABLES



Table 1: Groundwater Analytical Results

					PFAS - Perfluoroalkyl Sulfonic Acids					PFAS - Perfluoroalkyl Carboxylic Acids										
					Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluorohexanoic acid (PFHxA)	Perfluorooctanoic acid (PFPA)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorohexadecanoic acid (PFHxDA)	Perfluorooctadecanoic acid (PFODa)	Perfluoroundecanoic acid (PFUnDA)		
LOD - Limit of Reporting					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		
PFAS NEMP 2020 Drinking Water					0.02	0.02	0.02	0.02	0.02	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02		
PFAS NEMP 2020 Recreational Water																				
Monitoring Area	Location Code	Date	Field ID	Lab Report Number																
Former Fuel Farm	MW101I	7/09/2021	0958 MW101I 210907	EP2110442	0.04	0.06	0.35	<0.02	0.18	<0.02	<0.1	0.03	<0.02	<0.02	0.01	<0.02	<0.02	<0.02		
Former Fuel Farm	MW102D	8/09/2021	0958 MW102D 210908	EP2110531	0.10	<0.02	0.12	<0.02	0.14	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Fire House and Refueling Area	MW104I	7/09/2021	0958 MW104I 210907	EP2110442	0.08	0.10	0.60	0.04	0.27	<0.02	<0.1	0.14	0.03	<0.02	0.03	<0.02	<0.02	<0.02		
Fire House and Refueling Area	MW105D	7/09/2021	0958 MW105D 210907	EP2110442	0.03	0.04	0.46	0.02	0.41	<0.02	<0.1	0.07	<0.02	0.02	<0.02	<0.02	<0.02	<0.02		
Primary Landfill	MW106S	6/09/2021	0958 MW106S 210906	EP2110395	<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		
Secondary Landfill	MW109S	7/09/2021	0958 MW109S 210907	EP2110442	<0.02	<0.02	0.02	<0.02	0.10	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Secondary Landfill	MW110S	7/09/2021	0958 MW110S 210907	EP2110442	<0.02	<0.02	<0.02	<0.02	0.07	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Former Fuel Farm	MW112S	7/09/2021	0958 MW112S 210907	EP2110442	<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		
Fire Equipment Testing - Former Fuel Farm	MW113S	7/09/2021	0958 MW113S 210907	EP2110442	<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		
Sewage system and leach field	MW114S	7/09/2021	0958 MW114S 210907	EP2110442	0.06	0.07	0.51	<0.02	0.27	<0.02	<0.1	0.08	0.02	0.02	0.02	<0.02	<0.02	<0.02		
Site Drainage - East of Runway	MW115S	8/09/2021	0958 MW115S 210908	EP2110531	<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		
Inner Perimeter	MW116S	6/09/2021	0958 MW116S 210906	EP2110395	<0.02	<0.02	0.04	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Inner Perimeter	MW117I	6/09/2021	0958 MW117I 210906	EP2110395	<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		
Inner Perimeter	MW118D	6/09/2021	0958 MW118D 210906	EP2110395	<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		
Inner Perimeter	MW119S	6/09/2021	0958 MW119S 210906	EP2110395	<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		
Inner Perimeter	MW120I	6/09/2021	0958 MW120I 210906	EP2110395	<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		
Inner Perimeter	MW121D	6/09/2021	0958 MW121D 210906	EP2110395	<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		
Inner Perimeter	MW122S	6/09/2021	0958 MW122S 210906	EP2110395	<0.02	<0.02	0.06	<0.02	0.05	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Inner Perimeter	MW123I	6/09/2021	0958 MW123I 210906	EP2110395	<0.02	<0.02	0.07	<0.02	0.06	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Inner Perimeter	MW124D	6/09/2021	0958 MW124D 210906	EP2110395	<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		
Site Boundary	MW125S	6/09/2021	0958 MW125S 210906	EP2110395	<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		
Site Boundary	MW126I	6/09/2021	0958 MW126I 210906	EP2110395	<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		
Site Boundary	MW128D	6/09/2021	0958 MW128D 210906	EP2110395	<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		
Site Boundary	MW129I	6/09/2021	0958 MW129I 210906	EP2110395	<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		
Site Boundary	MW130D	6/09/2021	0958 MW130D 210906	EP2110395	<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		
Site Boundary	MW131D	6/09/2021	0958 MW131D 210906	EP2110395	<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		
Site Boundary	MW132I	6/09/2021	0958 MW132I 210906	EP2110395	<0.02	<0.02	0.03	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Site Boundary	MW133D	6/09/2021	0958 MW133D 210906	EP2110395	<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		
Site Boundary	MW135I	6/09/2021	0958 MW135I 210906	EP2110395	<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		
Site Boundary	MW136D	6/09/2021	0958 MW136D 210906	EP2110395	<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		
Off-Site Background well	MW137S	8/09/2021	0958 MW137S 210908	EP2110531	<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		
Site Boundary	MW138S	6/09/2021	0958 MW138S 210906	EP2110395	<0.02	<0.02	0.04	<0.02	0.12	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Site Boundary	MW139I	6/09/2021	0958 MW139I 210906	EP2110395	<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		
Site Boundary	MW140D	6/09/2021	0958 MW140D 210906	EP2110395	<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		
Off-Site	MW141S	8/09/2021	0958 MW141S 210908	EP2110531	0.07	0.09	0.65	0.06	0.41	<0.02	<0.1	0.15	0.03	0.02	0.04	<0.02	<0.02	<0.02		
Off-Site	MW142S	8/09/2021	0958 MW142S 210908	EP2110531	<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		
Former Fuel Farm	MW301	8/09/2021	0958 MW301 210908	EP2110531	0.69	2.50	17.2	1.02	49.9	<0.02	0.2	3.34	0.42	0.92	1.42	<0.02	<0.02	<0.02		
Former Fuel Farm	MW302	8/09/2021	0958 MW302 210908	EP2110531	0.07	0.10	1.52	0.15	0.64	<0.02	<0.1	0.12	0.03	<0.02	0.10	<0.02	<0.02	<0.02		
Former Fuel Farm	MW303	8/09/2021	0958 MW303 210908	EP2110531	0.22	0.45	3.45	0.54	57.1	<0.02	<0.1	0.51	0.09	0.07	0.41	<0.02	<0.02	<0.02		
Fire House and Refueling Area	MW304	7/09/2021	0958 MW304 210907	EP2110442	0.57	0.62	4.42	0.22	1.90	<0.02	0.1	0.88	0.20	0.10	0.20	<0.02	<0.02	<0.02		
Fire House and Refueling Area	MW305	7/09/2021	0958 MW305 210907	EP2110442	0.22	0.26	1.68	0.16	3.26	<0.02	<0.1	0.36	0.11	0.05	0.15	<0.02	<0.02	<0.02		
Fire House and Refueling Area	MW306	7/09/2021	0958 MW306 210907	EP2110442	0.56	1.28	3.71	0.20	2.89	<0.02	<0.1	0.91	0.15	0.18	0.18	<0.02	<0.02	<0.02		
Powerhouse	MW308	7/09/2021	0958 MW308 210907	EP2110442	0.42	0.81	3.58	0.33	27.5	<0.02	0.1	1.56	0.21	0.15	0.30	<0.02	<0.02	<0.02		
Powerhouse	MW309	7/09/2021	0958 MW309 210907	EP2110442	1.32	2.03	10.9	1.28	202	<0.02	<0.1	0.37	0.50	0.81	0.39	<0.02	<0.02	<0.02		
Powerhouse	MW310	7/09/2021	0958 MW310 210907	EP2110442	2.55	7.53	53.2	3.30	93.6	<0.02	0.6	8.52	1.04	2.09	2.92	<0.02	<0.02	<0.02		
Fire Equipment Testing - Former Fuel Farm	MW312	7/09/2021	0958 MW312 210907	EP2110442	<0.02	<0.02	0.09	<0.02	0.20	<0.02	<0.1	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		
Fire Equipment Testing - Former Fuel Farm	MW313	7/09/2021	0958 MW313 210907																	



Table 1: Groundwater Analytical Results

PFAS OMP
Gingin Satellite Airfield
Post-Winter 2021

					PFAS - 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 (PFOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorodecane sulfonamide (MeFDSA)	N-Ethyl perfluorooctane sulfonamide (EFOSA)	N-Ethyl perfluorodecane sulfonamide (EFDSA)	N-Ethyl perfluorooctane sulfonamide (EFOSA)	N-Ethyl perfluorodecane sulfonamide (EFDSA)	Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	Sum of PFAS	
LOD - Limit of Reporting					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	
PFAS NEMP 2020 Drinking Water					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 Recreational Water																	0.07		
																	2		
Monitoring Area	Location Code	Date	Field ID	Lab Report Number															
Former Fuel Farm	MW101I	7/09/2021	0958 MW101I 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.61	0.53	0.67	
Former Fuel Farm	MW102D	8/09/2021	0958 MW102D 210908	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.36	0.26	0.36	
Fire House and Refueling Area	MW104I	7/09/2021	0958 MW104I 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.15	0.87	1.29	
Fire House and Refueling Area	MW105D	7/09/2021	0958 MW105D 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.99	0.87	1.05	
Primary Landfill	MW106S	6/09/2021	0958 MW106S 210906	EP2110395	<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	
Secondary Landfill	MW109S	7/09/2021	0958 MW109S 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.12	0.12	0.12	
Secondary Landfill	MW110S	7/09/2021	0958 MW110S 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.07	0.07	0.07	
Former Fuel Farm	MW112S	7/09/2021	0958 MW112S 210907	EP2110442	<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	
Fire Equipment Testing - Former Fuel Farm	MW113S	7/09/2021	0958 MW113S 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.05	0.05	0.05	
Sewage system and leach field	MW114S	7/09/2021	0958 MW114S 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.98	0.78	1.05	
Site Drainage - East of Runway	MW115S	8/09/2021	0958 MW115S 210908	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.03	0.03	0.03	
Inner Perimeter	MW116S	6/09/2021	0958 MW116S 210906	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.04	0.04	0.04	
Inner Perimeter	MW117I	6/09/2021	0958 MW117I 210906	EP2110395	<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	
Inner Perimeter	MW118D	6/09/2021	0958 MW118D 210906	EP2110395	<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	
Inner Perimeter	MW119S	6/09/2021	0958 MW119S 210906	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02	
Inner Perimeter	MW120I	6/09/2021	0958 MW120I 210906	EP2110395	<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	
Inner Perimeter	MW121D	6/09/2021	0958 MW121D 210906	EP2110395	<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	
Inner Perimeter	MW122S	6/09/2021	0958 MW122S 210906	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.11	0.11	0.11	
Inner Perimeter	MW123I	6/09/2021	0958 MW123I 210906	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.13	0.13	0.13	
Inner Perimeter	MW124D	6/09/2021	0958 MW124D 210906	EP2110395	<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	
Site Boundary	MW125S	6/09/2021	0958 MW125S 210906	EP2110395	<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	
Site Boundary	MW126I	6/09/2021	0958 MW126I 210906	EP2110395	<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	
Site Boundary	MW128D	6/09/2021	0958 MW128D 210906	EP2110395	<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	
Site Boundary	MW129I	6/09/2021	0958 MW129I 210906	EP2110395	<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	
Site Boundary	MW130D	6/09/2021	0958 MW130D 210906	EP2110395	<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	
Site Boundary	MW131D	6/09/2021	0958 MW131D 210906	EP2110395	<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	
Site Boundary	MW132I	6/09/2021	0958 MW132I 210906	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.03	0.03	0.03	
Site Boundary	MW133D	6/09/2021	0958 MW133D 210906	EP2110395	<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	
Site Boundary	MW135I	6/09/2021	0958 MW135I 210906	EP2110395	<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	
Site Boundary	MW136D	6/09/2021	0958 MW136D 210906	EP2110395	<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	
Off-Site Background well	MW137S	8/09/2021	0958 MW137S 210908	EP2110531	<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	
Site Boundary	MW138S	6/09/2021	0958 MW138S 210906	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.16	0.16	0.16	
Site Boundary	MW139I	6/09/2021	0958 MW139I 210906	EP2110395	<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	
Site Boundary	MW140D	6/09/2021	0958 MW140D 210906	EP2110395	<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	
Off-Site	MW141S	8/09/2021	0958 MW141S 210908	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.37	1.06	1.52	
Off-Site	MW142S	8/09/2021	0958 MW142S 210908	EP2110531	<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	
Former Fuel Farm	MW301	8/09/2021	0958 MW301 210908	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	74.1	67.1	77.6	
Former Fuel Farm	MW302	8/09/2021	0958 MW302 210908	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2.48	2.16	2.73	
Former Fuel Farm	MW303	8/09/2021	0958 MW303 210908	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	61.8	60.6	62.8	
Fire House and Refueling Area	MW304	7/09/2021	0958 MW304 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	8.37	6.32	9.21	
Fire House and Refueling Area	MW305	7/09/2021	0958 MW305 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	5.83	4.94	6.25	
Fire House and Refueling Area	MW306	7/09/2021	0958 MW306 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	8.58	6.60	10.1	
Powerhouse	MW308	7/09/2021	0958 MW308 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	33.8	31.1	35.0	
Powerhouse	MW309	7/09/2021	0958 MW309 210907	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	219	213	223	
Powerhouse	MW310	7/09/2021	0958 MW310 210907	EP2110442	<0.05	0.12	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	165	147	175	
Fire Equipment Testing - Former Fuel Farm	MW312	7/09/2021	0958 MW312 210907	EP2110442	<0.05	<0.05	<0.05	<0											



Table 2 - Rinsates and Field Blank 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)	Perfluorohexanoic acid (PFHxA)	Perfluoropentanoic acid (PFPeA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorononanoic acid (PFNA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)
	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	0.02	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.05	0.02	0.02
PFAS NEMP 2020 Drinking Water											0.56						
PFAS NEMP 2020 Recreational Water											10						

Date	Field ID	Sample Type	Lab Report Number																
6/09/2021	0958_QC301_210906	Rinsate	EP2110395	<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	<0.05	<0.02
6/09/2021	0958_QC401_210906	Field_B	EP2110395	<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	<0.05	<0.02
7/09/2021	0958_QC302_210907	Rinsate	EP2110442	<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	<0.05	<0.02
7/09/2021	0958_QC402_210907	Field_B	EP2110442	<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	<0.05	<0.02
8/09/2021	0958_QC303_210908	Rinsate	EP2110531	<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	<0.05	<0.02
8/09/2021	0958_QC403_210908	Field_B	EP2110531	<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	<0.05	<0.02
10/09/2021	0958_QC305_210910	Rinsate	EP2110622	<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	<0.05	<0.02
10/09/2021	0958_QC405_210910	Field_B	EP2110622	<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	<0.05	<0.02

Environmental Standards
HEPA, January 2020, PFAS NEMP 2020 Drinking Water
HEPA, January 2020, PFAS NEMP 2020 Recreational Water



Table 2 - Rinsates and Field Blank analytical results

	PFAS		PFAS - Fluorotelomer Sulfonic Acids				PFAS - Perfluoroalkyl Sulfonamides							PFAS		
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	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 PFAS (WA DER List)	Sum of PFHxS and PFOS	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	µg/L	µg/L
LOR - Limit of reporting	0.02	0.02	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																
6/09/2021	0958_QC301_210906	Rinsate	EP2110395	<0.02	<0.02	<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
6/09/2021	0958_QC401_210906	Field_B	EP2110395	<0.02	<0.02	<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
7/09/2021	0958_QC302_210907	Rinsate	EP2110442	<0.02	<0.02	<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
7/09/2021	0958_QC402_210907	Field_B	EP2110442	<0.02	<0.02	<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
8/09/2021	0958_QC303_210908	Rinsate	EP2110531	<0.02	<0.02	<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
8/09/2021	0958_QC403_210908	Field_B	EP2110531	<0.02	<0.02	<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
10/09/2021	0958_QC305_210910	Rinsate	EP2110622	<0.02	<0.02	<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
10/09/2021	0958_QC405_210910	Field_B	EP2110622	<0.02	<0.02	<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



Table 3 - Relative Percentage Differences

		Date	6/09/2021	6/09/2021		6/09/2021	6/09/2021		6/09/2021	6/09/2021		6/09/2021	6/09/2021	
		Field ID	0958_MW125S_210906	0958_QC101_210906		0958_MW125S_210906	0958_QC201_210906		0958_MW116S_210906	0958_QC102_210906		0958_MW116S_210906	0958_QC202_210906	
		Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water	
		Lab Report Number	EP2110395	EP2110395	RPD	EP2110395	822876	RPD	EP2110395	EP2110395	RPD	EP2110395	822876	RPD
	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	<0.01	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	0.04	0.03	29	0.04	0.03	29
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	<0.01	<0.01	0	<0.01	<0.01	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
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
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	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
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	<0.01	<0.01	0	<0.01	<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
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
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
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
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
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
PFAS - 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 PFAS (WA DER List)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.05	0	0.04	0.03	29	0.04	<0.05	0
Sum of PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	0.04	0.03	29	0.04	0.03	29
Sum of PFAS	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.1	0	0.04	0.03	29	0.04	<0.1	0
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01					<0.01						0.03	
Sum of PFAS (PFOS + PFOA)	µg/L	0.01					<0.01						<0.01	

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

Table 3 - Relative Percentage Differences

		Date	7/09/2021	7/09/2021		7/09/2021	7/09/2021		7/09/2021	7/09/2021		7/09/2021	7/09/2021	
		Field ID	0958_MW309_210907	0958_QC103_210907		0958_MW309_210907	0958_QC203_210907		0958_POT104_210907	0958_QC105_210907		0958_POT104_210907	0958_QC205_210907	
		Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water	
		Lab Report Number	EP2110442	EP2110442	RPD	EP2110442	823596	RPD	EP2110442	EP2110442	RPD	EP2110442	823596	RPD
	Unit	LOR												
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01					0.46						0.04	
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	1.32	1.30	2	1.32	1.4	6	0.08	0.06	29	0.08	0.07	13
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	2.03	2.04	0	2.03	1.9	7	0.10	0.07	35	0.10	0.11	10
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	10.9	8.73	22	10.9	9.4	15	0.63	0.43	38	0.63	0.83	27
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	1.28	1.57	20	1.28	0.22	141	0.04	0.03	29	0.04	0.08	67
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	202	202	0	202	140	36	0.33	0.25	28	0.33	0.42	24
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	0.3	0.3	0	0.3	0.30	0	<0.1	<0.1	0	<0.1	0.07	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	3.07	3.07	0	3.07	3.1	1	0.14	0.10	33	0.14	0.16	13
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	0.50	0.46	8	0.50	0.77	43	0.03	0.02	40	0.03	0.03	0
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	0.81	0.75	8	0.81	0.84	4	<0.02	<0.02	0	<0.02	0.02	0
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.39	0.37	5	0.39	0.46	16	0.03	0.02	40	0.03	0.03	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
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
Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.02	<0.02	0	<0.02	0.02	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
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
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
PFAS - 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 PFAS (WA DER List)	µg/L	0.01	219	217	1	219	156.27	33	1.24	0.88	34	1.24	1.63	27
Sum of PFHxS and PFOS	µg/L	0.01	213	211	1	213	149.4	35	0.96	0.68	34	0.96	1.25	26
Sum of PFAS	µg/L	0.01	223	220	1	223	158.87	34	1.38	0.98	34	1.38	1.86	30
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01					149.86						1.28	
Sum of PFAS (PFOS + PFOA)	µg/L	0.01					140.46						0.45	

Table 3 - Relative Percentage Differences

		Date	7/09/2021	7/09/2021		7/09/2021	7/09/2021		8/09/2021	8/09/2021		8/09/2021	8/09/2021	
		Field ID	0958_MW110S_210907	0958_QC104_210907		0958_MW110S_210907	0958_QC204_210907		0958_MW301_210908	0958_QC106_210908		0958_MW301_210908	0958_QC206_210908	
		Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water	
		Lab Report Number	EP2110442	EP2110442	RPD	EP2110442	823596	RPD	EP2110531	EP2110531	RPD	EP2110531	823600	RPD
	Unit	LOR												
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01					<0.01						0.08	
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	0.69	0.64	8	0.69	0.61	12
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	2.50	2.13	16	2.50	1.1	78
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.02	<0.02	0	<0.02	0.02	0	17.2	15.2	12	17.2	12	36
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	1.02	1.28	23	1.02	0.58	55
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.07	0.07	0	0.07	0.09	25	49.9	60.2	19	49.9	53	6
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01					<0.01						0.23	
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	0.2	0.1	67	0.2	0.17	16
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	3.34	3.17	5	3.34	2.5	29
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	0.42	0.40	5	0.42	0.44	5
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	0.92	0.96	4	0.92	0.86	7
Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	1.42	1.65	15	1.42	1.4	1
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
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
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
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
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
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
PFAS - 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 PFAS (WA DER List)	µg/L	0.01	0.07	0.07	0	0.07	0.11	44	74.1	82.3	10	74.1	70.98	4
Sum of PFHxS and PFOS	µg/L	0.01	0.07	0.07	0	0.07	0.11	44	67.1	75.4	12	67.1	65	3
Sum of PFAS	µg/L	0.01	0.07	0.07	0	0.07	0.11	44	77.6	85.7	10	77.6	72.97	6
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01					0.11						66.4	
Sum of PFAS (PFOS + PFOA)	µg/L	0.01					0.09						54.4	

			Date	8/09/2021	8/09/2021	RPD	8/09/2021	8/09/2021	RPD
			Field ID	0958_MW115S_210908	0958_QC107_210908		0958_MW115S_210908	0958_QC207_210908	
			Matrix Type	Water	Water		Water	Water	
			Lab Report Number	EP2110531	EP2110531		EP2110531	823600	
	Unit	LOR							
PFAS - Perfluoroalkyl Sulfonic Acids									
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01					<0.01		
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.02	<0.02	0	<0.02	0.03	40	
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.03	0.02	40	0.03	0.05	50	
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01					<0.01		
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01	<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	
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	
Perfluorodecanoic acid (PFDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	
PFAS - 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	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01	<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	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.05	0	
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.05	0	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	
PFAS									
Sum of PFAS (WA DER List)	µg/L	0.01	0.03	0.02	40	0.03	0.08	91	
Sum of PFHxS and PFOS	µg/L	0.01	0.03	0.02	40	0.03	0.08	91	
Sum of PFAS	µg/L	0.01	0.03	0.02	40	0.03	<0.1	0	
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01					0.08		
Sum of PFAS (PFOS + PFOA)	µg/L	0.01					0.05		

APPENDIX

C

LABORATORY CERTIFICATES OF ANALYSIS

**CHAIN OF CUSTODY**

COC#: 27249

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

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

Other comments:

CONTACT PH: [REDACTED]

SAMPLER MOBILE:

QUOTE NO: SY/139/19

/ ES2019CARBSD0002

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW138S		06/09/2021 09:19 AM	Water	ALS: 2 Non ALS: 0	No	X		
002	0958_MW139I		06/09/2021 09:29 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_MW140D		06/09/2021 09:35 AM	Water	ALS: 2 Non ALS: 0	No	X		
004	0958_MW135I		06/09/2021 10:19 AM	Water	ALS: 2 Non ALS: 0	No	X		
005	0958_MW136D		06/09/2021 10:27 AM	Water	ALS: 2 Non ALS: 0	No	X		
006	0958_MW132I		06/09/2021 10:47 AM	Water	ALS: 2 Non ALS: 0	No	X		
007	0958_MW133D		06/09/2021 10:58 AM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab QC
008	0958_MW131D		06/09/2021 11:07 AM	Water	ALS: 2 Non ALS: 0	No	X		
009	0958_MW130D		06/09/2021 11:45 AM	Water	ALS: 2 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

COC#: 27249

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_MW129I		06/09/2021 11:51 AM	Water	ALS: 2 Non ALS: 0	No	X		
011	0958_MW126I		06/09/2021 12:30 PM	Water	ALS: 2 Non ALS: 0	No	X		
012	0958_MW125S		06/09/2021 12:39 PM	Water	ALS: 2 Non ALS: 0	No	X		
013	0958_QC101		06/09/2021 12:47 PM	Water	ALS: 2 Non ALS: 0	No	X		
014	0958_POT102		06/09/2021 12:57 PM	Water	ALS: 2 Non ALS: 0	No	X		
015	0958_MW106S		06/09/2021 01:17 PM	Water	ALS: 2 Non ALS: 0	No	X		
016	0958_MW116S		06/09/2021 01:44 PM	Water	ALS: 2 Non ALS: 0	No	X		
017	0958_QC102		06/09/2021 01:45 PM	Water	ALS: 2 Non ALS: 0	No	X		
018	0958_MW117I		06/09/2021 01:52 PM	Water	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

ALS COC#: 27249

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0958_MW118D		06/09/2021 01:59 PM	Water	ALS: 2 Non ALS: 0	No	X		
020	0958_MW128S		06/09/2021 12:08 PM	Water	ALS: 0 Non ALS: 0	No	X		
021	0958_MW119S		06/09/2021 02:15 PM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab QC
022	0958_MW128S		06/09/2021 12:08 PM	Water	ALS: 2 Non ALS: 0	No	X		
023	0958_MW120I		06/09/2021 02:29 PM	Water	ALS: 2 Non ALS: 0	No	X		
024	0958_MW121D		06/09/2021 02:39 PM	Water	ALS: 2 Non ALS: 0	No	X		
025	0958_MW123I		06/09/2021 02:56 PM	Water	ALS: 2 Non ALS: 0	No	X		
026	0958_MW124D		06/09/2021 03:05 PM	Water	ALS: 2 Non ALS: 0	No	X		
027	0958_MW122S		06/09/2021 03:14 PM	Water	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 27249

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER:

PRIMARY SAMPLER:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

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:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
028	0958_POT101		06/09/2021 03:29 PM	Water	ALS: 2 Non ALS: 0	No	X		
029	0958_POT103		06/09/2021 03:34 PM	Water	ALS: 2 Non ALS: 0	No	X		
030	0958_QC301_210906		06/09/2021 03:44 PM	Water	ALS: 2 Non ALS: 0	No	X		
031	0958_QC401_210906		06/09/2021 03:45 PM	Water	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 27249

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER:

PRIMARY SAMPLER:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW138S	HDPE (no PTFE)	20 mL	00352101028271	Grey	No	
001	0958_MW138S	HDPE (no PTFE)	20 mL	00352101027995	Grey	No	
002	0958_MW139I	HDPE (no PTFE)	20 mL	00352101028006	Grey	No	
002	0958_MW139I	HDPE (no PTFE)	20 mL	00352101028496	Grey	No	
003	0958_MW140D	HDPE (no PTFE)	20 mL	00352101028257	Grey	No	
003	0958_MW140D	HDPE (no PTFE)	20 mL	00352101028365	Grey	No	
004	0958_MW135I	HDPE (no PTFE)	20 mL	00352101028256	Grey	No	
004	0958_MW135I	HDPE (no PTFE)	20 mL	00352101028092	Grey	No	
005	0958_MW136D	HDPE (no PTFE)	20 mL	00352101028162	Grey	No	
005	0958_MW136D	HDPE (no PTFE)	20 mL	00352101028370	Grey	No	
006	0958_MW132I	HDPE (no PTFE)	20 mL	00352101028147	Grey	No	
006	0958_MW132I	HDPE (no PTFE)	20 mL	00352101028323	Grey	No	
007	0958_MW133D	HDPE (no PTFE)	20 mL	00352101028448	Grey	No	
007	0958_MW133D	HDPE (no PTFE)	20 mL	00352101028182	Grey	No	
007	0958_MW133D	HDPE (no PTFE)	20 mL	00352101028087	Grey	No	
007	0958_MW133D	HDPE (no PTFE)	20 mL	00352101028334	Grey	No	
008	0958_MW131D	HDPE (no PTFE)	20 mL	00352101028113	Grey	No	
008	0958_MW131D	HDPE (no PTFE)	20 mL	00352101028036	Grey	No	
009	0958_MW130D	HDPE (no PTFE)	20 mL	00352101028474	Grey	No	
009	0958_MW130D	HDPE (no PTFE)	20 mL	00352101028197	Grey	No	
010	0958_MW129I	HDPE (no PTFE)	20 mL	00352101028500	Grey	No	
010	0958_MW129I	HDPE (no PTFE)	20 mL	00352101028387	Grey	No	
011	0958_MW126I	HDPE (no PTFE)	20 mL	00352101028424	Grey	No	
011	0958_MW126I	HDPE (no PTFE)	20 mL	00352101028158	Grey	No	
012	0958_MW125S	HDPE (no PTFE)	20 mL	00352101028489	Grey	No	
012	0958_MW125S	HDPE (no PTFE)	20 mL	00352101028494	Grey	No	



CHAIN OF CUSTODY

COC#: 27249 ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

CONTACT PH: [REDACTED]

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

013	0958_QC101	HDPE (no PTFE)	20 mL	00352101027999	Grey	No	
013	0958_QC101	HDPE (no PTFE)	20 mL	00352101028263	Grey	No	
014	0958_POT102	HDPE (no PTFE)	20 mL	00352101028225	Grey	No	
014	0958_POT102	HDPE (no PTFE)	20 mL	00352101028328	Grey	No	
015	0958_MW106S	HDPE (no PTFE)	20 mL	00352101028188	Grey	No	
015	0958_MW106S	HDPE (no PTFE)	20 mL	00352101028066	Grey	No	
016	0958_MW116S	HDPE (no PTFE)	20 mL	00352101028486	Grey	No	
016	0958_MW116S	HDPE (no PTFE)	20 mL	00352101028058	Grey	No	
017	0958_QC102	HDPE (no PTFE)	20 mL	00352101027990	Grey	No	
017	0958_QC102	HDPE (no PTFE)	20 mL	00352101028457	Grey	No	
018	0958_MW117I	HDPE (no PTFE)	20 mL	00352101028515	Grey	No	
018	0958_MW117I	HDPE (no PTFE)	20 mL	00352101028218	Grey	No	
019	0958_MW118D	HDPE (no PTFE)	20 mL	00352101028582	Grey	No	
019	0958_MW118D	HDPE (no PTFE)	20 mL	00352101028565	Grey	No	
021	0958_MW119S	HDPE (no PTFE)	20 mL	00352101028503	Grey	No	
021	0958_MW119S	HDPE (no PTFE)	20 mL	00352101028571	Grey	No	
021	0958_MW119S	HDPE (no PTFE)	20 mL	00352101028377	Grey	No	
021	0958_MW119S	HDPE (no PTFE)	20 mL	00352101028584	Grey	No	
022	0958_MW128S	HDPE (no PTFE)	20 mL	00352101028308	Grey	No	
022	0958_MW128S	HDPE (no PTFE)	20 mL	00352101028326	Grey	No	
023	0958_MW120I	HDPE (no PTFE)	20 mL	00352101028186	Grey	No	
023	0958_MW120I	HDPE (no PTFE)	20 mL	00352101028480	Grey	No	
024	0958_MW121D	HDPE (no PTFE)	20 mL	00352101028264	Grey	No	
024	0958_MW121D	HDPE (no PTFE)	20 mL	00352101028348	Grey	No	
025	0958_MW123I	HDPE (no PTFE)	20 mL	00352101028417	Grey	No	
025	0958_MW123I	HDPE (no PTFE)	20 mL	00352101028101	Grey	No	
026	0958_MW124D	HDPE (no PTFE)	20 mL	00352101028425	Grey	No	

**CHAIN OF CUSTODY**

COC#: 27249

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER:

PRIMARY SAMPLER:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

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:

026	0958_MW124D	HDPE (no PTFE)	20 mL	00352101028161	Grey	No	
027	0958_MW122S	HDPE (no PTFE)	20 mL	00352101028172	Grey	No	
027	0958_MW122S	HDPE (no PTFE)	20 mL	00352101028274	Grey	No	
028	0958_POT101	HDPE (no PTFE)	20 mL	00352101028487	Grey	No	
028	0958_POT101	HDPE (no PTFE)	20 mL	00352101028086	Grey	No	
029	0958_POT103	HDPE (no PTFE)	20 mL	00352101028420	Grey	No	
029	0958_POT103	HDPE (no PTFE)	20 mL	00352101028181	Grey	No	
030	0958_QC301_210906	HDPE (no PTFE)	20 mL	00352101028540	Grey	No	
030	0958_QC301_210906	HDPE (no PTFE)	20 mL	00352101028470	Grey	No	
031	0958_QC401_210906	HDPE (no PTFE)	20 mL	00352101028122	Grey	No	
031	0958_QC401_210906	HDPE (no PTFE)	20 mL	00352101028046	Grey	No	

Total Bottle Count: ALS: 64, Non ALS: 0

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2110395

<p>Client : CARDNO (WA) PTY LTD</p> <p>Contact : [REDACTED]</p> <p>Address : 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006</p> <p>E-mail : [REDACTED]</p> <p>Telephone : ----</p> <p>Facsimile : ----</p> <p>Project : WA_0958_PFASOMP</p> <p>Order number : DEF19009/330</p> <p>C-O-C number : 27249</p> <p>Site : DEF19009/Gingin</p> <p>Sampler : [REDACTED] [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : Nick Courts</p> <p>Address : 26 Rigali Way Wangara WA Australia 6065</p> <p>E-mail : [REDACTED]</p> <p>Telephone : [REDACTED]</p> <p>Facsimile : [REDACTED]</p> <p>Page : 1 of 3</p> <p>Quote number : ES2019CARBSD0002 (SY/139/19)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

Date Samples Received : 06-Sep-2021 16:55	Issue Date : 07-Sep-2021
Client Requested Due : 16-Sep-2021	Scheduled Reporting Date : 16-Sep-2021
Date	

Delivery Details

Mode of Delivery : Client Drop Off	Security Seal : Not Available
No. of coolers/boxes : 1	Temperature : 22.8 - Ice present
Receipt Detail :	No. of samples received / analysed : 30 / 30

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.
- **PFAS analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911.**
- **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)
EP2110395-001	06-Sep-2021 09:19	0958_MW138S_210906	✓
EP2110395-002	06-Sep-2021 09:29	0958_MW139I_210906	✓
EP2110395-003	06-Sep-2021 09:35	0958_MW140D_210906	✓
EP2110395-004	06-Sep-2021 10:19	0958_MW135I_210906	✓
EP2110395-005	06-Sep-2021 10:27	0958_MW136D_210906	✓
EP2110395-006	06-Sep-2021 10:47	0958_MW132I_210906	✓
EP2110395-007	06-Sep-2021 10:58	0958_MW133D_210906	✓
EP2110395-008	06-Sep-2021 11:07	0958_MW131D_210906	✓
EP2110395-009	06-Sep-2021 11:45	0958_MW130D_210906	✓
EP2110395-010	06-Sep-2021 11:51	0958_MW129I_210906	✓
EP2110395-011	06-Sep-2021 12:30	0958_MW126I_210906	✓
EP2110395-012	06-Sep-2021 12:39	0958_MW125S_210906	✓
EP2110395-013	06-Sep-2021 12:47	0958_QC101_210906	✓
EP2110395-014	06-Sep-2021 12:57	0958_POT102_210906	✓
EP2110395-015	06-Sep-2021 13:17	0958_MW106S_210906	✓
EP2110395-016	06-Sep-2021 13:44	0958_MW116S_210906	✓
EP2110395-017	06-Sep-2021 13:45	0958_QC102_210906	✓
EP2110395-018	06-Sep-2021 13:52	0958_MW117I_210906	✓
EP2110395-019	06-Sep-2021 13:59	0958_MW118D_210906	✓
EP2110395-021	06-Sep-2021 14:15	0958_MW119S_210906	✓
EP2110395-022	06-Sep-2021 12:08	0958_MW128S_210906	✓
EP2110395-023	06-Sep-2021 14:29	0958_MW120I_210906	✓
EP2110395-024	06-Sep-2021 14:39	0958_MW121D_210906	✓
EP2110395-025	06-Sep-2021 14:56	0958_MW123I_210906	✓
EP2110395-026	06-Sep-2021 15:05	0958_MW124D_210906	✓
EP2110395-027	06-Sep-2021 15:14	0958_MW122S_210906	✓
EP2110395-028	06-Sep-2021 15:29	0958_POT101_210906	✓
EP2110395-029	06-Sep-2021 15:34	0958_POT103_210906	✓
EP2110395-030	06-Sep-2021 15:44	0958_QC301_210906	✓
EP2110395-031	06-Sep-2021 15:45	0958_QC401_210906	✓

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	████████████████████████████████████
██████████	- A4 - AU Tax Invoice (INV)	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 : **EP2110395**
Client : **CARDNO (WA) PTY LTD**
Contact : [REDACTED]
Address : 11 HARVEST TERRACE PO BOX 155
 WEST PERTH WA, AUSTRALIA 6006
Telephone : ----
Project : WA_0958_PFASOMP
Order number : DEF19009/330
C-O-C number : 27249
Sampler : [REDACTED] [REDACTED]
Site : DEF19009/Gingin
Quote number : SY/139/19
No. of samples received : 30
No. of samples analysed : 30

Page : 1 of 17
Laboratory : Environmental Division Perth
Contact : Nick Courts
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : [REDACTED]
Date Samples Received : 06-Sep-2021 16:55
Date Analysis Commenced : 14-Sep-2021
Issue Date : 15-Sep-2021 12:53



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 Contact 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_MW138S_21090 6	0958_MW139I_21090 6	0958_MW140D_21090 6	0958_MW135I_21090 6	0958_MW136D_21090 6
Sampling date / time				06-Sep-2021 09:19	06-Sep-2021 09:29	06-Sep-2021 09:35	06-Sep-2021 10:19	06-Sep-2021 10:27
Compound	CAS Number	LOR	Unit	EP2110395-001	EP2110395-002	EP2110395-003	EP2110395-004	EP2110395-005
				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	0.02	µg/L	0.04	<0.02	<0.02	<0.02	<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	0.12	<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_MW138S_21090 6	0958_MW139I_21090 6	0958_MW140D_21090 6	0958_MW135I_21090 6	0958_MW136D_21090 6
Sampling date / time				06-Sep-2021 09:19	06-Sep-2021 09:29	06-Sep-2021 09:35	06-Sep-2021 10:19	06-Sep-2021 10:27
Compound	CAS Number	LOR	Unit	EP2110395-001	EP2110395-002	EP2110395-003	EP2110395-004	EP2110395-005
				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	0.16	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.16	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.16	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	116	106	95.9	98.1	97.4
13C8-PFOA	----	0.02	%	110	104	107	109	108



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW132I_21090 6	0958_MW133D_21090 6	0958_MW131D_21090 6	0958_MW130D_21090 6	0958_MW129I_21090 6
Sampling date / time				06-Sep-2021 10:47	06-Sep-2021 10:58	06-Sep-2021 11:07	06-Sep-2021 11:45	06-Sep-2021 11:51
Compound	CAS Number	LOR	Unit	EP2110395-006	EP2110395-007	EP2110395-008	EP2110395-009	EP2110395-010
				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	0.02	µg/L	0.03	<0.02	<0.02	<0.02	<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	<0.01	<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_21090 6	0958_MW133D_21090 6	0958_MW131D_21090 6	0958_MW130D_21090 6	0958_MW129I_21090 6
Sampling date / time				06-Sep-2021 10:47	06-Sep-2021 10:58	06-Sep-2021 11:07	06-Sep-2021 11:45	06-Sep-2021 11:51
Compound	CAS Number	LOR	Unit	EP2110395-006	EP2110395-007	EP2110395-008	EP2110395-009	EP2110395-010
				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	0.03	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.03	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.03	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	103	99.9	99.7	97.6	105
13C8-PFOA	----	0.02	%	102	110	115	104	104



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW126I_21090 6	0958_MW125S_21090 6	0958_QC101_210906	0958_MW106S_21090 6	0958_MW116S_21090 6
Sampling date / time				06-Sep-2021 12:30	06-Sep-2021 12:39	06-Sep-2021 12:47	06-Sep-2021 13:17	06-Sep-2021 13:44
Compound	CAS Number	LOR	Unit	EP2110395-011	EP2110395-012	EP2110395-013	EP2110395-015	EP2110395-016
				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	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	0.04
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_MW126I_21090 6	0958_MW125S_21090 6	0958_QC101_210906	0958_MW106S_21090 6	0958_MW116S_21090 6
Sampling date / time				06-Sep-2021 12:30	06-Sep-2021 12:39	06-Sep-2021 12:47	06-Sep-2021 13:17	06-Sep-2021 13:44
Compound	CAS Number	LOR	Unit	EP2110395-011	EP2110395-012	EP2110395-013	EP2110395-015	EP2110395-016
				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	<0.01	<0.01	<0.01	0.04
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	0.04
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	0.04
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	98.9	98.6	97.6	95.9	112
13C8-PFOA	----	0.02	%	106	113	109	93.2	92.3



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_QC102_210906	0958_MW117I_210906	0958_MW118D_210906	0958_MW119S_210906	0958_MW128S_210906
					6	6	6	6
Sampling date / time				06-Sep-2021 13:45	06-Sep-2021 13:52	06-Sep-2021 13:59	06-Sep-2021 14:15	06-Sep-2021 12:08
Compound	CAS Number	LOR	Unit	EP2110395-017	EP2110395-018	EP2110395-019	EP2110395-021	EP2110395-022
				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	0.02	µg/L	0.03	<0.02	<0.02	<0.02	<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	<0.01	0.02	<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_QC102_210906	0958_MW117I_210906	0958_MW118D_210906	0958_MW119S_210906	0958_MW128S_210906
Sampling date / time				06-Sep-2021 13:45	06-Sep-2021 13:52	06-Sep-2021 13:59	06-Sep-2021 14:15	06-Sep-2021 12:08
Compound	CAS Number	LOR	Unit	EP2110395-017	EP2110395-018	EP2110395-019	EP2110395-021	EP2110395-022
				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	0.03	<0.01	<0.01	0.02	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.03	<0.01	<0.01	0.02	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.03	<0.01	<0.01	0.02	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	104	97.3	91.1	92.5	101
13C8-PFOA	----	0.02	%	94.9	97.3	98.7	95.7	97.8



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW120I_21090 6	0958_MW121D_21090 6	0958_MW123I_21090 6	0958_MW124D_21090 6	0958_MW122S_21090 6
Sampling date / time				06-Sep-2021 14:29	06-Sep-2021 14:39	06-Sep-2021 14:56	06-Sep-2021 15:05	06-Sep-2021 15:14
Compound	CAS Number	LOR	Unit	EP2110395-023	EP2110395-024	EP2110395-025	EP2110395-026	EP2110395-027
				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	0.02	µg/L	<0.02	<0.02	0.07	<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	<0.01	<0.01	0.06	<0.01	0.05
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_MW120I_21090 6	0958_MW121D_21090 6	0958_MW123I_21090 6	0958_MW124D_21090 6	0958_MW122S_21090 6
Sampling date / time				06-Sep-2021 14:29	06-Sep-2021 14:39	06-Sep-2021 14:56	06-Sep-2021 15:05	06-Sep-2021 15:14
Compound	CAS Number	LOR	Unit	EP2110395-023	EP2110395-024	EP2110395-025	EP2110395-026	EP2110395-027
				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	0.13	<0.01	0.11
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.13	<0.01	0.11
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.13	<0.01	0.11
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	92.0	101	94.1	104	93.2
13C8-PFOA	----	0.02	%	96.2	101	100	96.8	94.3



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: POTABLE WATER (Matrix: WATER)				Sample ID	0958_POT102_210906	0958_POT101_210906	0958_POT103_210906	----	----
Sampling date / time					06-Sep-2021 12:57	06-Sep-2021 15:29	06-Sep-2021 15:34	----	----
Compound	CAS Number	LOR	Unit	EP2110395-014	EP2110395-028	EP2110395-029	-----	-----	
				Result	Result	Result	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.08	0.08	0.08	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.10	0.10	0.10	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.68	0.54	0.60	----	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	0.04	0.04	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.36	0.37	0.31	----	----	
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	0.03	0.03	0.03	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.15	0.16	0.14	----	----	
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	0.03	0.03	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_POT102_210906	0958_POT101_210906	0958_POT103_210906	----	----
Sampling date / time				06-Sep-2021 12:57	06-Sep-2021 15:29	06-Sep-2021 15:34	----	----
Compound	CAS Number	LOR	Unit	EP2110395-014	EP2110395-028	EP2110395-029	-----	-----
				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	1.49	1.37	1.35	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.04	0.91	0.91	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.35	1.23	1.21	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	108	104	89.8	----	----
13C8-PFOA	----	0.02	%	94.3	99.3	105	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC301_210906	0958_QC401_210906	----	----	----
Sampling date / time				06-Sep-2021 15:44	06-Sep-2021 15:45	----	----	----
Compound	CAS Number	LOR	Unit	EP2110395-030	EP2110395-031	-----	-----	-----
				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	0.02	µg/L	<0.02	<0.02	----	----	----
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_210906	0958_QC401_210906	----	----	----
Sampling date / time				06-Sep-2021 15:44	06-Sep-2021 15:45	----	----	----
Compound	CAS Number	LOR	Unit	EP2110395-030	EP2110395-031	-----	-----	-----
				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	%	96.8	114	----	----	----
13C8-PFOA	----	0.02	%	104	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	: EP2110395	Page	: 1 of 7
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Nick Courts
Address	: 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 06-Sep-2021
Order number	: DEF19009/330	Date Analysis Commenced	: 14-Sep-2021
C-O-C number	: 27249	Issue Date	: 15-Sep-2021
Sampler	: [REDACTED]		
Site	: DEF19009/Gingin		
Quote number	: SY/139/19		
No. of samples received	: 30		
No. of samples analysed	: 30		



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: 3899084)									
EP2110395-007	0958_MW133D_210906	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: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	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: 3899309)									
EP2110395-021	0958_MW119S_210906	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.02	0.02	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: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	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: 3899084)									
EP2110395-007	0958_MW133D_210906	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

Page : 3 of 7
 Work Order : EP2110395
 Client : CARDNO (WA) 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 (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3899084) - continued									
EP2110395-007	0958_MW133D_210906	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: 3899309)									
EP2110395-021	0958_MW119S_210906	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: 3899084)									
EP2110395-007	0958_MW133D_210906	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: 3899309)									
EP2110395-021	0958_MW119S_210906	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

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 Client : CARDNO (WA) PTY LTD
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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: 3899309) - continued									
EP2110395-021	0958_MW119S_210906	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: 3899084)									
EP2110395-007	0958_MW133D_210906	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: 3899309)									
EP2110395-021	0958_MW119S_210906	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: 3899084)									
EP2110395-007	0958_MW133D_210906	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 3899309)									
EP2110395-021	0958_MW119S_210906	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: 3899084)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	90.0	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	102	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	78.0	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	97.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	93.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	113	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3899309)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	127	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	101	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	102	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	102	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	137	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3899084)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	87.6	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	96.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	92.0	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	106	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	94.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.6	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 (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	97.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	120	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3899309)								
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	106	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	112	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	117	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	116	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	115	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	116	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	104	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: 3899309) - continued								
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	98.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	114	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3899084)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	104	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	85.8	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	85.0	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	84.6	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	85.6	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	97.8	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	71.2	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3899309)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	112	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	91.2	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	105	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	112	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	92.8	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	110	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	82.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3899084)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	94.0	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	100	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	77.8	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	80.0	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3899309)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	118	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	129	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	82.2	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	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.

- **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	: EP2110395	Page	: 1 of 6
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 06-Sep-2021
Site	: DEF19009/Gingin	Issue Date	: 15-Sep-2021
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 30
Order number	: DEF19009/330	No. of samples analysed	: 30

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)		06-Sep-2021	14-Sep-2021	05-Mar-2022	✓	14-Sep-2021	05-Mar-2022	✓
0958_MW138S_210906,	0958_MW139I_210906,							
0958_MW140D_210906,	0958_MW135I_210906,							
0958_MW136D_210906,	0958_MW132I_210906,							
0958_MW133D_210906,	0958_MW131D_210906,							
0958_MW130D_210906,	0958_MW129I_210906,							
0958_MW126I_210906,	0958_MW125S_210906,							
0958_QC101_210906,	0958_POT102_210906,							
0958_MW106S_210906,	0958_MW116S_210906,							
0958_QC102_210906,	0958_MW117I_210906,							
0958_MW118D_210906,	0958_MW119S_210906,							
0958_MW128S_210906,	0958_MW120I_210906,							
0958_MW121D_210906,	0958_MW123I_210906,							
0958_MW124D_210906,	0958_MW122S_210906,							
0958_POT101_210906,	0958_POT103_210906,							
0958_QC301_210906,	0958_QC401_210906							



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)		06-Sep-2021	14-Sep-2021	05-Mar-2022	✓	14-Sep-2021	05-Mar-2022	✓
0958_MW138S_210906,	0958_MW139I_210906,							
0958_MW140D_210906,	0958_MW135I_210906,							
0958_MW136D_210906,	0958_MW132I_210906,							
0958_MW133D_210906,	0958_MW131D_210906,							
0958_MW130D_210906,	0958_MW129I_210906,							
0958_MW126I_210906,	0958_MW125S_210906,							
0958_QC101_210906,	0958_POT102_210906,							
0958_MW106S_210906,	0958_MW116S_210906,							
0958_QC102_210906,	0958_MW117I_210906,							
0958_MW118D_210906,	0958_MW119S_210906,							
0958_MW128S_210906,	0958_MW120I_210906,							
0958_MW121D_210906,	0958_MW123I_210906,							
0958_MW124D_210906,	0958_MW122S_210906,							
0958_POT101_210906,	0958_POT103_210906,							
0958_QC301_210906,	0958_QC401_210906							
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)		06-Sep-2021	14-Sep-2021	05-Mar-2022	✓	14-Sep-2021	05-Mar-2022	✓
0958_MW138S_210906,	0958_MW139I_210906,							
0958_MW140D_210906,	0958_MW135I_210906,							
0958_MW136D_210906,	0958_MW132I_210906,							
0958_MW133D_210906,	0958_MW131D_210906,							
0958_MW130D_210906,	0958_MW129I_210906,							
0958_MW126I_210906,	0958_MW125S_210906,							
0958_QC101_210906,	0958_POT102_210906,							
0958_MW106S_210906,	0958_MW116S_210906,							
0958_QC102_210906,	0958_MW117I_210906,							
0958_MW118D_210906,	0958_MW119S_210906,							
0958_MW128S_210906,	0958_MW120I_210906,							
0958_MW121D_210906,	0958_MW123I_210906,							
0958_MW124D_210906,	0958_MW122S_210906,							
0958_POT101_210906,	0958_POT103_210906,							
0958_QC301_210906,	0958_QC401_210906							

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 Work Order : EP2110395
 Client : CARDNO (WA) PTY LTD
 Project : WA_0958_PFASOMP



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_MW138S_210906, 0958_MW140D_210906, 0958_MW136D_210906, 0958_MW133D_210906, 0958_MW130D_210906, 0958_MW126I_210906, 0958_QC101_210906, 0958_MW106S_210906, 0958_QC102_210906, 0958_MW118D_210906, 0958_MW128S_210906, 0958_MW121D_210906, 0958_MW124D_210906, 0958_POT101_210906, 0958_QC301_210906,	0958_MW139I_210906, 0958_MW135I_210906, 0958_MW132I_210906, 0958_MW131D_210906, 0958_MW129I_210906, 0958_MW125S_210906, 0958_POT102_210906, 0958_MW116S_210906, 0958_MW117I_210906, 0958_MW119S_210906, 0958_MW120I_210906, 0958_MW123I_210906, 0958_MW122S_210906, 0958_POT103_210906, 0958_QC401_210906	06-Sep-2021	14-Sep-2021	05-Mar-2022	✓	14-Sep-2021	05-Mar-2022	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW138S_210906, 0958_MW140D_210906, 0958_MW136D_210906, 0958_MW133D_210906, 0958_MW130D_210906, 0958_MW126I_210906, 0958_QC101_210906, 0958_MW106S_210906, 0958_QC102_210906, 0958_MW118D_210906, 0958_MW128S_210906, 0958_MW121D_210906, 0958_MW124D_210906, 0958_POT101_210906, 0958_QC301_210906,	0958_MW139I_210906, 0958_MW135I_210906, 0958_MW132I_210906, 0958_MW131D_210906, 0958_MW129I_210906, 0958_MW125S_210906, 0958_POT102_210906, 0958_MW116S_210906, 0958_MW117I_210906, 0958_MW119S_210906, 0958_MW120I_210906, 0958_MW123I_210906, 0958_MW122S_210906, 0958_POT103_210906, 0958_QC401_210906	06-Sep-2021	14-Sep-2021	05-Mar-2022	✓	14-Sep-2021	05-Mar-2022	✓



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	37	5.41	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.



CHAIN OF CUSTODY

COC#: 27284

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

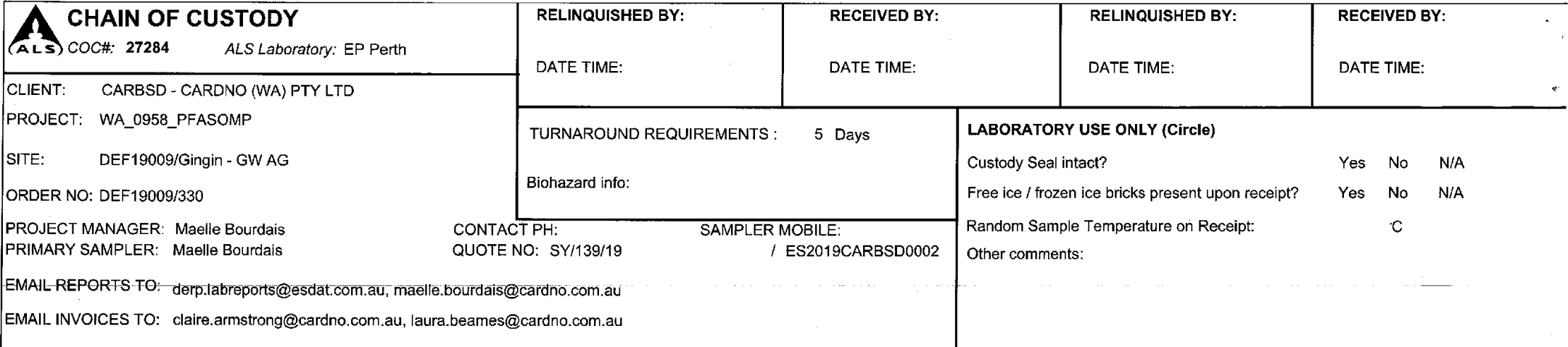
EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW402		07/09/2021 10:17 AM	Water	ALS: 2 Non ALS: 0	No	X		
002	0958_MW312		07/09/2021 10:38 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_MW313		07/09/2021 10:32 AM	Water	ALS: 2 Non ALS: 0	No	X		
004	0958_MW309		07/09/2021 11:00 AM	Water	ALS: 2 Non ALS: 0	No	X		
005	0958_QC103_210907		07/09/2021 11:01 AM	Water	ALS: 2 Non ALS: 0	No	X		
006	0958_MW310		07/09/2021 11:08 AM	Water	ALS: 2 Non ALS: 0	No	X		
007	0958_MW308		07/09/2021 11:12 AM	Water	ALS: 2 Non ALS: 0	No	X		
008	0958_MW306		07/09/2021 11:30 AM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab QC
009	0958_MW305		07/09/2021 11:37 AM	Water	ALS: 2 Non ALS: 0	No	X		



Tuesday, September 7, 2021 8:30:13 AM 2 of 5



CHAIN OF CUSTODY

COC#: 27284

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

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:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0958_MW110S		07/09/2021 02:10 PM	Water	ALS: 2 Non ALS: 0	No	X		
020	0958_QC104_210907		07/09/2021 02:13 PM	Water	ALS: 2 Non ALS: 0	No	X		
021	0958_MW109S		07/09/2021 02:23 PM	Water	ALS: 2 Non ALS: 0	No	X		
022	0958_MW113S		07/09/2021 02:46 PM	Water	ALS: 2 Non ALS: 0	No	X		
023	0958_MW112S		07/09/2021 02:54 PM	Water	ALS: 2 Non ALS: 0	No	X		
024	0958_MW101I		07/09/2021 03:13 PM	Water	ALS: 2 Non ALS: 0	No	X		
025	0958_QC302_210907		07/09/2021 04:04 PM	Water	ALS: 2 Non ALS: 0	No	X		
026	0958_QC402_210907		07/09/2021 04:05 PM	Water	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 27284

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW402	HDPE (no PTFE)	20 mL	00352101028201	Grey	No	
001	0958_MW402	HDPE (no PTFE)	20 mL	00352101028023	Grey	No	
002	0958_MW312	HDPE (no PTFE)	20 mL	00352101028088	Grey	No	
002	0958_MW312	HDPE (no PTFE)	20 mL	00352101028139	Grey	No	
003	0958_MW313	HDPE (no PTFE)	20 mL	00352101028041	Grey	No	
003	0958_MW313	HDPE (no PTFE)	20 mL	00352101028329	Grey	No	
004	0958_MW309	HDPE (no PTFE)	20 mL	00352107028013	Grey	No	
004	0958_MW309	HDPE (no PTFE)	20 mL	00352101028094	Grey	No	
005	0958_QC103_210907	HDPE (no PTFE)	20 mL	00352101028512	Grey	No	
005	0958_QC103_210907	HDPE (no PTFE)	20 mL	00352101028174	Grey	No	
006	0958_MW310	HDPE (no PTFE)	20 mL	00352101028275	Grey	No	
006	0958_MW310	HDPE (no PTFE)	20 mL	00352101028432	Grey	No	
007	0958_MW308	HDPE (no PTFE)	20 mL	00352101028437	Grey	No	
007	0958_MW308	HDPE (no PTFE)	20 mL	00352101028392	Grey	No	
008	0958_MW306	HDPE (no PTFE)	20 mL	00352101028221	Grey	No	
008	0958_MW306	HDPE (no PTFE)	20 mL	00352101028301	Grey	No	
008	0958_MW306	HDPE (no PTFE)	20 mL	00352101027992	Grey	No	
008	0958_MW306	HDPE (no PTFE)	20 mL	00352101028518	Grey	No	
009	0958_MW305	HDPE (no PTFE)	20 mL	00352101028071	Grey	No	
009	0958_MW305	HDPE (no PTFE)	20 mL	00352101028535	Grey	No	
010	0958_POT104	HDPE (no PTFE)	20 mL	00352101028491	Grey	No	
010	0958_POT104	HDPE (no PTFE)	20 mL	00352101028015	Grey	No	
011	0958_QC105_210907	HDPE (no PTFE)	20 mL	00352101028435	Grey	No	
011	0958_QC105_210907	HDPE (no PTFE)	20 mL	00352101028479	Grey	No	
012	0958_MW304	HDPE (no PTFE)	20 mL	00352101028572	Grey	No	
012	0958_MW304	HDPE (no PTFE)	20 mL	00352101028350	Grey	No	



CHAIN OF CUSTODY

COC#: 27284

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

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:

013	0958_MW504	HDPE (no PTFE)	20 mL	00352101028007	Grey	No	
013	0958_MW504	HDPE (no PTFE)	20 mL	00352101028060	Grey	No	
014	0958_MW104I	HDPE (no PTFE)	20 mL	00352101028421	Grey	No	
014	0958_MW104I	HDPE (no PTFE)	20 mL	00352101028032	Grey	No	
015	0958_MW105D	HDPE (no PTFE)	20 mL	00352101028028	Grey	No	
015	0958_MW105D	HDPE (no PTFE)	20 mL	00352101028427	Grey	No	
016	0958_POT103	HDPE (no PTFE)	20 mL	00352101028103	Grey	No	
016	0958_POT103	HDPE (no PTFE)	20 mL	00352101028027	Grey	No	
017	0958_MW114S	HDPE (no PTFE)	20 mL	00352101028299	Grey	No	
017	0958_MW114S	HDPE (no PTFE)	20 mL	00352101028454	Grey	No	
018	0958_MW505	HDPE (no PTFE)	20 mL	00352101028031	Grey	No	
018	0958_MW505	HDPE (no PTFE)	20 mL	00352101028051	Grey	No	
018	0958_MW505	HDPE (no PTFE)	20 mL	00352101028084	Grey	No	
018	0958_MW505	HDPE (no PTFE)	20 mL	00352101028402	Grey	No	
019	0958_MW110S	HDPE (no PTFE)	20 mL	00352101028189	Grey	No	
019	0958_MW110S	HDPE (no PTFE)	20 mL	00352101028338	Grey	No	
020	0958_QC104_210907	HDPE (no PTFE)	20 mL	00352101028439	Grey	No	
020	0958_QC104_210907	HDPE (no PTFE)	20 mL	00352101028034	Grey	No	
021	0958_MW109S	HDPE (no PTFE)	20 mL	00352101028089	Grey	No	
021	0958_MW109S	HDPE (no PTFE)	20 mL	00352101028124	Grey	No	
022	0958_MW113S	HDPE (no PTFE)	20 mL	00352101028481	Grey	No	
022	0958_MW113S	HDPE (no PTFE)	20 mL	00352101028428	Grey	No	
023	0958_MW112S	HDPE (no PTFE)	20 mL	00352101028096	Grey	No	
023	0958_MW112S	HDPE (no PTFE)	20 mL	00352101028520	Grey	No	
024	0958_MW101I	HDPE (no PTFE)	20 mL	00352101028463	Grey	No	
024	0958_MW101I	HDPE (no PTFE)	20 mL	00352101028008	Grey	No	
025	0958_QC302_210907	HDPE (no PTFE)	20 mL	00352101028306	Grey	No	



CHAIN OF CUSTODY

COC#: 27284

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

025	0958_QC302_210907	HDPE (no PTFE)	20 mL	00352101028335	Grey	No	
026	0958_QC402_210907	HDPE (no PTFE)	20 mL	00352101028332	Grey	No	
026	0958_QC402_210907	HDPE (no PTFE)	20 mL	00352101028125	Grey	No	

Total Bottle Count: ALS: 56, Non ALS: 0

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2110442

<p>Client : CARDNO (WA) PTY LTD</p> <p>Contact : [REDACTED]</p> <p>Address : 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006</p> <p>E-mail : [REDACTED]</p> <p>Telephone : ----</p> <p>Facsimile : ----</p> <p>Project : WA_0958_PFASOMP</p> <p>Order number : DEF19009/330</p> <p>C-O-C number : 27284</p> <p>Site : DEF19009/Gingin</p> <p>Sampler : [REDACTED] [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : Nick Courts</p> <p>Address : 26 Rigali Way Wangara WA Australia 6065</p> <p>E-mail : [REDACTED]</p> <p>Telephone : [REDACTED]</p> <p>Facsimile : [REDACTED]</p> <p>Page : 1 of 3</p> <p>Quote number : ES2019CARBSD0002 (SY/139/19)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

Date Samples Received : 08-Sep-2021 12:30	Issue Date : 08-Sep-2021
Client Requested Due : 20-Sep-2021	Scheduled Reporting Date : 20-Sep-2021
Date	

Delivery Details

Mode of Delivery : Carrier	Security Seal : Intact.
No. of coolers/boxes : 3	Temperature : 9.7 - Ice present
Receipt Detail :	No. of samples received / analysed : 26 / 26

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.
- **PFAS analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911.**
- **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)
EP2110442-001	07-Sep-2021 10:17	0958_MW402_210907	✓
EP2110442-002	07-Sep-2021 10:38	0958_MW312_210907	✓
EP2110442-003	07-Sep-2021 10:32	0958_MW313_210907	✓
EP2110442-004	07-Sep-2021 11:00	0958_MW309_210907	✓
EP2110442-005	07-Sep-2021 11:01	0958_QC103_210907	✓
EP2110442-006	07-Sep-2021 11:08	0958_MW310_210907	✓
EP2110442-007	07-Sep-2021 11:12	0958_MW308_210907	✓
EP2110442-008	07-Sep-2021 11:30	0958_MW306_210907	✓
EP2110442-009	07-Sep-2021 11:37	0958_MW305_210907	✓
EP2110442-010	07-Sep-2021 11:50	0958_POT104_210907	✓
EP2110442-011	07-Sep-2021 11:51	0958_QC105_210907	✓
EP2110442-012	07-Sep-2021 12:01	0958_MW304_210907	✓
EP2110442-013	07-Sep-2021 12:16	0958_MW504_210907	✓
EP2110442-014	07-Sep-2021 12:49	0958_MW104I_210907	✓
EP2110442-015	07-Sep-2021 12:56	0958_MW105D_210907	✓
EP2110442-016	07-Sep-2021 13:09	0958_POT103_210907	✓
EP2110442-017	07-Sep-2021 13:18	0958_MW114S_210907	✓
EP2110442-018	07-Sep-2021 13:49	0958_MW505_210907	✓
EP2110442-019	07-Sep-2021 14:10	0958_MW110S_210907	✓
EP2110442-020	07-Sep-2021 14:13	0958_QC104_210907	✓
EP2110442-021	07-Sep-2021 14:23	0958_MW109S_210907	✓
EP2110442-022	07-Sep-2021 14:46	0958_MW113S_210907	✓
EP2110442-023	07-Sep-2021 14:54	0958_MW112S_210907	✓
EP2110442-024	07-Sep-2021 15:13	0958_MW101I_210907	✓
EP2110442-025	07-Sep-2021 16:04	0958_QC302_210907	✓
EP2110442-026	07-Sep-2021 16:05	0958_QC402_210907	✓

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	████████████████████████████████████
██████████	- A4 - AU Tax Invoice (INV)	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 : **EP2110442**
Client : **CARDNO (WA) PTY LTD**
Contact : [REDACTED]
Address : 11 HARVEST TERRACE PO BOX 155
 WEST PERTH WA, AUSTRALIA 6006
Telephone : ----
Project : WA_0958_PFASOMP
Order number : DEF19009/330
C-O-C number : 27284
Sampler : [REDACTED] [REDACTED]
Site : DEF19009/Gingin
Quote number : SY/139/19
No. of samples received : 26
No. of samples analysed : 26

Page : 1 of 17
Laboratory : Environmental Division Perth
Contact : Nick Courts
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : [REDACTED]
Date Samples Received : 08-Sep-2021 12:30
Date Analysis Commenced : 15-Sep-2021
Issue Date : 17-Sep-2021 11:46



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
[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 Contact 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.
- Ionic balances were calculated using: major anions - chloride, alkalinity and sulfate; and major cations - calcium, magnesium, potassium and sodium.
- 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_210907	0958_MW312_210907	0958_MW313_210907	0958_MW309_210907	0958_QC103_210907
Sampling date / time				07-Sep-2021 10:17	07-Sep-2021 10:38	07-Sep-2021 10:32	07-Sep-2021 11:00	07-Sep-2021 11:01
Compound	CAS Number	LOR	Unit	EP2110442-001	EP2110442-002	EP2110442-003	EP2110442-004	EP2110442-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.09	<0.02	<0.02	1.32	1.30
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.12	<0.02	<0.02	2.03	2.04
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.76	0.09	0.07	10.9	8.73
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.05	<0.02	<0.02	1.28	1.57
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.37	0.20	0.02	202	202
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	0.50	0.46
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.14	0.02	<0.02	3.07	3.07
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.02	<0.02	<0.02	0.81	0.75
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.04	<0.01	<0.01	0.39	0.37
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_MW402_210907	0958_MW312_210907	0958_MW313_210907	0958_MW309_210907	0958_QC103_210907
Sampling date / time				07-Sep-2021 10:17	07-Sep-2021 10:38	07-Sep-2021 10:32	07-Sep-2021 11:00	07-Sep-2021 11:01
Compound	CAS Number	LOR	Unit	EP2110442-001	EP2110442-002	EP2110442-003	EP2110442-004	EP2110442-005
				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	1.61	0.31	0.09	223	220
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.13	0.29	0.09	213	211
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.44	0.31	0.09	219	217
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	103	111	108	76.6	106
13C8-PFOA	----	0.02	%	105	100	105	107	110



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW310_210907	0958_MW308_210907	0958_MW306_210907	0958_MW305_210907	0958_MW304_210907
Sampling date / time				07-Sep-2021 11:08	07-Sep-2021 11:12	07-Sep-2021 11:30	07-Sep-2021 11:37	07-Sep-2021 12:01
Compound	CAS Number	LOR	Unit	EP2110442-006	EP2110442-007	EP2110442-008	EP2110442-009	EP2110442-012
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	2.55	0.42	0.56	0.22	0.57
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	7.53	0.81	1.28	0.26	0.62
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	53.2	3.58	3.71	1.68	4.42
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	3.30	0.33	0.20	0.16	0.22
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	93.6	27.5	2.89	3.26	1.90
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	0.6	0.1	<0.1	<0.1	0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	1.04	0.21	0.15	0.11	0.20
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	8.52	1.56	0.91	0.36	0.88
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	2.09	0.15	0.18	0.05	0.10
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	2.92	0.30	0.18	0.15	0.20
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_MW310_210907	0958_MW308_210907	0958_MW306_210907	0958_MW305_210907	0958_MW304_210907
Sampling date / time				07-Sep-2021 11:08	07-Sep-2021 11:12	07-Sep-2021 11:30	07-Sep-2021 11:37	07-Sep-2021 12:01
Compound	CAS Number	LOR	Unit	EP2110442-006	EP2110442-007	EP2110442-008	EP2110442-009	EP2110442-012
				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	0.12	<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	175	35.0	10.1	6.25	9.21
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	147	31.1	6.60	4.94	6.32
Sum of PFAS (WA DER List)	----	0.01	µg/L	165	33.8	8.58	5.83	8.37
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	84.1	104	111	97.4	107
13C8-PFOA	----	0.02	%	105	103	108	105	94.8



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW504_210907	0958_MW104I_210907	0958_MW105D_210907	0958_MW114S_210907	0958_MW505_210907
Sampling date / time				07-Sep-2021 12:16	07-Sep-2021 12:49	07-Sep-2021 12:56	07-Sep-2021 13:18	07-Sep-2021 13:49
Compound	CAS Number	LOR	Unit	EP2110442-013	EP2110442-014	EP2110442-015	EP2110442-017	EP2110442-018
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.22	0.08	0.03	0.06	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.71	0.10	0.04	0.07	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	8.62	0.60	0.46	0.51	0.06
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	1.22	0.04	0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	16.9	0.27	0.41	0.27	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	0.15	0.03	<0.02	0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.90	0.14	0.07	0.08	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.12	<0.02	<0.02	0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.69	0.03	0.02	0.02	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW504_210907	0958_MW104I_210907	0958_MW105D_210907	0958_MW114S_210907	0958_MW505_210907
Sampling date / time				07-Sep-2021 12:16	07-Sep-2021 12:49	07-Sep-2021 12:56	07-Sep-2021 13:18	07-Sep-2021 13:49
Compound	CAS Number	LOR	Unit	EP2110442-013	EP2110442-014	EP2110442-015	EP2110442-017	EP2110442-018
				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	29.5	1.29	1.05	1.05	0.09
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	25.5	0.87	0.87	0.78	0.09
Sum of PFAS (WA DER List)	----	0.01	µg/L	27.6	1.15	0.99	0.98	0.09
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	112	119	106	98.8	108
13C8-PFOA	----	0.02	%	103	108	99.3	103	100



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW110S_21090 7	0958_QC104_210907	0958_MW109S_21090 7	0958_MW113S_21090 7	0958_MW112S_21090 7
Sampling date / time				07-Sep-2021 14:10	07-Sep-2021 14:13	07-Sep-2021 14:23	07-Sep-2021 14:46	07-Sep-2021 14:54
Compound	CAS Number	LOR	Unit	EP2110442-019	EP2110442-020	EP2110442-021	EP2110442-022	EP2110442-023
				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	0.02	µg/L	<0.02	<0.02	0.02	0.02	<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	0.07	0.07	0.10	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 (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_MW110S_21090 7	0958_QC104_210907	0958_MW109S_21090 7	0958_MW113S_21090 7	0958_MW112S_21090 7
Sampling date / time				07-Sep-2021 14:10	07-Sep-2021 14:13	07-Sep-2021 14:23	07-Sep-2021 14:46	07-Sep-2021 14:54
Compound	CAS Number	LOR	Unit	EP2110442-019	EP2110442-020	EP2110442-021	EP2110442-022	EP2110442-023
				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	0.07	0.07	0.12	0.05	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.07	0.07	0.12	0.05	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.07	0.07	0.12	0.05	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	104	103	105	94.2	108
13C8-PFOA	----	0.02	%	103	104	107	104	102



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW101I_21090
7

Sampling date / time

07-Sep-2021 15:13

Compound	CAS Number	LOR	Unit

EP2110442-024

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.04	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.06	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.35	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.18	----	----	----	----
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	0.03	----	----	----	----
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_MW101I_21090
7

Sampling date / time

07-Sep-2021 15:13

Compound

CAS Number

LOR

Unit

EP2110442-024

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	0.67	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.53	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.61	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	113	----	----	----	----
13C8-PFOA	----	0.02	%	108	----	----	----	----



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

				0958_POT104_21090 7	0958_QC105_210907	0958_POT103_21090 7	----	----
Sampling date / time				07-Sep-2021 11:50	07-Sep-2021 11:51	07-Sep-2021 13:09	----	----
Compound	CAS Number	LOR	Unit	EP2110442-010	EP2110442-011	EP2110442-016	-----	-----
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.08	0.06	0.08	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.10	0.07	0.10	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.63	0.43	0.63	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	0.03	0.04	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.33	0.25	0.35	----	----
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	0.03	0.02	0.03	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.14	0.10	0.14	----	----
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	0.03	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_21090 7	0958_QC105_210907	0958_POT103_21090 7	----	----
Sampling date / time				07-Sep-2021 11:50	07-Sep-2021 11:51	07-Sep-2021 13:09	----	----
Compound	CAS Number	LOR	Unit	EP2110442-010	EP2110442-011	EP2110442-016	-----	-----
				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	1.38	0.98	1.42	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.96	0.68	0.98	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.24	0.88	1.28	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	113	104	104	----	----
13C8-PFOA	----	0.02	%	103	106	103	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC302_210907	0958_QC402_210907	----	----	----
Sampling date / time				07-Sep-2021 16:04	07-Sep-2021 16:05	----	----	----
Compound	CAS Number	LOR	Unit	EP2110442-025	EP2110442-026	-----	-----	-----
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	----	----	----
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_QC302_210907	0958_QC402_210907	----	----	----
Sampling date / time				07-Sep-2021 16:04	07-Sep-2021 16:05	----	----	----
Compound	CAS Number	LOR	Unit	EP2110442-025	EP2110442-026	-----	-----	-----
Result				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	%	98.0	105	----	----	----
13C8-PFOA	----	0.02	%	104	106	----	----	----



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	: EP2110442	Page	: 1 of 10
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Nick Courts
Address	: 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 08-Sep-2021
Order number	: DEF19009/330	Date Analysis Commenced	: 15-Sep-2021
C-O-C number	: 27284	Issue Date	: 17-Sep-2021
Sampler	: [REDACTED]		
Site	: DEF19009/Gingin		
Quote number	: SY/139/19		
No. of samples received	: 26		
No. of samples analysed	: 26		



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: 3901924)									
EP2110442-008	0958_MW306_210907	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	2.89	2.47	15.8	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.56	0.52	7.1	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	1.28	1.06	18.8	0% - 20%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	3.71	3.07	18.9	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.20	0.17	15.5	0% - 50%
		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: 3901925)									
ES2132931-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.03	0.02	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.42	0.48	12.7	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.28	0.26	7.9	0% - 50%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.42	0.40	4.8	0% - 20%
		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
ES2132934-001	Anonymous	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	0.48	0.49	3.8	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.74	0.66	11.7	0% - 20%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	1.56	1.36	14.0	0% - 20%
		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: 3901924)									
EP2110442-008	0958_MW306_210907	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.18	0.16	12.0	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.15	0.13	17.3	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.91	0.83	9.0	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.18	0.16	12.3	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: 3901924) - continued									
EP2110442-008	0958_MW306_210907	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: 3901925)									
ES2132931-001	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	0.04	0.04	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.12	0.12	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<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
		ES2132934-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.06	0.06
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3			0.02	µg/L	0.48	0.46	4.4	0% - 20%
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4			0.02	µg/L	0.88	0.90	2.1	0% - 20%
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9			0.02	µg/L	0.21	0.21	0.0	0% - 50%
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	0.2	0.2	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3901924)									
EP2110442-008	0958_MW306_210907	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: 3901924) - continued									
EP2110442-008	0958_MW306_210907	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: 3901925)									
ES2132931-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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
ES2132934-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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: 3901924)									
EP2110442-008	0958_MW306_210907	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: 3901925)									

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 Work Order : EP2110442
 Client : CARDNO (WA) 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: 3901925) - continued									
ES2132931-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
ES2132934-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 3901924)									
EP2110442-008	0958_MW306_210907	EP231X: Sum of PFAS	----	0.01	µg/L	10.1	8.57	16.0	0% - 20%
EP231P: PFAS Sums (QC Lot: 3901925)									
ES2132931-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	1.31	1.32	0.8	0% - 20%
ES2132934-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	4.65	4.38	6.0	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: 3901924)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	92.0	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	101	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	85.8	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	93.2	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	79.6	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	83.6	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3901925)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	82.2	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	97.4	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	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	81.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	78.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	94.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3901924)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	90.6	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	94.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	90.4	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	130
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	98.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	94.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.4	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	93.6	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	86.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	105	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3901925)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	86.5	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	92.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	100	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	92.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	91.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	93.6	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: 3901925) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	90.2	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	82.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3901924)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	90.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	86.2	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	91.0	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	139	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	88.5	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	85.0	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	86.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3901925)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	87.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	93.8	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	85.9	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	99.8	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	96.0	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	95.0	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	82.6	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3901924)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	97.6	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	88.8	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	84.2	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	118	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3901925)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	89.6	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	81.8	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	120	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	107	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: 3901924)							
EP2110442-018	0958_MW505_210907	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	89.2	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	93.2	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	94.2	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	123	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	77.4	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3901925)							
ES2132931-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	86.4	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	95.2	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	82.2	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	76.8	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	75.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	87.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3901924)							
EP2110442-018	0958_MW505_210907	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	90.7	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	97.4	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	92.8	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	102	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	103	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	97.4	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	91.6	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	88.4	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	92.0	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	88.2	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	97.3	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3901925)							
ES2132931-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	84.0	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	88.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	84.0	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	90.4	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	93.2	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	91.6	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	88.2	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	86.4	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: 3901925) - continued							
ES2132931-001	Anonymous	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	84.0	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	92.6	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3901924)							
EP2110442-018	0958_MW505_210907	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	99.4	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	92.8	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	95.5	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	145	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	87.1	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	87.8	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	72.6	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3901925)							
ES2132931-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	86.2	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	76.2	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	94.4	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	100	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	77.1	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	78.2	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	79.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3901924)							
EP2110442-018	0958_MW505_210907	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	87.2	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	81.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	93.8	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	82.4	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3901925)							
ES2132931-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	76.2	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	85.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	70.6	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: 3901925) - continued							
ES2132931-001	Anonymous	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	119	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2110442	Page	: 1 of 6
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 08-Sep-2021
Site	: DEF19009/Gingin	Issue Date	: 17-Sep-2021
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 26
Order number	: DEF19009/330	No. of samples analysed	: 26

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	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	3	36	8.33	10.00	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_QC104_210907, 0958_MW113S_210907, 0958_MW101I_210907, 0958_QC402_210907	0958_MW109S_210907, 0958_MW112S_210907, 0958_QC302_210907,	07-Sep-2021	15-Sep-2021	06-Mar-2022	✔	16-Sep-2021	06-Mar-2022	✔
HDPE (no PTFE) (EP231X) 0958_MW402_210907, 0958_MW313_210907, 0958_QC103_210907, 0958_MW308_210907, 0958_MW305_210907, 0958_QC105_210907, 0958_MW504_210907, 0958_MW105D_210907, 0958_MW114S_210907, 0958_MW110S_210907	0958_MW312_210907, 0958_MW309_210907, 0958_MW310_210907, 0958_MW306_210907, 0958_POT104_210907, 0958_MW304_210907, 0958_MW104I_210907, 0958_POT103_210907, 0958_MW505_210907,	07-Sep-2021	16-Sep-2021	06-Mar-2022	✔	16-Sep-2021	06-Mar-2022	✔

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_QC104_210907, 0958_MW113S_210907, 0958_MW101I_210907, 0958_QC402_210907	0958_MW109S_210907, 0958_MW112S_210907, 0958_QC302_210907,	07-Sep-2021	15-Sep-2021	06-Mar-2022	✓	16-Sep-2021	06-Mar-2022	✓
HDPE (no PTFE) (EP231X) 0958_MW402_210907, 0958_MW313_210907, 0958_QC103_210907, 0958_MW308_210907, 0958_MW305_210907, 0958_QC105_210907, 0958_MW504_210907, 0958_MW105D_210907, 0958_MW114S_210907, 0958_MW110S_210907	0958_MW312_210907, 0958_MW309_210907, 0958_MW310_210907, 0958_MW306_210907, 0958_POT104_210907, 0958_MW304_210907, 0958_MW104I_210907, 0958_POT103_210907, 0958_MW505_210907,	07-Sep-2021	16-Sep-2021	06-Mar-2022	✓	16-Sep-2021	06-Mar-2022	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_QC104_210907, 0958_MW113S_210907, 0958_MW101I_210907, 0958_QC402_210907	0958_MW109S_210907, 0958_MW112S_210907, 0958_QC302_210907,	07-Sep-2021	15-Sep-2021	06-Mar-2022	✓	16-Sep-2021	06-Mar-2022	✓
HDPE (no PTFE) (EP231X) 0958_MW402_210907, 0958_MW313_210907, 0958_QC103_210907, 0958_MW308_210907, 0958_MW305_210907, 0958_QC105_210907, 0958_MW504_210907, 0958_MW105D_210907, 0958_MW114S_210907, 0958_MW110S_210907	0958_MW312_210907, 0958_MW309_210907, 0958_MW310_210907, 0958_MW306_210907, 0958_POT104_210907, 0958_MW304_210907, 0958_MW104I_210907, 0958_POT103_210907, 0958_MW505_210907,	07-Sep-2021	16-Sep-2021	06-Mar-2022	✓	16-Sep-2021	06-Mar-2022	✓

Page : 4 of 6
 Work Order : EP2110442
 Client : CARDNO (WA) PTY LTD
 Project : WA_0958_PFASOMP



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_QC104_210907, 0958_MW113S_210907, 0958_MW101I_210907, 0958_QC402_210907	0958_MW109S_210907, 0958_MW112S_210907, 0958_QC302_210907,	07-Sep-2021	15-Sep-2021	06-Mar-2022	✔	16-Sep-2021	06-Mar-2022	✔
HDPE (no PTFE) (EP231X) 0958_MW402_210907, 0958_MW313_210907, 0958_QC103_210907, 0958_MW308_210907, 0958_MW305_210907, 0958_QC105_210907, 0958_MW504_210907, 0958_MW105D_210907, 0958_MW114S_210907, 0958_MW110S_210907	0958_MW312_210907, 0958_MW309_210907, 0958_MW310_210907, 0958_MW306_210907, 0958_POT104_210907, 0958_MW304_210907, 0958_MW104I_210907, 0958_POT103_210907, 0958_MW505_210907,	07-Sep-2021	16-Sep-2021	06-Mar-2022	✔	16-Sep-2021	06-Mar-2022	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_QC104_210907, 0958_MW113S_210907, 0958_MW101I_210907, 0958_QC402_210907	0958_MW109S_210907, 0958_MW112S_210907, 0958_QC302_210907,	07-Sep-2021	15-Sep-2021	06-Mar-2022	✔	16-Sep-2021	06-Mar-2022	✔
HDPE (no PTFE) (EP231X) 0958_MW402_210907, 0958_MW313_210907, 0958_QC103_210907, 0958_MW308_210907, 0958_MW305_210907, 0958_QC105_210907, 0958_MW504_210907, 0958_MW105D_210907, 0958_MW114S_210907, 0958_MW110S_210907	0958_MW312_210907, 0958_MW309_210907, 0958_MW310_210907, 0958_MW306_210907, 0958_POT104_210907, 0958_MW304_210907, 0958_MW104I_210907, 0958_POT103_210907, 0958_MW505_210907,	07-Sep-2021	16-Sep-2021	06-Mar-2022	✔	16-Sep-2021	06-Mar-2022	✔



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	36	8.33	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	5.56	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#: 27357

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW Template

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.auEMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au**SAMPLE DETAILS****ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW102D		08/09/2021 09:49 AM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab QC
002	0958_MW301		08/09/2021 10:14 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_QC106_210908		08/09/2021 10:16 AM	Water	ALS: 2 Non ALS: 0	No	X		
004	0958_MW303		08/09/2021 10:27 AM	Water	ALS: 2 Non ALS: 0	No	X		
005	0958_MW302		08/09/2021 10:33 AM	Water	ALS: 2 Non ALS: 0	No	X		
006	0958_MW115S		08/09/2021 10:49 AM	Water	ALS: 2 Non ALS: 0	No	X		
007	0958_QC107_210908		08/09/2021 10:50 AM	Water	ALS: 2 Non ALS: 0	No	X		
008	0958_MW137S		08/09/2021 11:12 AM	Water	ALS: 2 Non ALS: 0	No	X		
009	0958_MW403		08/09/2021 11:59 AM	Water	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 27357 ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW Template

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

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:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_MW142S		08/09/2021 12:26 PM	Water	ALS: 2 Non ALS: 0	No	X		
011	0958_MW141S		08/09/2021 12:48 PM	Water	ALS: 2 Non ALS: 0	No	X		
012	0958_QC303_210908		08/09/2021 12:53 PM	Water	ALS: 2 Non ALS: 0	No	X		
013	0958_QC403_210908		08/09/2021 12:54 PM	Water	ALS: 2 Non ALS: 0	No	X		



RECEIVED BY:

DATE TIME:

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

Other comments:



CHAIN OF CUSTODY

COC#: 27357

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW Template

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

013	0958_QC403_210908	HDPE (no PTFE)	20 mL	00352101028408	Grey	No	
013	0958_QC403_210908	HDPE (no PTFE)	20 mL	00352101028111	Grey	No	

Total Bottle Count: ALS: 28, Non ALS: 0

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2110531

<p>Client : CARDNO (WA) PTY LTD</p> <p>Contact : [REDACTED]</p> <p>Address : 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006</p> <p>E-mail : [REDACTED]</p> <p>Telephone : ----</p> <p>Facsimile : ----</p> <p>Project : WA_0958_PFASOMP</p> <p>Order number : DEF19009/330</p> <p>C-O-C number : 27357</p> <p>Site : DEF19009/Gingin</p> <p>Sampler : [REDACTED] [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : Nick Courts</p> <p>Address : 26 Rigali Way Wangara WA 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 : ES2019CARBSD0002 (SY/139/19)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

Date Samples Received : 09-Sep-2021 10:15	Issue Date : 09-Sep-2021
Client Requested Due Date : 21-Sep-2021	Scheduled Reporting Date : 21-Sep-2021

Delivery Details

Mode of Delivery : Carrier	Security Seal : Not Available
No. of coolers/boxes : 3	Temperature : 3.2 - Ice present
Receipt Detail :	No. of samples received / analysed : 13 / 13

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.
- **PFAS analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911.**
- **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 -
EP2110531-001	08-Sep-2021 09:49	0958_MW102D_210908	✓
EP2110531-002	08-Sep-2021 10:14	0958_MW301_210908	✓
EP2110531-003	08-Sep-2021 10:16	0958_QC106_210908	✓
EP2110531-004	08-Sep-2021 10:27	0958_MW303_210908	✓
EP2110531-005	08-Sep-2021 10:33	0958_MW302_210908	✓
EP2110531-006	08-Sep-2021 10:49	0958_MW115S_210908	✓
EP2110531-007	08-Sep-2021 10:50	0958_QC107_210908	✓
EP2110531-008	08-Sep-2021 11:12	0958_MW137S_210908	✓
EP2110531-009	08-Sep-2021 11:59	0958_MW403_210908	✓
EP2110531-010	08-Sep-2021 12:26	0958_MW142S_210908	✓
EP2110531-011	08-Sep-2021 12:48	0958_MW141S_210908	✓
EP2110531-012	08-Sep-2021 12:53	0958_QC303_210908	✓
EP2110531-013	08-Sep-2021 12:54	0958_QC403_210908	✓

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

[REDACTED]	- A4 - AU Tax Invoice (INV)	Email	[REDACTED]
DERP LAB REPORTS			
[REDACTED]	- EDI Format - ESDAT (ESDAT)	Email	[REDACTED]
[REDACTED]	- A4 - AU Tax Invoice (INV)	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 : **EP2110531**
Client : **CARDNO (WA) PTY LTD**
Contact : [REDACTED]
Address : 11 HARVEST TERRACE PO BOX 155
 WEST PERTH WA, AUSTRALIA 6006
Telephone : ----
Project : WA_0958_PFASOMP
Order number : DEF19009/330
C-O-C number : 27357
Sampler : [REDACTED] [REDACTED]
Site : DEF19009/Gingin
Quote number : SY/139/19
No. of samples received : 13
No. of samples analysed : 13

Page : 1 of 11
Laboratory : Environmental Division Perth
Contact : Nick Courts
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : [REDACTED]
Date Samples Received : 09-Sep-2021 10:15
Date Analysis Commenced : 17-Sep-2021
Issue Date : 21-Sep-2021 10:10



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 Contact 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_MW102D_210908	0958_MW301_210908	0958_QC106_210908	0958_MW303_210908	0958_MW302_210908
Sampling date / time				08-Sep-2021 09:49	08-Sep-2021 10:14	08-Sep-2021 10:16	08-Sep-2021 10:27	08-Sep-2021 10:33
Compound	CAS Number	LOR	Unit	EP2110531-001	EP2110531-002	EP2110531-003	EP2110531-004	EP2110531-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.10	0.69	0.64	0.22	0.07
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	2.50	2.13	0.45	0.10
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.12	17.2	15.2	3.45	1.52
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	1.02	1.28	0.54	0.15
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.14	49.9	60.2	57.1	0.64
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	0.2	0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.42	0.40	0.09	0.03
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	3.34	3.17	0.51	0.12
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.92	0.96	0.07	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	1.42	1.65	0.41	0.10
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_MW102D_210908	0958_MW301_210908	0958_QC106_210908	0958_MW303_210908	0958_MW302_210908
Sampling date / time				08-Sep-2021 09:49	08-Sep-2021 10:14	08-Sep-2021 10:16	08-Sep-2021 10:27	08-Sep-2021 10:33
Compound	CAS Number	LOR	Unit	EP2110531-001	EP2110531-002	EP2110531-003	EP2110531-004	EP2110531-005
				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	0.36	77.6	85.7	62.8	2.73
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.26	67.1	75.4	60.6	2.16
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.36	74.1	82.3	61.8	2.48
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	97.8	104	104	99.3	103
13C8-PFOA	----	0.02	%	104	95.5	99.4	98.7	102



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW115S_21090 8	0958_QC107_210908	0958_MW137S_21090 8	0958_MW403_210908	0958_MW142S_21090 8
Sampling date / time				08-Sep-2021 10:49	08-Sep-2021 10:50	08-Sep-2021 11:12	08-Sep-2021 11:59	08-Sep-2021 12:26
Compound	CAS Number	LOR	Unit	EP2110531-006	EP2110531-007	EP2110531-008	EP2110531-009	EP2110531-010
				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	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<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	0.03	0.02	<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

				0958_MW115S_21090 8	0958_QC107_210908	0958_MW137S_21090 8	0958_MW403_210908	0958_MW142S_21090 8
Sampling date / time				08-Sep-2021 10:49	08-Sep-2021 10:50	08-Sep-2021 11:12	08-Sep-2021 11:59	08-Sep-2021 12:26
Compound	CAS Number	LOR	Unit	EP2110531-006	EP2110531-007	EP2110531-008	EP2110531-009	EP2110531-010
				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	0.03	0.02	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.03	0.02	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.03	0.02	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	95.0	95.8	112	100	109
13C8-PFOA	----	0.02	%	103	104	104	101	107



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0958_MW141S_21090
8

Sampling date / time

08-Sep-2021 12:48

Compound

CAS Number

LOR

Unit

EP2110531-011

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.07	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.09	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.65	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.06	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.41	----	----	----	----
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	0.15	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.04	----	----	----	----
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_21090
8

Sampling date / time

08-Sep-2021 12:48

Compound CAS Number LOR Unit

EP2110531-011

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	1.52	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.06	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.37	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	112	----	----	----	----
13C8-PFOA	----	0.02	%	99.5	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC303_210908	0958_QC403_210908	----	----	----
Sampling date / time				08-Sep-2021 12:53	08-Sep-2021 12:54	----	----	----
Compound	CAS Number	LOR	Unit	EP2110531-012	EP2110531-013	-----	-----	-----
				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	0.02	µg/L	<0.02	<0.02	----	----	----
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_QC303_210908	0958_QC403_210908	----	----	----
Sampling date / time				08-Sep-2021 12:53	08-Sep-2021 12:54	----	----	----
Compound	CAS Number	LOR	Unit	EP2110531-012	EP2110531-013	-----	-----	-----
				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	%	108	106	----	----	----
13C8-PFOA	----	0.02	%	99.5	99.0	----	----	----



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	: EP2110531	Page	: 1 of 7
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Nick Courts
Address	: 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 09-Sep-2021
Order number	: DEF19009/330	Date Analysis Commenced	: 17-Sep-2021
C-O-C number	: 27357	Issue Date	: 21-Sep-2021
Sampler	: [REDACTED]		
Site	: DEF19009/Gingin		
Quote number	: SY/139/19		
No. of samples received	: 13		
No. of samples analysed	: 13		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[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: 3906220)									
EP2110531-001	0958_MW102D_210908	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.14	0.16	13.8	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.10	0.08	13.8	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.12	0.10	19.0	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: 3906220)									
EP2110531-001	0958_MW102D_210908	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: 3906220)									
EP2110531-001	0958_MW102D_210908	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 7
 Work Order : EP2110531
 Client : CARDNO (WA) PTY LTD
 Project : WA_0958_PFSOMP



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: 3906220) - continued									
EP2110531-001	0958_MW102D_210908	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: 3906220)									
EP2110531-001	0958_MW102D_210908	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: 3906220)									
EP2110531-001	0958_MW102D_210908	EP231X: Sum of PFAS	----	0.01	µg/L	0.36	0.34	5.7	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: 3906220)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	94.2	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	110	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	94.6	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	106	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	99.6	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3907193)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	85.8	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	0.02	µg/L	<0.02	0.25 µg/L	81.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	94.2	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	90.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	62.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3906220)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	91.9	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	99.8	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	98.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	111	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	98.8	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	96.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	99.8	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	113	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	93.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	110	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3907193)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	88.1	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	98.0	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	107	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	88.6	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	87.6	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: 3907193) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	87.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	119	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3906220)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	97.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	95.1	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	89.5	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	102	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	96.8	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	94.6	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3907193)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	91.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	81.9	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	83.9	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	128	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	82.7	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	92.0	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	81.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3906220)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	92.0	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	99.6	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	108	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	126	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3907193)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	83.8	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	83.0	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	103	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	85.8	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: 3906220)							
ES2133163-004	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	105	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	111	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	100	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	116	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	113	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	73.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3906220)							
ES2133163-004	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	92.2	73.0	129
		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	103	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	109	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	95.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	101	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	98.6	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	98.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTeDA)	72629-94-8	0.25 µg/L	81.2	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	124	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3906220)							
ES2133163-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	113	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	86.4	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	76.7	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	119	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	78.2	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	101	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	97.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3906220)							
ES2133163-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	85.6	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	87.2	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: 3906220) - continued							
ES2133163-004	Anonymous	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	117	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	93.0	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2110531	Page	: 1 of 5
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 09-Sep-2021
Site	: DEF19009/Gingin	Issue Date	: 21-Sep-2021
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 13
Order number	: DEF19009/330	No. of samples analysed	: 13

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- 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 Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	26	3.85	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	26	3.85	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)		08-Sep-2021	17-Sep-2021	07-Mar-2022	✔	17-Sep-2021	07-Mar-2022	✔	
0958_MW102D_210908,									0958_MW301_210908,
0958_QC106_210908,									0958_MW303_210908,
0958_MW302_210908,									0958_MW115S_210908,
0958_QC107_210908,									0958_MW137S_210908,
0958_MW403_210908,									0958_MW142S_210908,
0958_MW141S_210908,									0958_QC303_210908,
0958_QC403_210908									
EP231B: Perfluoroalkyl Carboxylic Acids									
HDPE (no PTFE) (EP231X)		08-Sep-2021	17-Sep-2021	07-Mar-2022	✔	17-Sep-2021	07-Mar-2022	✔	
0958_MW102D_210908,									0958_MW301_210908,
0958_QC106_210908,									0958_MW303_210908,
0958_MW302_210908,									0958_MW115S_210908,
0958_QC107_210908,									0958_MW137S_210908,
0958_MW403_210908,									0958_MW142S_210908,
0958_MW141S_210908,									0958_QC303_210908,
0958_QC403_210908									



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
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW102D_210908, 0958_QC106_210908, 0958_MW302_210908, 0958_QC107_210908, 0958_MW403_210908, 0958_MW141S_210908, 0958_QC403_210908	0958_MW301_210908, 0958_MW303_210908, 0958_MW115S_210908, 0958_MW137S_210908, 0958_MW142S_210908, 0958_QC303_210908,	08-Sep-2021	17-Sep-2021	07-Mar-2022	✔	17-Sep-2021	07-Mar-2022	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW102D_210908, 0958_QC106_210908, 0958_MW302_210908, 0958_QC107_210908, 0958_MW403_210908, 0958_MW141S_210908, 0958_QC403_210908	0958_MW301_210908, 0958_MW303_210908, 0958_MW115S_210908, 0958_MW137S_210908, 0958_MW142S_210908, 0958_QC303_210908,	08-Sep-2021	17-Sep-2021	07-Mar-2022	✔	17-Sep-2021	07-Mar-2022	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW102D_210908, 0958_QC106_210908, 0958_MW302_210908, 0958_QC107_210908, 0958_MW403_210908, 0958_MW141S_210908, 0958_QC403_210908	0958_MW301_210908, 0958_MW303_210908, 0958_MW115S_210908, 0958_MW137S_210908, 0958_MW142S_210908, 0958_QC303_210908,	08-Sep-2021	17-Sep-2021	07-Mar-2022	✔	17-Sep-2021	07-Mar-2022	✔



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	26	3.85	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	26	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	26	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	26	3.85	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#: 27456

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

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

SAMPLER MOBILE:

/ ES2019CARBSD0002

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	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW401		10/09/2021 09:08 AM	Water	ALS: 2 Non ALS: 0	No	X		
002	0958_QC305_210910		10/09/2021 09:16 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_QC405_210910		10/09/2021 09:18 AM	Water	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 27456

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au, laura.beames@cardno.com.au

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

SAMPLER MOBILE:

/ ES2019CARBSD0002

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_MW401	HDPE (no PTFE)	20 mL	00352010010905	Grey	No	
001	0958_MW401	HDPE (no PTFE)	20 mL	00352010010966	Grey	No	
002	0958_QC305_210910	HDPE (no PTFE)	20 mL	00352010010960	Grey	No	
002	0958_QC305_210910	HDPE (no PTFE)	20 mL	00352010011103	Grey	No	
003	0958_QC405_210910	HDPE (no PTFE)	20 mL	00352010010989	Grey	No	
003	0958_QC405_210910	HDPE (no PTFE)	20 mL	00352010010885	Grey	No	

Total Bottle Count: ALS: 6, Non ALS: 0

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2110622

<p>Client : CARDNO (WA) PTY LTD</p> <p>Contact : [REDACTED]</p> <p>Address : 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006</p> <p>E-mail : [REDACTED]</p> <p>Telephone : ----</p> <p>Facsimile : ----</p> <p>Project : WA_0958_PFASOMP</p> <p>Order number : DEF19009/330</p> <p>C-O-C number : 27456</p> <p>Site : DEF19009/Gingin</p> <p>Sampler : [REDACTED] [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : Nick Courts</p> <p>Address : 26 Rigali Way Wangara WA 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 : ES2019CARBSD0002 (SY/139/19)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

Date Samples Received : 10-Sep-2021 10:50	Issue Date : 10-Sep-2021
Client Requested Due Date : 22-Sep-2021	Scheduled Reporting Date : 22-Sep-2021

Delivery Details

Mode of Delivery : Client Drop Off	Security Seal : Not Available
No. of coolers/boxes : ----	Temperature : 20.2
Receipt Detail :	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.
- **PFAS analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911.**
- **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)
EP2110622-001	10-Sep-2021 09:08	0958_MW401_210910	✓
EP2110622-002	10-Sep-2021 09:16	0958_QC305_210910	✓
EP2110622-003	10-Sep-2021 09:18	0958_QC405_210910	✓

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

- A4 - AU Tax Invoice (INV)

Email

- *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 : **EP2110622**
Client : **CARDNO (WA) PTY LTD**
Contact : [REDACTED]
Address : 11 HARVEST TERRACE PO BOX 155
 WEST PERTH WA, AUSTRALIA 6006
Telephone : ----
Project : WA_0958_PFASOMP
Order number : DEF19009/330
C-O-C number : 27456
Sampler : [REDACTED] [REDACTED]
Site : DEF19009/Gingin
Quote number : SY/139/19
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 7
Laboratory : Environmental Division Perth
Contact : Nick Courts
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : [REDACTED]
Date Samples Received : 10-Sep-2021 10:50
Date Analysis Commenced : 17-Sep-2021
Issue Date : 21-Sep-2021 10:10



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 Contact 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_MW401_210910

Sampling date / time				10-Sep-2021 09:08	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2110622-001	-----	-----	-----	-----
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	0.02	µg/L	<0.02	----	----	----	----
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_MW401_210910

Sampling date / time				10-Sep-2021 09:08	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2110622-001	-----	-----	-----	-----
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	%	102	----	----	----	----
13C8-PFOA	----	0.02	%	98.6	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

				0958_QC305_210910	0958_QC405_210910	----	----	----
Sampling date / time				10-Sep-2021 09:16	10-Sep-2021 09:18	----	----	----
Compound	CAS Number	LOR	Unit	EP2110622-002	EP2110622-003	-----	-----	-----
				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	0.02	µg/L	<0.02	<0.02	----	----	----
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_QC305_210910	0958_QC405_210910	----	----	----
Sampling date / time				10-Sep-2021 09:16	10-Sep-2021 09:18	----	----	----
Compound	CAS Number	LOR	Unit	EP2110622-002	EP2110622-003	-----	-----	-----
				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	%	110	104	----	----	----
13C8-PFOA	----	0.02	%	89.6	89.7	----	----	----



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	: EP2110622	Page	: 1 of 11
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Nick Courts
Address	: 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 10-Sep-2021
Order number	: DEF19009/330	Date Analysis Commenced	: 17-Sep-2021
C-O-C number	: 27456	Issue Date	: 21-Sep-2021
Sampler	: [REDACTED]		
Site	: DEF19009/Gingin		
Quote number	: SY/139/19		
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]	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: 3907203)									
ES2133640-002	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.04	0.04	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: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	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
ES2133640-005	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.03	0.03	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: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	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: 3907735)									
EB2125899-001	Anonymous	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: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	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
EB2125904-001	Anonymous	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: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	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**

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: 3907735) - continued									
EB2125904-001	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: 3907203)									
ES2133640-002	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
ES2133640-005	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
		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: 3907735)									
EB2125899-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EB2125904-001	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: 3907735) - continued									
EB2125904-001	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: 3907203)									
ES2133640-002	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
ES2133640-005	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
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3907735)									
EB2125899-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: **WATER**

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: 3907735) - continued									
EB2125899-001	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EB2125904-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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: 3907203)							
ES2133640-002	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
ES2133640-005	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3907735)									
EB2125899-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2110622
 Client : CARDNO (WA) 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: 3907735) - continued									
EB2125899-001	Anonymous	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
EB2125904-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 3907203)									
ES2133640-002	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.04	0.04	0.0	No Limit
ES2133640-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.03	0.03	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 3907735)									
EB2125899-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EB2125904-001	Anonymous	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 (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3907203)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	88.0	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	92.6	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	85.2	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	92.4	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	94.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	87.8	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3907735)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	77.6	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	88.6	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.25 µg/L	76.0	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	80.4	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	88.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3907203)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	82.5	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	90.4	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	91.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	85.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	92.4	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	99.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	91.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	97.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	100	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3907735)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	77.2	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	93.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	87.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.0	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.8	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	95.8	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	96.0	69.0	133



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				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3907735) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	87.2	72.0	134
EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	83.6	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3907203)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	91.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	83.7	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	90.0	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	95.1	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	91.1	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	88.6	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	87.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3907735)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	84.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	73.3	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	80.4	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	80.3	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	87.2	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	92.0	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	87.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3907203)								
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	99.6	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	101	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	95.8	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3907735)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	70.2	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	88.8	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	100	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	78.2	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: 3907203)							
ES2133640-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	94.8	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	85.0	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	81.0	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	86.2	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	95.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	84.0	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3907735)							
EB2125899-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	76.8	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	88.6	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	77.4	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	82.6	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	77.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	83.0	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3907203)							
ES2133640-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	80.9	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	87.0	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	90.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	81.8	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	97.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	90.6	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	101	71.0	129
		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	87.8	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	93.8	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	96.1	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3907735)							
EB2125899-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	81.0	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	75.6	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	83.2	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	80.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	90.0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	92.6	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	91.6	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	89.4	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: 3907735) - continued							
EB2125899-002	Anonymous	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	82.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	81.6	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	99.0	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3907203)							
ES2133640-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	87.0	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	80.2	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	90.2	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	90.8	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	82.6	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	84.6	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	90.4	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3907735)							
EB2125899-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	74.0	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	73.3	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	74.6	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	77.5	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	80.2	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	84.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3907203)							
ES2133640-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	93.6	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	94.6	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	86.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	84.6	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3907735)							
EB2125899-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	67.0	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	82.0	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	96.2	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: 3907735) - continued							
EB2125899-002	Anonymous	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	77.6	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2110622	Page	: 1 of 4
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 10-Sep-2021
Site	: DEF19009/Gingin	Issue Date	: 21-Sep-2021
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 3
Order number	: DEF19009/330	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_QC305_210910, 0958_QC405_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	17-Sep-2021	09-Mar-2022	✓
HDPE (no PTFE) (EP231X) 0958_MW401_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	20-Sep-2021	09-Mar-2022	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0958_QC305_210910, 0958_QC405_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	17-Sep-2021	09-Mar-2022	✓
HDPE (no PTFE) (EP231X) 0958_MW401_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	20-Sep-2021	09-Mar-2022	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0958_QC305_210910, 0958_QC405_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	17-Sep-2021	09-Mar-2022	✓
HDPE (no PTFE) (EP231X) 0958_MW401_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	20-Sep-2021	09-Mar-2022	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0958_QC305_210910, 0958_QC405_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	17-Sep-2021	09-Mar-2022	✓
HDPE (no PTFE) (EP231X) 0958_MW401_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	20-Sep-2021	09-Mar-2022	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0958_QC305_210910, 0958_QC405_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	17-Sep-2021	09-Mar-2022	✓
HDPE (no PTFE) (EP231X) 0958_MW401_210910	10-Sep-2021	17-Sep-2021	09-Mar-2022	✓	20-Sep-2021	09-Mar-2022	✓



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	37	10.81	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	2	37	5.41	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

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS

Page 1 of 1

Company Name : Cardno (WA) Pty Ltd	Contact Name : Maelle Bourdais	Purchase Order : DEF19009	COC Number : DEF19009 -01
Office Address : 11 Harvest Terrace, West perth, WA, 6005		PROJECT Number : WA_0958_PFSOMP	Eurofins mgt quote ID : NA
	Email for COC/SRN/Results : [REDACTED]	PROJECT Name : DEF19009/Gingin	Data output format: PDF; ESDAT

Special Directions & Comments :

Please send ESDAT files to [REDACTED] with the project No in the header file

Please send email invoice to
claire.armstrong@cardno.com.au

Eurofins | mgt DI water batch number:

	Sample ID	Date	Matrix	PFAS											Containers:								Sample comments:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Relinquished By: Andrew Glover	Laboratory Staff [REDACTED]	Turn around time 1 DAY ☐ 2 DAY ☐ 3 DAY ☐	Method Of Shipment ☒ Courier ☐ Hand Delivered ☐ Postal	Temperature on arrival: 18.3°C
Date & Time : 6/09/2021	Date & Time : 7/9/21 3:21pm	STANDARD ☒ Other:	Courier Consignment # :	Report number:
Signature:	Signature:			

7/9/21 3:21pm #822876
18.3°C
18.3°C

Australia

Melbourne

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

Sydney

Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane

1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth

46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

Newcastle

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

New Zealand

Auckland

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

Christchurch

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

Sample Receipt Advice

Company name: Cardno (WA)
Contact name: [REDACTED]
Project name: DEF19009/GINGIN
Project ID: WA_0958_PFASOMP
Turnaround time: 5 Day
Date/Time received: Sep 7, 2021 3:21 PM
Eurofins reference: 822876

Sample Information

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

Notes

Contact

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

[REDACTED] on phone : [REDACTED] 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 Cardno (WA) email address.

Australia

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

Sydney
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IANZ # 1327

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

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: DEF19009/GINGIN
Project ID: WA_0958_PFASOMP

Order No.: DEF19009
Report #: 822876
Phone: [REDACTED]
Fax: [REDACTED]

Received: Sep 7, 2021 3:21 PM
Due: Sep 14, 2021
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA Site # 1254

Sydney Laboratory - NATA Site # 18217

Brisbane Laboratory - NATA Site # 20794

Perth Laboratory - NATA Site # 23736

Mayfield Laboratory - NATA Site # 25079

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_210906	Sep 06, 2021		Water	B21-Se14284	X
2	0958_QC202_210906	Sep 06, 2021		Water	B21-Se14285	X
Test Counts						2

Cardno Consulting WA
11 Harvest Terrace
West Perth
WA 6005



NATA Accredited
Accreditation Number 1261
Site Number 20794

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 **822876-W**
 Project name **DEF19009/GINGIN**
 Project ID **WA_0958_PFSOMP**
 Received Date **Sep 07, 2021**

Client Sample ID			0958_QC201_2 10906	0958_QC202_2 10906
Sample Matrix			Water	Water
Eurofins Sample No.			B21-Se14284	B21-Se14285
Date Sampled			Sep 06, 2021	Sep 06, 2021
Test/Reference	LOR	Unit		
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
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	70
13C5-PFPeA (surr.)	1	%	74	65
13C5-PFHxA (surr.)	1	%	72	62
13C4-PFHpA (surr.)	1	%	99	80
13C8-PFOA (surr.)	1	%	143	107
13C5-PFNA (surr.)	1	%	105	72
13C6-PFDA (surr.)	1	%	123	100
13C2-PFUnDA (surr.)	1	%	111	77
13C2-PFDoDA (surr.)	1	%	88	53
13C2-PFTeDA (surr.)	1	%	92	47
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	%	75	48
D3-N-MeFOSA (surr.)	1	%	93	57

Client Sample ID			0958_QC201_2 10906	0958_QC202_2 10906
Sample Matrix			Water	Water
Eurofins Sample No.			B21-Se14284	B21-Se14285
Date Sampled			Sep 06, 2021	Sep 06, 2021
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonamido substances				
D5-N-EtFOSA (surr.)	1	%	96	54
D7-N-MeFOSE (surr.)	1	%	106	65
D9-N-EtFOSE (surr.)	1	%	103	71
D5-N-EtFOSAA (surr.)	1	%	48	23
D3-N-MeFOSAA (surr.)	1	%	33	15
Perfluoroalkyl sulfonic acids (PFASs)				
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	< 0.01
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	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 0.03
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	90	67
18O2-PFHxS (surr.)	1	%	98	91
13C8-PFOS (surr.)	1	%	115	94
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	%	82	75
13C2-6:2 FTSA (surr.)	1	%	120	81
13C2-8:2 FTSA (surr.)	1	%	84	59
13C2-10:2 FTSA (surr.)	1	%	121	73
PFASs Summations				
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	0.03
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	0.03
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	< 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)	Brisbane	Sep 08, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Brisbane	Sep 08, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Brisbane	Sep 08, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Brisbane	Sep 08, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: DEF19009/GINGIN
Project ID: WA_0958_PFASOMP

Order No.: DEF19009
Report #: 822876
Phone: [REDACTED]
Fax: [REDACTED]

Received: Sep 7, 2021 3:21 PM
Due: Sep 14, 2021
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA Site # 1254

Sydney Laboratory - NATA Site # 18217

Brisbane Laboratory - NATA Site # 20794

Perth Laboratory - NATA Site # 23736

Mayfield Laboratory - NATA Site # 25079

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_210906	Sep 06, 2021		Water	B21-Se14284	X
2	0958_QC202_210906	Sep 06, 2021		Water	B21-Se14285	X
Test Counts						2

Internal Quality Control Review and Glossary

General

1. 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.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. 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.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. 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)	%	109			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	109			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	123			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	100			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	92			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	95			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	96			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	102			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	107			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	77			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	82			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	100			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	80			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	85			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)			%	80			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)			%	72			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	100			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	107			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)									
Perfluorobutanesulfonic acid (PFBS)			%	87			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	77			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	125			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	72			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	84			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	108			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	76			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	80			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	102			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	86			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	119			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	84			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)	B21-Se14285	CP	%	89			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	B21-Se14285	CP	%	95			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	B21-Se14285	CP	%	115			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	B21-Se14285	CP	%	92			50-150	Pass	
Perfluorooctanoic acid (PFOA)	B21-Se14285	CP	%	83			50-150	Pass	
Perfluorononanoic acid (PFNA)	B21-Se14285	CP	%	95			50-150	Pass	
Perfluorodecanoic acid (PFDA)	B21-Se14285	CP	%	94			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	B21-Se14285	CP	%	94			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	B21-Se14285	CP	%	111			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	B21-Se14285	CP	%	79			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B21-Se14285	CP	%	82			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	B21-Se14285	CP	%	98			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B21-Se14285	CP	%	90			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B21-Se14285	CP	%	89			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B21-Se14285	CP	%	112			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B21-Se14285	CP	%	81			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B21-Se14285	CP	%	89			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se14285	CP	%	106			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	B21-Se14285	CP	%	75			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	B21-Se14285	CP	%	68			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	B21-Se14285	CP	%	116			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	B21-Se14285	CP	%	57			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	B21-Se14285	CP	%	97			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se14285	CP	%	122			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	B21-Se14285	CP	%	89			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	B21-Se14285	CP	%	69			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)	B21-Se14285	CP	%	108			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se14285	CP	%	99			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se14285	CP	%	109			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se14285	CP	%	95			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)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFASs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	B21-Se14284	CP	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)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se14284	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se14284	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD		
Perfluorobutanoic acid (PFBA)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Perfluoropentanoic acid (PFPeA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanoic acid (PFHxA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanoic acid (PFHpA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanoic acid (PFOA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanoic acid (PFNA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanoic acid (PFDA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroundecanoic acid (PFUnDA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorododecanoic acid (PFDoDA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotridecanoic acid (PFTrDA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotetradecanoic acid (PFTeDA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	B21-Se14285	CP	ug/L	0.03	0.02	10	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	B21-Se14285	CP	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)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se14285	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se14285	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se14285	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	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

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

Authorised by:


Analytical Services Manager
Senior Analyst-PFAS (QLD)



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 or please [click here](#).

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Australia

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Sydney

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IANZ # 1327

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Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name: Cardno (WA)
Contact name: [REDACTED]
Project name: DEF19009/GINGIN
Project ID: WA_0958_PFASOMP
Turnaround time: 5 Day
Date/Time received: Sep 9, 2021 4:18 PM
Eurofins reference: 823596

Sample Information

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

Notes

Contact

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

[REDACTED] on phone : [REDACTED] 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 Cardno (WA) email address.

Australia

Melbourne
6 Monterey Road
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NATA # 1261 Site # 1254

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Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: DEF19009/GINGIN
Project ID: WA_0958_PFASOMP

Order No.:
Report #: 823596
Phone:
Fax:

Received: Sep 9, 2021 4:18 PM
Due: Sep 16, 2021
Priority: 5 Day
Contact Name:

Eurofins Analytical Services Manager :

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA Site # 1254

Sydney Laboratory - NATA Site # 18217

Brisbane Laboratory - NATA Site # 20794

Perth Laboratory - NATA Site # 23736

Mayfield Laboratory - NATA Site # 25079

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC203_210907	Sep 07, 2021		Water	B21-Se19680	X
2	0958_QC204_210907	Sep 07, 2021		Water	B21-Se19681	X
3	0958_QC205_210907	Sep 07, 2021		Water	B21-Se19682	X
Test Counts						3

Cardno Consulting WA
11 Harvest Terrace
West Perth
WA 6005



NATA Accredited
Accreditation Number 1261
Site Number 20794

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 **823596-W**
 Project name **DEF19009/GINGIN**
 Project ID **WA_0958_PFSOMP**
 Received Date **Sep 09, 2021**

Client Sample ID			0958_QC203_2 10907	0958_QC204_2 10907	0958_QC205_2 10907
Sample Matrix			Water	Water	Water
Eurofins Sample No.			B21-Se19680	B21-Se19681	B21-Se19682
Date Sampled			Sep 07, 2021	Sep 07, 2021	Sep 07, 2021
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.30	< 0.05	0.07
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.77	< 0.01	0.03
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	3.1	< 0.01	0.16
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	0.84	< 0.01	0.02
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 0.46	< 0.01	^{N09} 0.03
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	0.02	< 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	%	98	114	114
13C5-PFPeA (surr.)	1	%	135	90	101
13C5-PFHxA (surr.)	1	%	119	79	87
13C4-PFHpA (surr.)	1	%	58	72	88
13C8-PFOA (surr.)	1	%	57	80	90
13C5-PFNA (surr.)	1	%	59	79	107
13C6-PFDA (surr.)	1	%	11	62	92
13C2-PFUnDA (surr.)	1	%	41	65	121
13C2-PFDoDA (surr.)	1	%	104	73	153
13C2-PFTeDA (surr.)	1	%	91	85	136
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	%	98	66	129
D3-N-MeFOSA (surr.)	1	%	78	67	84

Client Sample ID			0958_QC203_2 10907	0958_QC204_2 10907	0958_QC205_2 10907
Sample Matrix			Water	Water	Water
Eurofins Sample No.			B21-Se19680	B21-Se19681	B21-Se19682
Date Sampled			Sep 07, 2021	Sep 07, 2021	Sep 07, 2021
Test/Reference	LOR	Unit			
Perfluoroalkyl sulfonamido substances					
D5-N-EtFOSA (surr.)	1	%	80	54	85
D7-N-MeFOSE (surr.)	1	%	85	52	91
D9-N-EtFOSE (surr.)	1	%	102	83	83
D5-N-EtFOSAA (surr.)	1	%	85	33	85
D3-N-MeFOSAA (surr.)	1	%	84	40	101
Perfluoroalkyl sulfonic acids (PFASs)					
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	1.4	< 0.01	0.07
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	^{N09} < 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	0.46	< 0.01	0.04
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 1.9	< 0.01	^{N09} 0.11
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 9.4	^{N09} 0.02	^{N09} 0.83
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.22	< 0.01	^{N09} 0.08
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 140	^{N09} 0.09	^{N09} 0.42
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	123	142	134
18O2-PFHxS (surr.)	1	%	119	91	78
13C8-PFOS (surr.)	1	%	109	71	98
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	%	66	93	113
13C2-6:2 FTSA (surr.)	1	%	73	72	88
13C2-8:2 FTSA (surr.)	1	%	71	68	124
13C2-10:2 FTSA (surr.)	1	%	56	96	INT
PFASs Summations					
Sum (PFHxS + PFOS)*	0.01	ug/L	149.4	0.11	1.25
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	140.46	0.09	0.45
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	149.86	0.11	1.28
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	156.27	0.11	1.63
Sum of PFASs (n=30)*	0.1	ug/L	158.87	0.11	1.86

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Brisbane	Sep 10, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Brisbane	Sep 10, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Brisbane	Sep 10, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Brisbane	Sep 10, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

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

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

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

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

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

Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: DEF19009/GINGIN
Project ID: WA_0958_PFASOMP

Order No.:
Report #: 823596
Phone: [REDACTED]
Fax: [REDACTED]

Received: Sep 9, 2021 4:18 PM
Due: Sep 16, 2021
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA Site # 1254

Sydney Laboratory - NATA Site # 18217

Brisbane Laboratory - NATA Site # 20794

Perth Laboratory - NATA Site # 23736

Mayfield Laboratory - NATA Site # 25079

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC203_210907	Sep 07, 2021		Water	B21-Se19680	X
2	0958_QC204_210907	Sep 07, 2021		Water	B21-Se19681	X
3	0958_QC205_210907	Sep 07, 2021		Water	B21-Se19682	X
Test Counts						3

Internal Quality Control Review and Glossary

General

1. 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.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ug/L: micrograms per litre
ppm: Parts per million	ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NC	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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. 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.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. 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)	%	129			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	124			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	124			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	121			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	118			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	109			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	102			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	111			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	107			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	86			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	118			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)			%	123			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	99			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)			%	130			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)			%	135			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	118			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	117			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)									
Perfluorobutanesulfonic acid (PFBS)			%	110			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	119			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	117			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	77			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	126			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	122			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	110			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	95			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	111			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	106			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	122			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	117			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)		B21-Se19680	CP	%	132		50-150	Pass	
Perfluorohexanoic acid (PFHxA)		B21-Se19680	CP	%	74		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)		B21-Se19680	CP	%	67		50-150	Pass	
Perfluorooctanoic acid (PFOA)		B21-Se19680	CP	%	94		50-150	Pass	
Perfluorononanoic acid (PFNA)		B21-Se19680	CP	%	111		50-150	Pass	
Perfluorodecanoic acid (PFDA)		B21-Se19680	CP	%	104		50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)		B21-Se19680	CP	%	107		50-150	Pass	
Perfluorododecanoic acid (PFDoDA)		B21-Se19680	CP	%	108		50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)		B21-Se19680	CP	%	95		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)		B21-Se19680	CP	%	101		50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)		B21-Se19680	CP	%	65		50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)		B21-Se19680	CP	%	62		50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)		B21-Se19680	CP	%	77		50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)		B21-Se19680	CP	%	73		50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)		B21-Se19680	CP	%	69		50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B21-Se19680	CP	%	72			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se19680	CP	%	73			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	B21-Se19680	CP	%	67			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	B21-Se19680	CP	%	64			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	B21-Se19680	CP	%	88			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se19680	CP	%	68			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	B21-Se19680	CP	%	139			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	B21-Se19680	CP	%	75			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	B21-Se19680	CP	%	83			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se19680	CP	%	78			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se19680	CP	%	75			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se19680	CP	%	74			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	B21-Se19682	CP	%	117			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	B21-Se19682	CP	%	105			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	B21-Se19682	CP	%	98			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	B21-Se19682	CP	%	102			50-150	Pass	
Perfluorooctanoic acid (PFOA)	B21-Se19682	CP	%	77			50-150	Pass	
Perfluorononanoic acid (PFNA)	B21-Se19682	CP	%	96			50-150	Pass	
Perfluorodecanoic acid (PFDA)	B21-Se19682	CP	%	97			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	B21-Se19682	CP	%	112			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	B21-Se19682	CP	%	109			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	B21-Se19682	CP	%	77			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B21-Se19682	CP	%	90			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	B21-Se19682	CP	%	91			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B21-Se19682	CP	%	102			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B21-Se19682	CP	%	95			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B21-Se19682	CP	%	137			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B21-Se19682	CP	%	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)	B21-Se19682	CP	%	112			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se19682	CP	%	108			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	B21-Se19682	CP	%	66			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	B21-Se19682	CP	%	108			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	B21-Se19682	CP	%	91			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	B21-Se19682	CP	%	115			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	B21-Se19682	CP	%	67			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se19682	CP	%	119			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	B21-Se19682	CP	%	116			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	B21-Se19682	CP	%	80			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)	B21-Se19682	CP	%	78			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se19682	CP	%	145			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se19682	CP	%	140			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se19682	CP	%	96			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)	B21-Se19680	CP	ug/L	0.30	0.30	3.0	30%	Pass	
Perfluoropentanoic acid (PFPeA)	B21-Se19680	CP	ug/L	0.77	0.94	20	30%	Pass	
Perfluorohexanoic acid (PFHxA)	B21-Se19680	CP	ug/L	3.1	2.9	6.0	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	B21-Se19680	CP	ug/L	0.84	0.79	6.0	30%	Pass	
Perfluorooctanoic acid (PFOA)	B21-Se19680	CP	ug/L	0.46	0.45	3.0	30%	Pass	
Perfluorononanoic acid (PFNA)	B21-Se19680	CP	ug/L	0.02	0.02	4.0	30%	Pass	
Perfluorodecanoic acid (PFDA)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	B21-Se19680	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B21-Se19680	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B21-Se19680	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B21-Se19680	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B21-Se19680	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B21-Se19680	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se19680	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFASs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	B21-Se19680	CP	ug/L	1.4	1.4	6.0	30%	Pass
Perfluorononanesulfonic acid (PFNS)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	B21-Se19680	CP	ug/L	0.46	0.44	4.0	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	B21-Se19680	CP	ug/L	1.9	1.8	4.0	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	B21-Se19680	CP	ug/L	9.4	8.5	10	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se19680	CP	ug/L	0.22	0.28	24	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	B21-Se19680	CP	ug/L	140	140	1.0	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	B21-Se19680	CP	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)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se19680	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se19680	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD		
Perfluorobutanoic acid (PFBA)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Perfluoropentanoic acid (PFPeA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanoic acid (PFHxA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanoic acid (PFHpA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanoic acid (PFOA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanoic acid (PFNA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanoic acid (PFDA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroundecanoic acid (PFUnDA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorododecanoic acid (PFDoDA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotridecanoic acid (PFTrDA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotetradecanoic acid (PFTeDA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	B21-Se19681	CP	ug/L	0.02	0.02	6.0	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	B21-Se19681	CP	ug/L	0.09	0.08	10	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	B21-Se19681	CP	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)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se19681	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se19681	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se19681	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	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

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

Authorised by:


Analytical Services Manager
Senior Analyst-PFAS (QLD)



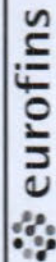
General Manager

- Indicates Not Requested

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

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

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mgt

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Fax: +613 8564 5090
Email: enquiries.melb@mglabmark.com.au

CHAIN OF CUSTODY RECORD

CLIENT DETAILS				Page 1 of 1			
Company Name : Cardno (WA) Pty Ltd		Contact Name : Maelle Bourdais		Purchase Order : DEF19009		COC Number : DEF19009 -02	
Office Address : 11 Harvest Terrace, West Perth, WA, 6005		PROJECT Number : WA_0958_PFA50MP		Eurofins mgt quote ID : NA		Data output format: PDF; ESDAT	
Email for COC/SRN/Results : maelle.bourdais@cardno.com.au		PROJECT Name : DEF19009/Ginglin		Some common holding times (with correct preservation). For further information contact the lab			
Special Directions & Comments : Please send ESDAT files to derp.labreports@esdat.com.au with the project No in the header file		Analytes		Waters			
Please send email invoice to claire.armstrong@cardno.com.au		PFAS (28 analytes)		Soils			
Eurofins mgt DI water batch number:		Sample ID		Containers:			
		Date		1LP 250P 125P 1LA 40mL vial 125mL A Jar			
		Matrix		Sample comments:			
1 0958 QC206 210908		Water					
2 0958 QC207 210908		Water					
3							
4							
5							
6							
7							
8							
9							
10							
Relinquished By: Andrew Glover		Received By: Rob Johnston		Method Of Shipment			
Date & Time : 8/09/2021		Date & Time : 9/9/21 16:18		Temperature on arrival: 11.0°C			
Signature:		Signature: UR		Report number: 823600			



Date/Time: 9/9/21 16:18
Chilled: 11.3
Temp: 11.3
Correction: -0.3
Final Temp: 11.0°C

Australia

Melbourne 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254	Sydney Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794	Perth 46-48 Banksia Road Welshpool WA 6106 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448 NATA # 1261 Site # 25079	New Zealand Auckland 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
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Sample Receipt Advice

Company name: Cardno (WA)
Contact name: [REDACTED]
Project name: DEF19009/GINGIN
Project ID: WA_0958_PFASOMP
Turnaround time: 5 Day
Date/Time received: Sep 9, 2021 4:18 PM
Eurofins reference: 823600

Sample Information

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

Notes

Contact

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

[REDACTED] on phone : [REDACTED] 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 Cardno (WA) email address.

Australia

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NATA # 1261 Site # 1254

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NATA # 1261 Site # 20794

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IANZ # 1290

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: DEF19009/GINGIN
Project ID: WA_0958_PFASOMP

Order No.: DEF19009
Report #: 823600
Phone: [REDACTED]
Fax: [REDACTED]

Received: Sep 9, 2021 4:18 PM
Due: Sep 16, 2021
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA Site # 1254

Sydney Laboratory - NATA Site # 18217

Brisbane Laboratory - NATA Site # 20794

Perth Laboratory - NATA Site # 23736

Mayfield Laboratory - NATA Site # 25079

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC206_210908	Sep 08, 2021		Water	B21-Se19752	X
2	0958_QC207_210908	Sep 08, 2021		Water	B21-Se19753	X
Test Counts						2

Cardno Consulting WA
11 Harvest Terrace
West Perth
WA 6005



NATA Accredited
Accreditation Number 1261
Site Number 20794

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 823600-W
Project name DEF19009/GINGIN
Project ID WA_0958_PFASOMP
Received Date Sep 09, 2021

Client Sample ID			0958_QC206_2 10908	0958_QC207_2 10908
Sample Matrix			Water	Water
Eurofins Sample No.			B21-Se19752	B21-Se19753
Date Sampled			Sep 08, 2021	Sep 08, 2021
Test/Reference	LOR	Unit		
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.17	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.44	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	2.5	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.86	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 1.4	< 0.01
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	%	99	108
13C5-PFPeA (surr.)	1	%	76	90
13C5-PFHxA (surr.)	1	%	117	74
13C4-PFHpA (surr.)	1	%	101	69
13C8-PFOA (surr.)	1	%	106	104
13C5-PFNA (surr.)	1	%	72	94
13C6-PFDA (surr.)	1	%	71	92
13C2-PFUnDA (surr.)	1	%	44	80
13C2-PFDoDA (surr.)	1	%	62	84
13C2-PFTeDA (surr.)	1	%	65	76
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	%	69	93
D3-N-MeFOSA (surr.)	1	%	51	66

Client Sample ID			0958_QC206_2 10908	0958_QC207_2 10908
Sample Matrix			Water	Water
Eurofins Sample No.			B21-Se19752	B21-Se19753
Date Sampled			Sep 08, 2021	Sep 08, 2021
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonamido substances				
D5-N-EtFOSA (surr.)	1	%	57	77
D7-N-MeFOSE (surr.)	1	%	56	78
D9-N-EtFOSE (surr.)	1	%	43	57
D5-N-EtFOSAA (surr.)	1	%	31	16
D3-N-MeFOSAA (surr.)	1	%	18	16
Perfluoroalkyl sulfonic acids (PFASs)				
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	0.61	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	0.23	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	0.08	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 1.1	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 1.2	^{N09} 0.03
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.58	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 5.3	^{N09} 0.05
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	70	105
18O2-PFHxS (surr.)	1	%	104	80
13C8-PFOS (surr.)	1	%	68	92
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	%	74	87
13C2-6:2 FTSA (surr.)	1	%	47	69
13C2-8:2 FTSA (surr.)	1	%	57	86
13C2-10:2 FTSA (surr.)	1	%	76	56
PFASs Summations				
Sum (PFHxS + PFOS)*	0.01	ug/L	65	0.08
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	54.4	0.05
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	66.4	0.08
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	70.98	0.08
Sum of PFASs (n=30)*	0.1	ug/L	72.97	< 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)	Brisbane	Sep 10, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Brisbane	Sep 10, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Brisbane	Sep 10, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Brisbane	Sep 10, 2021	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Australia

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

Sydney
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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

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

New Zealand

Auckland
35 O'Rourke Road
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Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: DEF19009/GINGIN
Project ID: WA_0958_PFSOMP

Order No.: DEF19009
Report #: 823600
Phone: [REDACTED]
Fax: [REDACTED]

Received: Sep 9, 2021 4:18 PM
Due: Sep 16, 2021
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA Site # 1254

Sydney Laboratory - NATA Site # 18217

Brisbane Laboratory - NATA Site # 20794

Perth Laboratory - NATA Site # 23736

Mayfield Laboratory - NATA Site # 25079

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC206_210908	Sep 08, 2021		Water	B21-Se19752	X
2	0958_QC207_210908	Sep 08, 2021		Water	B21-Se19753	X
Test Counts						2

Internal Quality Control Review and Glossary

General

1. 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.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. 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.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ug/L: micrograms per litre
ppm: Parts per million	ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. 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.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. 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 (PFASs)							
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)							
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)	%	129			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	124			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	124			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	121			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	118			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	109			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	102			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	111			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	107			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	86			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	118			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)			%	123			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	99			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)			%	130			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)			%	135			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	118			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	117			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)									
Perfluorobutanesulfonic acid (PFBS)			%	110			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	119			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	117			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	77			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	126			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	122			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	110			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	95			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	111			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	106			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	122			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	117			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)	B21-Se19753	CP	%	107			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	B21-Se19753	CP	%	126			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	B21-Se19753	CP	%	131			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	B21-Se19753	CP	%	119			50-150	Pass	
Perfluorooctanoic acid (PFOA)	B21-Se19753	CP	%	109			50-150	Pass	
Perfluorononanoic acid (PFNA)	B21-Se19753	CP	%	116			50-150	Pass	
Perfluorodecanoic acid (PFDA)	B21-Se19753	CP	%	101			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	B21-Se19753	CP	%	106			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	B21-Se19753	CP	%	118			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	B21-Se19753	CP	%	100			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B21-Se19753	CP	%	104			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	B21-Se19753	CP	%	99			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B21-Se19753	CP	%	131			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B21-Se19753	CP	%	103			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B21-Se19753	CP	%	131			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B21-Se19753	CP	%	129			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B21-Se19753	CP	%	111			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se19753	CP	%	117			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	B21-Se19753	CP	%	97			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	B21-Se19753	CP	%	122			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	B21-Se19753	CP	%	123			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	B21-Se19753	CP	%	83			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	B21-Se19753	CP	%	108			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se19753	CP	%	114			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	B21-Se19753	CP	%	75			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	B21-Se19753	CP	%	94			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)	B21-Se19753	CP	%	120			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se19753	CP	%	103			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se19753	CP	%	126			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se19753	CP	%	142			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)	B21-Se19752	CP	ug/L	0.17	0.18	5.0	30%	Pass	
Perfluoropentanoic acid (PFPeA)	B21-Se19752	CP	ug/L	0.44	0.48	9.0	30%	Pass	
Perfluorohexanoic acid (PFHxA)	B21-Se19752	CP	ug/L	2.5	2.6	5.0	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	B21-Se19752	CP	ug/L	0.86	0.87	1.0	30%	Pass	
Perfluorooctanoic acid (PFOA)	B21-Se19752	CP	ug/L	1.4	1.5	9.0	30%	Pass	
Perfluorononanoic acid (PFNA)	B21-Se19752	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	B21-Se19752	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	B21-Se19752	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	B21-Se19752	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	B21-Se19752	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B21-Se19752	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	B21-Se19752	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B21-Se19752	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B21-Se19752	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B21-Se19752	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B21-Se19752	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B21-Se19752	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B21-Se19752	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	B21-Se19752	CP	ug/L	0.61	0.71	16	30%	Pass
Perfluorononanesulfonic acid (PFNS)	B21-Se19752	CP	ug/L	0.23	0.19	20	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	B21-Se19752	CP	ug/L	0.08	0.08	4.0	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	B21-Se19752	CP	ug/L	1.1	1.3	18	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	B21-Se19752	CP	ug/L	12	13	6.0	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	B21-Se19752	CP	ug/L	0.58	0.62	6.0	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	B21-Se19752	CP	ug/L	53	55	4.0	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	B21-Se19752	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)	B21-Se19752	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B21-Se19752	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B21-Se19752	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B21-Se19752	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	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

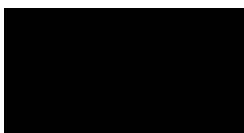
Qualifier Codes/Comments

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

Authorised by:




Analytical Services Manager
 Senior Analyst-PFAS (QLD)





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 or please [click here](#).

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

APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES

Monitoring Date	Monitoring Location ID	Sample_ID	TOC (mAHD)	Well Depth (m)	Screen Interval (bgl)	SWL (mbTOC)	RWL (mAHD)	Observations	Purge Method	Temp (Co)	DO (mg/L)	EC (us/Cm)	TDS (mg/L)	pH	Eh (mV)	QC Sample #
7/09/2021	MW101I	0958_MW101I_210907	73.5	23.5	19.78-22.78	12.09	61.41		HydraSleeve	22	1	98.7	64.35	5.27	-116.2	
7/09/2021	MW102D	0958_MW102D_210907	73.41	43.4	40.02-43.02	12.14	61.27		HydraSleeve	21.8	2.92	411.8	267.8	6.07	-77.8	
7/09/2021	MW104I	0958_MW104I_210907	73.74	22.9	19.5-22.9	12.21	61.53		HydraSleeve	23.3	1.05	117.1	76.05	5.57	-155.5	
7/09/2021	MW105D	0958_MW105D_210907	73.79	42.5	39-42.5	12.3	61.49		HydraSleeve	23.2	3.97	151.9	98.8	6.68	-4.8	
6/09/2021	MW106S	0958_MW106S_210906	71.54	11	6.8-10.8	6.55	64.99		HydraSleeve	19.9	3.87	219.3	142.35	3.6	87	
6/09/2021	MW107S		71.6	9.5	5.5-9.5			BORE DRY								
6/09/2021	MW108S		70.9	9	5.0-9.0			BORE DRY								
7/09/2021	MW109S	0958_MW109S_210907	73.45	10.3	5.8-10.3	7.34	66.11		HydraSleeve	21	2.27	132.9	86.45	3.9	-21.9	
7/09/2021	MW110S	0958_MW110S_210907	73.74	10	6.5-10.0	7.8	65.94		HydraSleeve	22.5	3.75	129.7	84.5	4.7	-9.1	QC104, 204
7/09/2021	MW111S		73.87	9.5	6.5-9.5			Dry	HydraSleeve							
7/09/2021	MW112S	0958_MW112S_210907	73.69	10.5	7.5-10.5	8.16	65.53		HydraSleeve	21	3.64	154.6	100.75	3.73	-10.3	
7/09/2021	MW113S	0958_MW113S_210907	73.79	9.6	6.5-9.5	8.41	65.38		HydraSleeve	21.1	2.13	161.9	105.3	3.96	-6.6	
7/09/2021	MW114S	0958_MW114S_210907	73.68	8	5.0-8.0	6.66	67.02		HydraSleeve	21.7	4.5	310.6	202.15	6.43	-43.5	
8/09/2021	MW115S	0958_MW115S_210908	70.79	8	5.0-8.0	5.07	65.72		HydraSleeve	20.7	2.53	173.9	113.1	3.72	-58	QC107, QC207
6/09/2021	MW116S	0958_MW116S_210906	74.43	11	8.0-11.0	9.26	65.17		HydraSleeve	20.4	4.01	179.7	117	4	-12.3	QC102, QC202
6/09/2021	MW117I	0958_MW117I_210906	74.19	23.3	21.3-23.3	13.98	60.21		HydraSleeve	20.2	1.66	122.6	79.95	5.25	-51.5	
6/09/2021	MW118D	0958_MW118D_210906	74.19	43	41-43	14.04	60.15		HydraSleeve	20	2.06	205.7	133.9	5.24	-75.5	
6/09/2021	MW119S	0958_MW119S_210906	74.06	13.1	10.1-13.1	11.62	62.44		HydraSleeve	20	4.26	149.3	96.85	4.05	12.9	
6/09/2021	MW120I	0958_MW120I_210906	73.84	23	19.94-22.94	15.17	58.67		HydraSleeve	20.3	3.28	92.7	60.45	4.82	-41.9	
6/09/2021	MW121D	0958_MW121D_210906	73.96	42.8	39.8-42.8	15.32	58.64		HydraSleeve	20.8	1.14	188.3	122.2	5.66	-118.4	
6/09/2021	MW122S	0958_MW122S_210906	75.84	13.5	10.5-13.5	12.43	63.41		HydraSleeve	21	4.65	152.2	98.8	3.86	-53.7	
6/09/2021	MW123I	0958_MW123I_210906	76.03	23	20-23	16.06	59.97		HydraSleeve	21.5	0.78	166.6	108.55	5.21	-94.4	
6/09/2021	MW124D	0958_MW124D_210906	75.87	42.5	39.5-42.5	16.8	59.07		HydraSleeve	21	1.65	220.9	143.65	5.73	-74.2	
6/09/2021	MW125S	0958_MW125S_210906	74.88	18	14.25-17.25	14.91	59.97		HydraSleeve	20.9	1.02	161.8	105.3	5.63	-106.4	Qc101, Qc201
6/09/2021	MW126I	0958_MW126I_210906	73.5	36.5	33.5-36.5	13.34	60.16		HydraSleeve	19.6	1.15	192.4	124.8	5.61	-119.2	
6/09/2021	MW128S	0958_MW128S_210906	74.4	50	47-50	17.1	57.3		HydraSleeve	19.4	1.24	217.7	141.7	5.58	-109.6	
6/09/2021	MW129I	0958_MW129I_210906	73.51	18.3	15.3-18.3	16.2	57.31		HydraSleeve	21	2.02	191	124.15	5.3	-121.6	
6/09/2021	MW130D	0958_MW130D_210906	72.77	36.5	33.5-36.5	15.74	57.03		HydraSleeve	20.3	2.17	219.2	142.35	6.08	-144	
6/09/2021	MW131D	0958_MW131D_210906	76.59	55.5	52.5-55.5	19.87	56.72		HydraSleeve	19.8	1.84	173.8	113.1	5.72	-123.4	
6/09/2021	MW132I	0958_MW132I_210906	76.43	21.5	18.5-21.5	19.75	56.68		HandBailing	19.7	0.89	144.5	94.25	5.87	-156.3	
6/09/2021	MW133D	0958_MW133D_210906	76.49	43.5	40.9-43.9	19.65	56.84		HydraSleeve	19.9	4.08	198.2	128.7	4.68	-99	
6/09/2021	MW134D		78.48	56	53-56			BORE DRY								
6/09/2021	MW135I	0958_MW135I_210906	77.67	24	21.1-23.6	21.17	56.5		HydraSleeve	18.6	1.47	232.6	151.45	6.33	-106.3	
6/09/2021	MW136D	0958_MW136D_210906	78.24	44	41-44	21.69	56.55		HydraSleeve	18.4	1.8	187.8	122.2	6.03	-133.3	
8/09/2021	MW137S	0958_MW137S_210908	73.12	8.7	4.7-8.7	7.86	65.26		HydraSleeve	21.2	2.69	379.4	246.35	3.53	-45.2	
6/09/2021	MW138S	0958_MW138S_210906	74.17	15	9.0-15.0	8.6	65.57		HydraSleeve	18	1.24	289.1	187.85	6.52	-140.9	
6/09/2021	MW139I	0958_MW139I_210906	73.99	30	27.0-30.0	14.09	59.9		HydraSleeve	18.6	1.07	211.7	137.8	6.24	-144	
6/09/2021	MW140D	0958_MW140D_210906	73.9	54	51.5-54.5	13.91	59.99		HydraSleeve	18.2	1.03	457.9	297	7.25	-145.1	
8/09/2021	MW141S	0958_MW141S_210908	74.36	16.5	13.5-16.5	11.1	63.26		HydraSleeve	20.6	1.1	237.7	154.7	4.22	-157.3	
8/09/2021	MW142S	0958_MW142S_210908	76.34	15.5	12.4-15.4	13.52	62.82		HydraSleeve	20.1	4.34	185.5	120.25	4.12	-54.3	
8/09/2021	MW143S		75.81	18.5	14-18.5			Bore Dry								
8/09/2021	MW301	0958_MW301_210908	74.547	10	7-10	8.52	66.027		HydraSleeve	21.3	4.37	158.3	102.7	3.92	-54.9	QC106, QC206
8/09/2021	MW302	0958_MW302_210908	74.7115	10	7-10	8.7	66.012		HydraSleeve	21.6	4.46	155.9	101.4	3.8	-52	
8/09/2021	MW303	0958_MW303_210908	74.5744	10	7-10	8.54	66.034		HydraSleeve	21.6	5.16	138.1	89.7	3.84	-54.2	
7/09/2021	MW304	0958_MW304_210907	74.094	9.5	6.5-9.5	7.39	66.704		HydraSleeve	22.9	3.53	307	199.55	5.15	44.7	
7/09/2021	MW305	0958_MW305_210907	73.885	9	6.0-9.0	7.1	66.785		HydraSleeve	23	2.19	206.9	164.55	4.7	-4.7	
7/09/2021	MW306	0958_MW306_210907	73.965	9	6.0-9.0	7.28	66.685		HydraSleeve	21.7	2.97	221.2	143.65	5.39	-16	
7/09/2021	MW307							Well destroyed cannot sample								
7/09/2021	MW308	0958_MW308_210907	73.691	9	6.0-9.0	6.98	66.711		HydraSleeve	22.7	3.47	234.9	152.75	6.37	0.2	
7/09/2021	MW309	0958_MW309_210907	73.899	9.5	6.5-9.5	7.27	66.629		HydraSleeve	23.2	3.88	152.8	99.45	4.74	13.4	QC103, QC203
7/09/2021	MW310	0958_MW310_210907	73.806	9	6.0-9.0	7.11	66.696		HydraSleeve	22.9	3.13	254.9	165.75	5.73	-15.4	
7/09/2021	MW312	0958_MW312_210907	74.541	9.5	6.5-9.5	8.01	66.531		HydraSleeve	20.7	4.32	205.6	133.9	5.8	24.3	
7/09/2021	MW313	0958_MW313_210907	74.688	10.5	7.5-10.5	8.16	66.528		HydraSleeve	20.8	5.97	175.9	114.4	4.55	61.9	
10/09/2021	MW401	0958_MW401_210910							Tap	17.3	4.5	207.9	135.2	6.52	-88.7	
7/09/2021	MW402	0958_MW402_210907							Tap	21	2.57	897	585	7.04	34	
8/09/2021	MW403	0958_MW403_210908	73.84	26	14-26	21.32	52.52		HydraSleeve	19.9	1.61	342.5	222.95	4.84	-56.2	
7/09/2021	MW504	0958_MW504_210907	72.82	13	10.0-13.0	6.48	66.34		Tap	22.4	4.37	145.1	94.25	5.33	27.9	
7/09/2021	MW505	0958_MW505_210907	73.83	13	10-13	7.84	65.99		Tap	23.9	2.13	152.3	98.8	6.31	-0.2	
6/09/2021	POT101	0958_POT101_210906							Tap	20.4	6.01	647	422.5	5.96	-52.3	
6/09/2021	POT102	0958_POT102_210906							Tap	19.6	5.7	566	370.5	6.03	60.6	
7/09/2021	POT103	0958_POT103_210907							Tap	15	8.24	538.9	350.13	6.96	19.4	
7/09/2021	POT104	0958_POT104_210907							Tap	25.3	4.76	551	357.5	6.06	39.5	QC105, QC205
6/09/2021	POT105	0958_POT105_210906							Tap	20.8	2.97	607	396.5	6.41	117.7	

Calibration Report

Multi-Parameter Water Quality Instrument

Customer: Cardno

Contact: [REDACTED]

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 20K104050

Cable length: 1m

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		✓	170.80 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 57.92
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 5 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:

Instrument Readings								
Parameter	Standards	Reference	Calibration Point	Span	Units	Before	After	Units
Temperature	Check Temp NATA	Room Temp	16.3	-0.1	°C	NA	16.2	°C
pH	pH 7.00	361531	7.01	-15.80	mV	7.05	7.01	pH
pH	pH 4.00	362911	4.00	155.00	mV	4.01	4.00	pH
Conductivity	2764 µs/cm at 25°C	20/1007	2764	GLP	4.94	2739	2764	µs/cm
ORP (Reference check only)	Zobell A & B	21/0502	248	248	mV	242.8	243.3	mV
Zero Dissolved Oxygen	NaSO3 in distilled water	10175	0.0	NA	NA	0	0.0	%
100% Dissolved Oxygen	100% Air Saturation	Air	100.0	3.8	uA	87.7	100.0	%

Calibrated by: [REDACTED]

Calibration Date: 02-Sep-21

Next Due: 01-Mar-22

Date of Bump Test	Project 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)
07/09	0958	YSI # 20010104	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N 35,000	14.4	pH 4.00: 3.98 pH 7.00: 7.02 Temp: 14.57 EC: 13,900	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N Temp: (± 2°C) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N			
08/09	0958	YSI # 20010104	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N	15.1	pH 4.00: 4.09 pH 7.00: 7.02 Temp: 16.5 EC: 1447	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N Temp: (± 2°C) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N			
10/9	0958	YSI # 20010104	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N	17.4	pH 4.00: 4.04 pH 7.00: 7.01 Temp: 18.4 EC: 1461	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N Temp: (± 2°C) ☒ 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 Temp: (± 2°C) 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 Temp: (± 2°C) 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 Temp: (± 2°C) 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 Temp: (± 2°C) 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 Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N			

APPENDIX

E

DATA QUALITY REVIEW

Data Quality Review PFAS Ongoing Monitoring Plan Post-Winter 2021 Quarterly Monitoring

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 6 and 10 September 2021 and is in accordance with the proposed scope of work, as documented in the SAQP (ref DEF19009_Gingin Satellite Airfield_ OMP PFAS_SAQP_Rev5) issued to the client and in general compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i> and NEPM “National Environment Protection (Assessment of Site Contamination) Measure”.</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 2021 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 all compliant with required timeframes.	
Background samples	No background samples were collected during the course of the investigation.		
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>		
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 tap water samples (20%) 6 for 52 groundwater samples (11.5%)
	Split duplicate	1 in 10 primary samples (10%)	1 for 5 tap water samples (20%) 6 for 52 groundwater samples (11.5%)
	Rinsate	1 per YSI per day	4 for 4 day (100%)
	Field Blank	1 per day	4 for 4 day (100%)

QA/QC Aspects	Evidence & Evaluation								
QC Testing – Blind Replicates (Primary Lab)	<ul style="list-style-type: none">RPD Acceptance Criteria: <table><tr><th>Magnitude of Results</th><th>Acceptable RPD range</th></tr><tr><td>< 10 x LOR</td><td>No limits</td></tr><tr><td>10 – 20 LOR</td><td>0% - 50%</td></tr><tr><td>> 20 x LOR</td><td>0% - 20%</td></tr></table> <p>Groundwater</p> <ul style="list-style-type: none">Primary Groundwater Samples Analysed: 52Blind Replicate Samples Analysed: 6 <p>RPDs levels are generally minor and probably related to the low analyte concentrations.</p> <p>Tap water</p> <ul style="list-style-type: none">Primary tap water Samples Analysed: 5Blind Replicate Samples Analysed: 1 <p>RPDs levels are generally minor and probably related to the low analyte concentrations.</p>	Magnitude of Results	Acceptable RPD range	< 10 x LOR	No limits	10 – 20 LOR	0% - 50%	> 20 x LOR	0% - 20%
Magnitude of Results	Acceptable RPD range								
< 10 x LOR	No limits								
10 – 20 LOR	0% - 50%								
> 20 x LOR	0% - 20%								
QC Testing – Field Splits (Secondary Lab)	<ul style="list-style-type: none">RPD Acceptance Criteria: <table><tr><th>Magnitude of Results</th><th>Acceptable RPD range</th></tr><tr><td>< 10 x LOR</td><td>No limits</td></tr><tr><td>10 – 20 LOR</td><td>0% - 50%</td></tr><tr><td>> 20 x LOR</td><td>0% - 20%</td></tr></table> <p>Groundwater</p> <ul style="list-style-type: none">Primary Groundwater Samples Analysed: 52Field Split Samples Analysed: 6 <p>RPDs levels are generally minor and probably related to the low analyte concentrations or the difference of methodology between the primary and secondary laboratories.</p> <p>Tap water</p> <ul style="list-style-type: none">Primary tap water Samples Analysed: 5Field Split Samples Analysed: 1 <p>RPDs levels are generally minor and probably related to the low analyte concentrations.</p>	Magnitude of Results	Acceptable RPD range	< 10 x LOR	No limits	10 – 20 LOR	0% - 50%	> 20 x LOR	0% - 20%
Magnitude of Results	Acceptable RPD range								
< 10 x LOR	No limits								
10 – 20 LOR	0% - 50%								
> 20 x LOR	0% - 20%								
Field Blanks	Field Blanks were collected at a rate of one per fieldwork 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, laboratory control samples and laboratory duplicates.</p> <p>No Matrix Spike outliers were recorded:</p> <p>The following Quality Control sample frequency non-conformance was reported:</p> <ul style="list-style-type: none">EP2110395<ul style="list-style-type: none">Laboratory duplicate (PFAS): expected rate: 10%, actual: 5.41%.Matrix Spike (PFAS): expected rate: 5%, actual: 0%.EP2110442<ul style="list-style-type: none">Laboratory duplicate (PFAS): expected rate: 10%, actual: 8.33%.EP2110531<ul style="list-style-type: none">Laboratory duplicate (PFAS): expected rate: 10%, actual: 3.85%.Matrix Spike (PFAS): expected rate: 5%, actual: 3.85%. <p>No Method Blank value outliers were reported.</p>								
Laboratory Method Detection Limit	Laboratory reports indicate the method detection limits were generally lower than the respective assessment criteria.								

QA/QC Aspects	Evidence & Evaluation
NATA endorsement of laboratory reports	Laboratory reports were stamped with the NATA endorsement stamp and signature. ALS Accreditation No. 825 Eurofins Accreditation No. 1261
Calibration of Field Equipment	All equipment used during the investigation was calibrated by the supplier prior to use. The equipment calibration certificates are provided in Appendix D.
Decontamination and Equipment Blanks	Rinsate blanks were collected at a rate of one per day when reusable equipment (water quality meter) 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 investigation is considered valid and complete.

APPENDIX

F

INFORMATION ABOUT ENVIRONMENTAL REPORTS

About Site Environmental Assessment Reports

1. Introduction

This document explains the Environmental Site Assessment (ESA) process and the context that applies to the use of Environmental Reports issued by Cardno.

2. What is an ESA?

Environmental Site Assessments (ESA) are undertaken for a range of purposes, specific to the brief issued by the client in each case. The scope may include one or a combination of any of the following:

- ☐ A factual report of the condition of a portion of the site or one aspect of an entire site.
- ☐ Assessment of the contamination levels in soil to be removed from a site – a waste classification assessment.
- ☐ Validation of the success of remediation of a site or a portion of a site.
- ☐ Provision of a professional opinion about the suitability of a site for one or more uses, in terms of its contamination status.

The scope of any ESA needs to be defined at the outset.

An ESA is not an Environmental Audit. Such audits are undertaken in accordance with the provisions of regulations enacted in various states of Australia, and are referred to as Site Audits in some jurisdictions. Statutory audits provide certification by EPA accredited auditors that a site is suitable for one or more uses. An ESA may provide similar advice but cannot be used in place of an audit if the latter is required by regulation in any instance. However in some circumstances and jurisdictions an ESA is sufficient to provide “environmental sign-off” of a site.

An ESA may be undertaken for due diligence purposes, to establish whether the site has been impacted to the extent that some beneficial uses of the site may be precluded. Due diligence audits in many cases may be completed as non-statutory Audits, although in some jurisdictions they can also be statutory audits, if defined as such at the outset.

3. The ESA Process

The Client generally initiates the ESA process by specifying a brief which identifies the specific objectives of the assessment. If not, it is the consultants’ duty to so specify the ESA

In the case of an ESA to provide an opinion about the suitability of the site for use, it would be conducted in accordance with NEPM (Site Assessment). Such ESA would not commence until a thorough site history assessment (Phase 1 Assessment: to identify the potential for significant contamination at a site) is conducted. However, where the history is unclear, a broad screening of chemical parameters can be used to test environmental media. This normally includes a broad range of organic and inorganic compounds and elements, often referred to as an Environmental Screen.

(In the case of an ESA for a purpose other than to provide an opinion about the suitability of the site for use, it is not always necessary to undertake a Phase 1 assessment.)

The ESA requires sampling of soil at representative locations across the site. A NATA accredited laboratory performs the analysis of soil. It is impractical for all of the soil to be assessed. The ESA is often based on a statistical method of grid or random sampling, augmented by targeted sampling at locations known or suspected to be contaminated. Guidance on sampling strategy and density is provided in Australian Standard AS4482.1–2005. However, some considerable degree of judgement is still required in the application of any sampling and testing strategy. For example the blanket application of the “hot spot” method presented in this standard is often inappropriate given its limitations.

The field program also investigates the likelihood of contamination below the site surface. Field investigations must sample and test fill as well as the natural soils. If contamination is found then it is common for further work to be undertaken to characterise, to the extent practical, its vertical and horizontal extent. However, where fill is encountered and testing shows it to be uncontaminated, it must be realised that the heterogeneous nature of the material might mean that not all pockets of contaminated material can be detected using normal sampling regimes.

EPA guidelines for auditors, that may be relevant for an ESA, indicate the need in all cases to consider the potential for groundwater contamination in any site. This does not mean all sites need to be drilled to sample groundwater, but it is most often the case. Most hydrogeological settings and groundwater conditions are complex and vary in space and time. The condition of groundwater is investigated to identify if any beneficial use or environmental value of groundwater is precluded due to contamination.

As previously stated for soil, all groundwater at the site cannot be tested. The environmental investigations are conducted in accordance with industry standards and guidelines (e.g. EPA Vic Pub 668). This provides a level of confidence that a sufficiently comprehensive assessment of the groundwater at the site is achieved.

Where an investigation shows that groundwater is polluted, consideration should be given to assessing the risks and the need for and practicality of any clean up.

4. Environmental Assessment Report

The ESA Report details the findings of the ESA. It provides summary information on the site definition, the reasons for the assessment and other relevant facts. It reviews the scope and quality of the site investigations, laboratory testing and data analyses undertaken. These reports also present a review of the contamination status of the site, the need for any further clean up, and an opinion on the suitability of the site for a range of beneficial uses and land uses such as “residential – low density”, “commercial” etc, as appropriate.

However, as noted above, some ESA have a narrow scope such as for classification of waste soil for removal from site, and do not make conclusions on suitability of site for use.

The ESA Report generally includes copies of other documents and reports, necessary to support the assessment findings, presented as appendices. These can contain more detailed information than the body of the ESA Report. Care should be taken to also read the appended documents and the ESA report in full.

Cardno generally issues reports in electronic form (e-Report) on CD ROM. ESA Reports are issued in this format as Adobe Acrobat™ PDF files. However, a paper copy of the executive summary of the ESA Report is generally issued to the client, and others as required by the brief or by regulation.

5. Limitations of Environmental Assessment Report

The ESA Report is prepared in a manner that can be easily read by a lay person with a legitimate interest in the contamination status of the site, such as the site owner or occupier, EPA and Local Planning Authority. The ESA report is not intended for use by other parties or for other purposes. Anyone who uses the assessment report for purposes other than specified in the report, does so at their own risk.

The site should only be used for one or more of the beneficial uses and land uses identified in the ESA as suitable.

The conditions and qualifications may apply to the suitability of the site for use, and it is the responsibility of the Client to be cognizant of and accept these in accepting the report. Cardno are only responsible for the issuing of the ESA report but accepts no liability for the costs incurred in the implementation of ESA findings.

The ESA provides a “snapshot” of the site conditions at the time of the site investigation. Consequently, the report may not be valid at a later time if there has been any change to the contamination status of the site in that time. Verification of the status of the site may be required in cases where a significant time has elapsed, or site conditions have changed since the assessment and audit.

The ESA is necessarily limited by constraints such as time, cost and available information; although normal professional practice at the time has been applied with all due care to prepare the report. A necessary requirement of this process is the horizontal and vertical interpolation of data from discrete locations. However, site conditions are generally not homogenous and some discrepancies will occur between the actual and predicted results at locations not directly sampled. There is a risk that contamination may occur at the site and not be identified by a competent investigation and assessment. The approach adopted in sampling (a combination of statistically based grid and judgmental sampling) seeks to reduce, but cannot eliminate, this risk.

Where unexpected occurrences of contamination arise, subsequent to the issue of the ESA Report, Cardno should be permitted to make an interpretation of these facts in relation to the ESA Report findings. Consequently, the Client should inform Cardno and seek their opinion. Cardno accepts no liability for costs incurred due to such

unexpected occurrences, given the inherent uncertainties in the assessment process.

Cardno uses information provided by other parties as the basis for the ESA, and reliance on this information is at the discretion of Cardno. However, however Cardno cannot guarantee any of the facts, findings or conclusions presented by other parties. Cardno will not be liable for the use of information, provided by others that is subsequently found to be intentionally misleading.

The ESA Report is not and does not purport to be anything other than a contaminated land ESA. It is not a geotechnical report and bore logs reproduced are for interpretation of the likely distribution of contamination. They are not intended for geotechnical interpretations and may not be adequate for this purpose.

The ESA Report is not intended to be a comprehensive analysis of the presence and associated risk of asbestos in buildings and services. Where asbestos in buildings and services is known or likely, the report may only caution that an appropriately qualified person be engaged to undertake demolition to avoid contamination of the site.

Cardno

13 August 2015

PFAS OMP Quarterly Sampling Event Factual Report

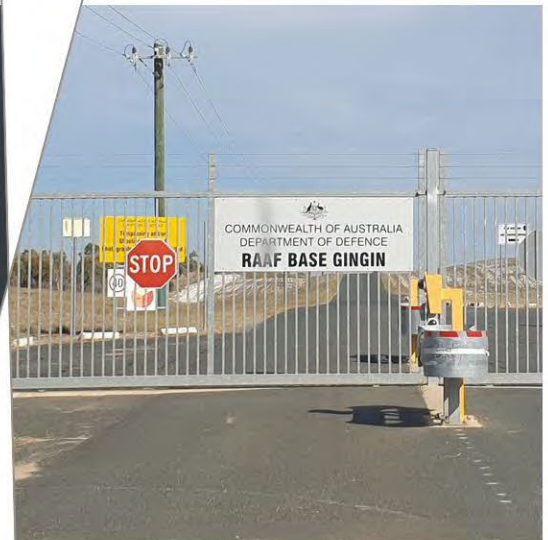
January 2022

Gingin Satellite Airfield

DEF19009

Prepared for
Department of Defence

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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 & Abbreviations

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
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
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 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 August 2021, Reference: DEF19009, ‘PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Gingin Satellite Airfield’.

The SAQP was reviewed prior to the sampling event and no changes related to the quarterly monitoring event 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 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 January 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 Environment and Regulation (DER), 2014, Assessment and Management of Contaminated Sites¹.
- > 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, 2021), 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	0958_MW401; 0958_MW402
Off-site wells - South	0958_MW141S; 0958_MW142S; 0958_MW143S; 0958_MW403
Off-site Abstraction wells ⁽¹⁾	Pinjar Production P140, Pinjar Production P145.

Note: (1) These are Water Corporation production bores 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, 2021) 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	0958_POT101; 0958_POT102; 0958_POT103; 0958_POT104; 0958_POT105.

2.3 Data Management

All the data included in this Factual 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.

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

2.3.1 Defence ESdat database

Data collected as part of the January 2022 OMP quarterly monitoring event was uploaded to the ESdat database according to the data management requirements of the DCMM Annex L, including:

- > All field data collected was uploaded;

¹ It is noted that 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.

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

2.4 Deviations from the OMP SAQP

The following deviations from the SAQP were reported:

- > Monitoring Bore 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.
- > On-site tap water monitoring locations POT101 and POT105 were destroyed and unable to be sampled. This has a limited impact on the OMP as the taps are no longer an exposure pathway due to removal.

No other deviation from the SAQP was reported during the January 2022 quarterly sampling 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 specified mark at the top of the well casing.
Groundwater Field Parameters	<p>Groundwater field parameters were recorded via a down-hole water quality meter (positioned within the mid screen interval) 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 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 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	Each sample was labelled with the sample location, date, project identification number and sampler's initials.

Activity	Details
	<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 (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 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 via flow cell, samples were analysed for the same analytical suite as the groundwater monitoring wells.

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 weather event that could have impacted the sampling or results were observed. The building where tap water monitoring locations POT101 and POT105 were located has been demolished.

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 (TDS ranging from 142.9 mg/L to 370.7 mg/L), acidic (pH ranging 4.28 to 6.21). Groundwater temperature was on average 27.1°C, DO readings mostly indicate aerobic groundwater condition (DO ranging from 1.03 mg/L to 2.6 mg/L). Field parameters were generally consistent with the previous monitoring events.

4.2.1.2 Groundwater gauging

Groundwater depth was recorded at 52.47 mAHD (MW403) to 63.58 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	0.05 (MW141S)	5	0
Sum of PFHxS and PFOS	MW402, MW141S	0.07 ²	1.52 (MW141S)	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 2022 quarterly monitoring event.
- > Two out of five groundwater samples (MW14S, MW402) 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.
- > 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 physiochemical 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 399.1 mg/L to 453 mg/L), acidic (pH ranging 5.73 to 6.4). Tap water temperature was on average 31.13°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 4-1. 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 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	0.05 (POT104)	3	0
Sum of PFHxS and PFOS	POT102, POT103, POT104	0.07 ²	1.28 (POT104)	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 detect of PFOA or Sum of PFOS and PFHxS were reported for the tap water locations during the January 2022 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 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

On-site tap water monitoring locations POT101 and POT105 were removed and unable to be sampled.

5 Summary and Conclusions

Cardno undertook the January 2022 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 bores and three on-site taps. One groundwater monitoring well couldn't be sampled as this well was found to be dry and two taps couldn't be sampled as these were destroyed.

The groundwater laboratory results reported the following:

- > Of the five (5) groundwater samples tested, Sum of PFOS and PFHxS (2 samples) 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 detect or new exceedance of guideline values were reported for the quarterly groundwater monitoring locations.

The tap water laboratory results reported the following:

- > All three (3) 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 three (3) samples reported PFOA concentrations above the laboratory LOR but below the adopted assessment criteria.
- > No first time detect 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 2022), scheduled for April 2022.

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 Water Quality Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000).
4. Contaminated Sites Act 2003, Western Australia.
5. Department of Defence, July 2018 amended August 2019, 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 2018) National Water Quality Management Strategy Australian Drinking Water Guidelines 6, August 2018
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)'.
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Site Specific References

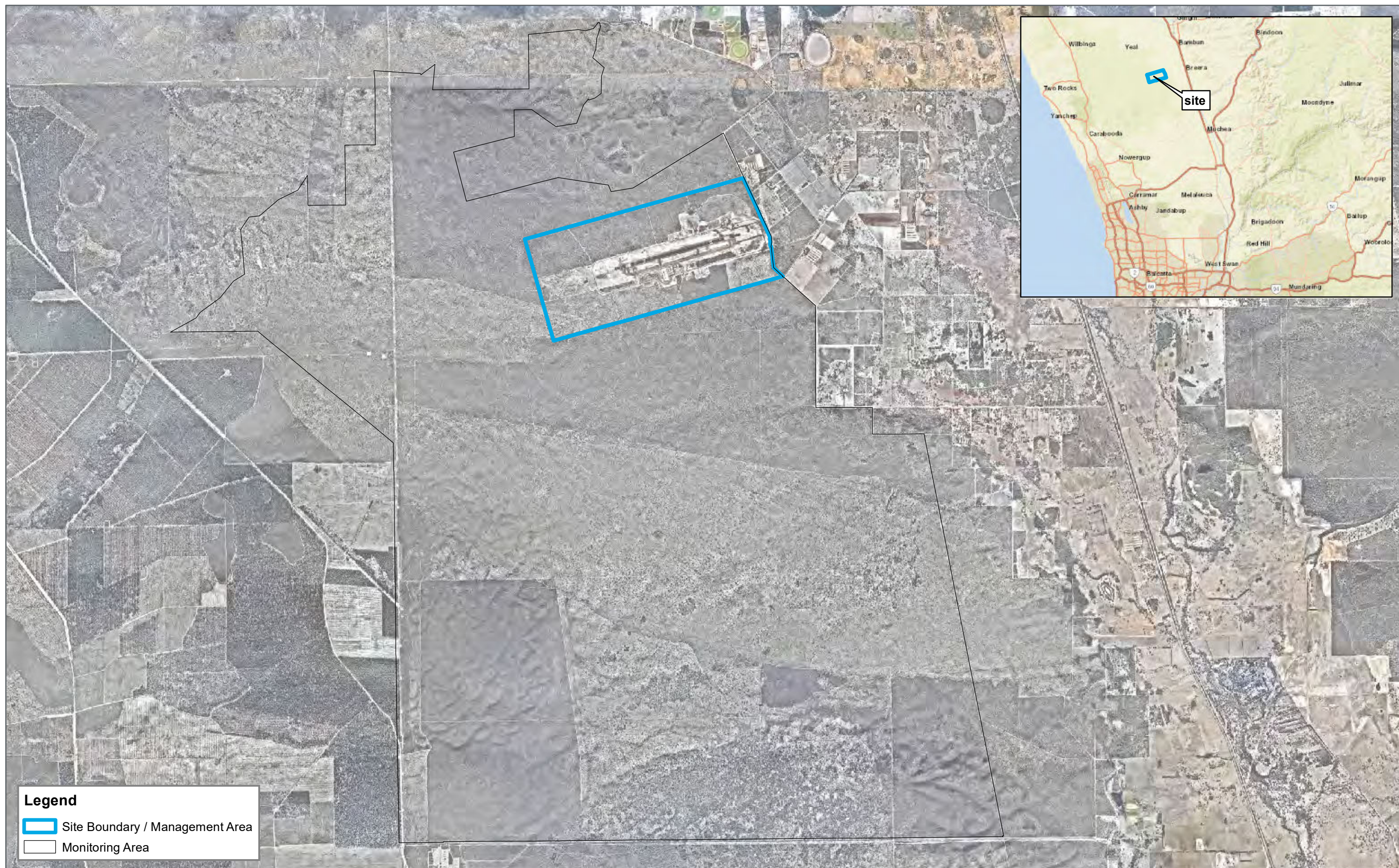
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20. Cardno, December 2020, PFAS OMP, Biannual Monitoring Factual Report – post-winter 2020.
21. Cardno, May 2021, PFAS OMP Quarterly Monitoring Factual Report - January 2021.
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24. Cardno, August 2021, PFAS OMP Quarterly Monitoring Factual Report – July 2021.
25. Cardno, November 2021, PFAS OMP, Biannual Monitoring Factual Report – post-winter 2021.
26. Department of Defence, 2018a, Gingin Satellite Airfield PFAS Ongoing Monitoring Plan.
27. Department of Defence, 2018b, Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan.
28. Jacobs, 2018a, Preliminary Conceptual Site Model - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0001).
29. Jacobs, 2018b, Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0002).
30. Jacobs, 2018c, Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-003).

31. Jacobs, 2018d, Tier 2 Human Health Risk Assessment – Offsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0005).
32. Jacobs, 2018e, Tier 3 Human Health Risk Assessment – Onsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0006).
33. Jacobs, 2019, PFAS Ongoing Groundwater Monitoring Report (No. IS219200-0000-NP-RPT-0008).

APPENDIX

A

FIGURES



Legend

Site Boundary / Management Area

Monitoring Area

FIGURE 1
 1:60,000 Scale at A3

Meters

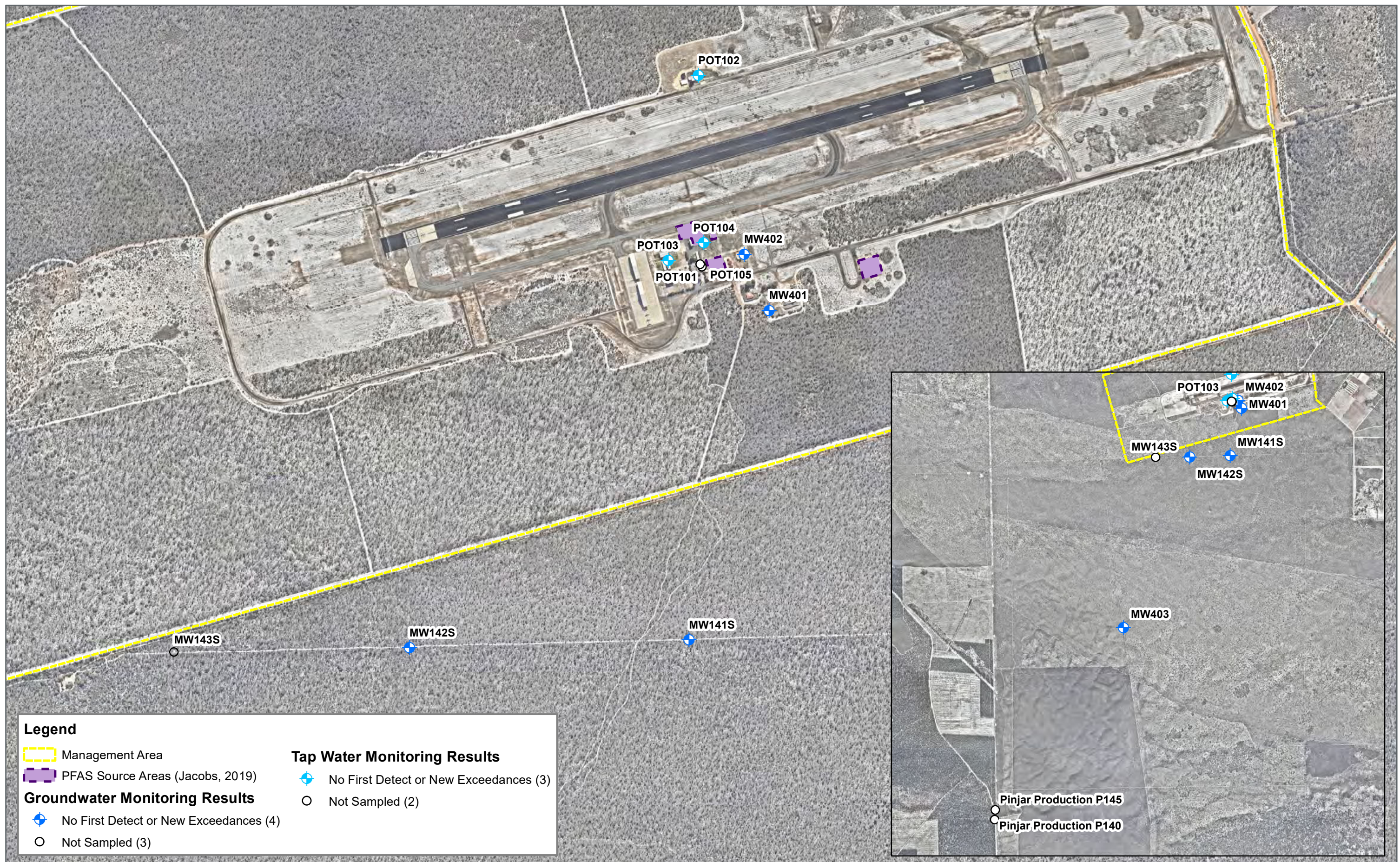
0 1,000 2,000

Site Location

BIANNUAL SAMPLING EVENT
 GINGIN SATELLITE AIRFIELD
 DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
 Date: 2022-02-02 | 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

LOR - Limit of Reporting	PFAS - Perfluoroalkyl Sulfonic Acids											
	Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorononanesulfonic acid (PFNS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01
PFAS NEMP 2020 Drinking Water												
PFAS NEMP 2020 Recreational Water												

Location Code	Date	Field ID	Sample Type	Lab Name	Lab Report No.												
MW141S	20/01/2022	0958_MW141S_220120	Normal	ALSE-Perth	EP2200662		0.11	0.10	0.94	0.07	0.58		<0.02	<0.1	0.04	0.25	0.03
MW142S	20/01/2022	0958_MW142S_220120	Normal	ALSE-Perth	EP2200662		<0.02	<0.02	<0.01	<0.02	<0.01		<0.02	<0.1	<0.02	<0.02	<0.02
MW401	19/01/2022	0958_MW401_220119	Normal	ALSE-Perth	EP2200662		<0.02	<0.02	<0.01	<0.02	<0.01		<0.02	<0.1	<0.02	<0.02	<0.02
MW402	19/01/2022	0958_MW402_220119	Normal	ALSE-Perth	EP2200662		0.09	0.08	0.67	0.05	0.40		<0.02	<0.1	0.02	0.16	0.02
MW403	20/01/2022	0958_MW403_220120	Normal	ALSE-Perth	EP2200662		<0.02	<0.02	<0.01	<0.02	<0.01		<0.02	<0.1	<0.02	<0.02	<0.02
MW403	20/01/2022	0958_QC102_220120	Field Duplicate	ALSE-Perth	EP2200662		<0.02	<0.02	<0.01	<0.02	<0.01		<0.02	<0.1	<0.02	<0.02	<0.02
MW403	20/01/2022	0958_QC202_220120	Interlab Duplicate	MGT	857293	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01
POT102	19/01/2022	0958_POT102_220119	Normal	ALSE-Perth	EP2200662		0.10	0.09	0.68	0.05	0.38		<0.02	<0.1	0.05	0.25	0.02
POT103	19/01/2022	0958_POT103_220119	Normal	ALSE-Perth	EP2200662		0.12	0.09	0.67	0.04	0.39		<0.02	<0.1	0.04	0.21	0.02
POT104	19/01/2022	0958_POT104_220119	Normal	ALSE-Perth	EP2200662		0.11	0.09	0.77	0.06	0.45		<0.02	<0.1	0.03	0.21	0.02
POT104	19/01/2022	0958_QC101_220119	Field Duplicate	ALSE-Perth	EP2200662		0.11	0.09	0.78	0.06	0.46		<0.02	<0.1	0.03	0.21	0.02
POT104	19/01/2022	0958_QC201_220119	Interlab Duplicate	MGT	857293	0.02	<0.01	0.07	0.61	0.06	0.45	<0.01	<0.01	<0.05	0.02	0.14	0.02
	19/01/2022	0958_QC301_220119	Rinsate	ALSE-Perth	EP2200662		<0.02	<0.02	<0.01	<0.02	<0.01		<0.02	<0.1	<0.02	<0.02	<0.02
	19/01/2022	0958_QC401_220119	Field Blank	ALSE-Perth	EP2200662		<0.02	<0.02	<0.01	<0.02	<0.01		<0.02	<0.1	<0.02	<0.02	<0.02
	20/01/2022	0958_QC302_220120	Rinsate	ALSE-Perth	EP2200662		<0.02	<0.02	<0.01	<0.02	<0.01		<0.02	<0.1	<0.02	<0.02	<0.02
	20/01/2022	0958_QC402_220120	Field Blank	ALSE-Perth	EP2200662		<0.02	<0.02	<0.01	<0.02	<0.01		<0.02	<0.1	<0.02	<0.02	<0.02

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 PFHxS+PFOS
New exceedance of guideline

	PFAS - Perfluoroalkyl Carboxylic Acids							PFAS - (n:2) Fluorotelomer Sulfonic Acids				PFAS - Perfluoroalkyl Sulfonamides								PFAS		
	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)	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	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	0.01	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	0.56																		0.07			
PFAS NEMP 2020 Recreational Water	10																		2			

Location Code	Date	Field ID																					
MW141S	20/01/2022	0958_MW141S_220120	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.52	2.00	2.17
MW142S	20/01/2022	0958_MW142S_220120	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<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	19/01/2022	0958_MW401_220119	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<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
MW402	19/01/2022	0958_MW402_220119	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.07	1.40	1.53
MW403	20/01/2022	0958_MW403_220120	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<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
MW403	20/01/2022	0958_QC102_220120	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<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
MW403	20/01/2022	0958_QC202_220120	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<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
POT102	19/01/2022	0958_POT102_220119	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.06	1.52	1.66
POT103	19/01/2022	0958_POT103_220119	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.06	1.49	1.62
POT104	19/01/2022	0958_POT104_220119	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.22	1.64	1.79
POT104	19/01/2022	0958_QC101_220119	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.24	1.66	1.81
POT104	19/01/2022	0958_QC201_220119	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.06	1.24	1.39
	19/01/2022	0958_QC301_220119	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<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
	19/01/2022	0958_QC401_220119	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<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
	20/01/2022	0958_QC302_220120	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<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
	20/01/2022	0958_QC402_220120	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<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

Notes
First time detect of PFOA or PFHxS+PFOS
New exceedance of guideline



Table 2: Relative Percentage Difference

		Date		19/01/2022		19/01/2022		19/01/2022		19/01/2022		20/01/2022		20/01/2022		20/01/2022		20/01/2022	
Field ID		0958_POT104_220119		0958_QC101_220119		0958_POT104_220119		0958_QC201_220119		0958_MW403_220120		0958_QC102_220120		0958_MW403_220120		0958_QC202_220120			
Matrix Type		Water		Water		Water		Water		Water		Water		Water		Water			
Lab Report Number		EP2200662		EP2200662		EP2200662		857293		EP2200662		EP2200662		EP2200662		857293			
	Unit	LOR																	
PFAS - Perfluoroalkyl Sulfonic Acids																			
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01					0.02									<0.01			
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	0.11	0.11	0	0.11	<0.01	167	<0.02	<0.02	0	<0.02	<0.01	<0.01	0				
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	0.09	0.09	0	0.09	0.07	25	<0.02	<0.02	0	<0.02	<0.01	<0.01	0				
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.77	0.78	1	0.77	0.61	23	<0.01	<0.01	0	<0.01	<0.01	<0.01	0				
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	0.06	0.06	0	0.06	0.06	0	<0.02	<0.02	0	<0.02	<0.01	<0.01	0				
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.45	0.46	2	0.45	0.45	0	<0.01	<0.01	0	<0.01	<0.01	<0.01	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	<0.01	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	<0.05	0				
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	0.03	0.03	0	0.03	0.02	40	<0.02	<0.02	0	<0.02	<0.01	<0.01	0				
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	0.21	0.21	0	0.21	0.14	40	<0.02	<0.02	0	<0.02	<0.01	<0.01	0				
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	0.02	0.02	0	0.02	0.02	0	<0.02	<0.02	0	<0.02	<0.01	<0.01	0				
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.05	0.05	0	0.05	<0.01	133	<0.01	<0.01	0	<0.01	<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	<0.01	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	<0.01	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	<0.01	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	<0.01	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	<0.01	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	<0.01	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	<0.01	0				
6:2 Fluorotelomersulfonic 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	<0.05	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	<0.01	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	<0.01	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	<0.05	0				
N-Methylperfluorooctane 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	<0.05	0				
N-Methylperfluorooctane 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	<0.05	0				
N-methylperfluorooctane 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	<0.05	0				
N-Ethylperfluorooctane 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	<0.05	0				
N-Ethylperfluorooctane 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	<0.05	0				
N-Ethylperfluorooctane 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	<0.05	0				
PFAS																			
Sum of PFHxS and PFOS	µg/L	0.01	1.22	1.24	2	1.22	1.06	14	<0.01	<0.01	0	<0.01	<0.01	<0.01	0				
Sum of PFAS (WA DER Ltd)	µg/L	0.01	1.64	1.66	1	1.64	1.24	28	<0.01	<0.01	0	<0.01	<0.01	<0.01	0				
Sum of PFAS	µg/L	0.01	1.79	1.81	1	1.79	1.39	25	<0.01	<0.01	0	<0.01	<0.01	<0.01	0				
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01					1.06									<0.01			

LOR: Limit of Reporting
*RPDs have only been considered where a concentration is greater than 1 times the LOR.
**Elevated RPDs are highlighted as per QA/QC 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



CHAIN OF CUSTODY

COC#: 32604

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - PW

ORDER NO: DEF19009/330

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

20/01

1655

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:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Ground Waters Primary WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW402		19/01/2022 09:39 AM	Water	ALS: 3 Non ALS: 0	No	Partial 1/8			
002	0958_POT104		19/01/2022 10:08 AM	Water	ALS: 3 Non ALS: 0	No	Partial 1/8			
003	0958_QC101		19/01/2022 10:09 AM	Water	ALS: 3 Non ALS: 0	No	Partial 1/8			
004	0958_POT103		19/01/2022 10:37 AM	Water	ALS: 5 Non ALS: 0	No	Partial 1/8			
005	0958_MW401		19/01/2022 10:39 AM	Water	ALS: 3 Non ALS: 0	No	Partial 1/8			
006	0958_POT102		19/01/2022 10:57 AM	Water	ALS: 3 Non ALS: 0	No	Partial 1/8			
007	0958_QC301		19/01/2022 03:57 PM	Water	ALS: 2 Non ALS: 0	No		X		
008	0958_QC401		19/01/2022 03:58 PM	Water	ALS: 2 Non ALS: 0	No		X		
009	0958_MW403		20/01/2022 12:33 PM	Water	ALS: 3 Non ALS: 0	No	Partial 1/8			

Environmental Division
Perth

Work Order Reference

EP2200662



Telephone : -- 61-8-9406 1301



CHAIN OF CUSTODY

COC#: 32604

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - PW

ORDER NO: DEF19009/330

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

SAMPLER MOBILE:

/ ES2019CARBSD0002

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	Ground Waters Primary WATER	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_QC102		20/01/2022 12:41 PM	Water	ALS: 3 Non ALS: 0	No	Partial 1/8			
011	0958_MW142S		20/01/2022 01:15 PM	Water	ALS: 5 Non ALS: 0	No	Partial 1/8			extra pfas bottles for lab qaqc
012	0958_MW141S		20/01/2022 01:38 PM	Water	ALS: 3 Non ALS: 0	No	Partial 1/8			
013	0958_QC302		20/01/2022 01:41 PM	Water	ALS: 2 Non ALS: 0	No		X		
014	0958_QC402		20/01/2022 01:42 PM	Water	ALS: 2 Non ALS: 0	No		X		

**CHAIN OF CUSTODY**

COC#: 32604

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - PW

ORDER NO: DEF19009/330

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

SAMPLER MOBILE:

/ ES2019CARBSD0002

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	PARTIAL ANALYSIS GROUP NAME	MATRIX	SELECTED ANALYSIS NAME
001	0958_MW402	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
002	0958_POT104	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
003	0958_QC101	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
004	0958_POT103	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
005	0958_MW401	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
006	0958_POT102	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
009	0958_MW403	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
010	0958_QC102	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
011	0958_MW142S	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)
012	0958_MW141S	Ground Waters Primary WATER	Water	- EP231X PFAS - Full Suite (28 analytes)



CHAIN OF CUSTODY

COC#: 32604

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFEASOMP

SITE: DEF19009/Gingin - PW

ORDER NO: DEF19009/330

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW402	Clear Plastic Bottle - Natural	250 mL	00070621097743	Green	No	
001	0958_MW402	HDPE (no PTFE)	20 mL	00350019159342	Grey	No	
001	0958_MW402	HDPE (no PTFE)	20 mL	00350019159229	Grey	No	
002	0958_POT104	HDPE (no PTFE)	20 mL	00350019151099	Grey	No	
002	0958_POT104	HDPE (no PTFE)	20 mL	00350019151178	Grey	No	
002	0958_POT104	Clear Plastic Bottle - Natural	250 mL	00070621200485	Green	No	
003	0958_QC101	Clear Plastic Bottle - Natural	250 mL	00070621200294	Green	No	
003	0958_QC101	HDPE (no PTFE)	20 mL	00350019159364	Grey	No	
003	0958_QC101	HDPE (no PTFE)	20 mL	00350019159498	Grey	No	
004	0958_POT103	Clear Plastic Bottle - Natural	250 mL	00070621097767	Green	No	
004	0958_POT103	HDPE (no PTFE)	20 mL	00350019159231	Grey	No	
004	0958_POT103	HDPE (no PTFE)	20 mL	00350019159351	Grey	No	
004	0958_POT103	HDPE (no PTFE)	20 mL	00350019159504	Grey	No	
004	0958_POT103	HDPE (no PTFE)	20 mL	00352010011150	Grey	No	
005	0958_MW401	Clear Plastic Bottle - Natural	250 mL	00070621200282	Green	No	
005	0958_MW401	HDPE (no PTFE)	20 mL	00350019177375	Grey	No	
005	0958_MW401	HDPE (no PTFE)	20 mL	00350019177399	Grey	No	
006	0958_POT102	Clear Plastic Bottle - Natural	250 mL	00070621097247	Green	No	
006	0958_POT102	HDPE (no PTFE)	20 mL	00352101012378	Grey	No	
006	0958_POT102	HDPE (no PTFE)	20 mL	00352010010884	Grey	No	
007	0958_QC301	HDPE (no PTFE)	20 mL	00350019041272	Grey	No	
007	0958_QC301	HDPE (no PTFE)	20 mL	00350019041085	Grey	No	
008	0958_QC401	HDPE (no PTFE)	20 mL	00352010040310	Grey	No	
008	0958_QC401	HDPE (no PTFE)	20 mL	00352010040493	Grey	No	
009	0958_MW403	Clear Plastic Bottle - Natural	250 mL	00070621200498	Green	No	
009	0958_MW403	HDPE (no PTFE)	20 mL	00352101061736	Grey	No	



CHAIN OF CUSTODY

COC#: 32604

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - PW

ORDER NO: DEF19009/330

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

009	0958_MW403	HDPE (no PTFE)	20 mL	00352101061696	Grey	No	
010	0958_QC102	Clear Plastic Bottle - Natural	250 mL	00070621199625	Green	No	
010	0958_QC102	HDPE (no PTFE)	20 mL	00352101061604	Grey	No	
010	0958_QC102	HDPE (no PTFE)	20 mL	00352101061654	Grey	No	
011	0958_MW142S	Clear Plastic Bottle - Natural	250 mL	00070621097779	Green	No	
011	0958_MW142S	HDPE (no PTFE)	20 mL	00350019177468	Grey	No	
011	0958_MW142S	HDPE (no PTFE)	20 mL	00352010040407	Grey	No	
011	0958_MW142S	HDPE (no PTFE)	20 mL	00352010040445	Grey	No	
011	0958_MW142S	HDPE (no PTFE)	20 mL	00350019177579	Grey	No	
012	0958_MW141S	HDPE (no PTFE)	20 mL	00352101061690	Grey	No	
012	0958_MW141S	HDPE (no PTFE)	20 mL	00352101061824	Grey	No	
012	0958_MW141S	Clear Plastic Bottle - Natural	250 mL	00070621200488	Green	No	
013	0958_QC302	HDPE (no PTFE)	20 mL	00350019159392	Grey	No	
013	0958_QC302	HDPE (no PTFE)	20 mL	00350019159363	Grey	No	
014	0958_QC402	HDPE (no PTFE)	20 mL	00350019159362	Grey	No	
014	0958_QC402	HDPE (no PTFE)	20 mL	00350019159369	Grey	No	

Total Bottle Count: ALS: 42, Non ALS: 0

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2200662

<p>Client : CARDNO (WA) PTY LTD</p> <p>Contact : [REDACTED]</p> <p>Address : 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006</p> <p>E-mail : [REDACTED]</p> <p>Telephone : ----</p> <p>Facsimile : ----</p> <p>Project : WA_0958_PFASOMP</p> <p>Order number : DEF19009/330</p> <p>C-O-C number : 32604</p> <p>Site : DEF19009/Gingin</p> <p>Sampler : [REDACTED] [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : [REDACTED]</p> <p>Address : 26 Rigali Way Wangara WA 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 : ES2019CARBSD0002 (SY/139/19)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

Date Samples Received : 20-Jan-2022 16:55	Issue Date : 21-Jan-2022
Client Requested Due Date : 02-Feb-2022	Scheduled Reporting Date : 02-Feb-2022

Delivery Details

Mode of Delivery : Carrier	Security Seal : Intact.
No. of coolers/boxes : 1	Temperature : 12.1 - Ice present
Receipt Detail :	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
- 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.
- **PFAS analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911.**
- **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)
EP2200662-001	19-Jan-2022 09:39	0958_MW402_220119	✓
EP2200662-002	19-Jan-2022 10:08	0958_POT104_220119	✓
EP2200662-003	19-Jan-2022 10:09	0958_QC101_220119	✓
EP2200662-004	19-Jan-2022 10:37	0958_POT103_220119	✓
EP2200662-005	19-Jan-2022 10:39	0958_MW401_220119	✓
EP2200662-006	19-Jan-2022 10:57	0958_POT102_220119	✓
EP2200662-007	19-Jan-2022 15:57	0958_QC301_220119	✓
EP2200662-008	19-Jan-2022 15:58	0958_QC401_220119	✓
EP2200662-009	20-Jan-2022 12:33	0958_MW403_220120	✓
EP2200662-010	20-Jan-2022 12:41	0958_QC102_220120	✓
EP2200662-011	20-Jan-2022 13:15	0958_MW142S_220120	✓
EP2200662-012	20-Jan-2022 13:38	0958_MW141S_220120	✓
EP2200662-013	20-Jan-2022 13:41	0958_QC302_220120	✓
EP2200662-014	20-Jan-2022 13:42	0958_QC402_220120	✓

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

- *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

Perth

- A4 - AU Tax Invoice (INV)

Email

perth@cardno.com.au



Environmental

CERTIFICATE OF ANALYSIS

Work Order : **EP2200662**
Client : **CARDNO (WA) PTY LTD**
Contact : **[REDACTED]**
Address : **11 HARVEST TERRACE PO BOX 155
WEST PERTH WA, AUSTRALIA 6006**
Telephone : **----**
Project : **WA_0958_PFASOMP**
Order number : **DEF19009/330**
C-O-C number : **32604**
Sampler : **[REDACTED] [REDACTED]**
Site : **DEF19009/Gingin**
Quote number : **SY/139/19**
No. of samples received : **14**
No. of samples analysed : **14**

Page : 1 of 9
Laboratory : Environmental Division Perth
Contact : **[REDACTED]**
Address : **26 Rigali Way Wangara WA Australia 6065**
Telephone : **[REDACTED]**
Date Samples Received : **20-Jan-2022 16:55**
Date Analysis Commenced : **25-Jan-2022**
Issue Date : **02-Feb-2022 10:15**



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 Contact 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_MW402_220119	0958_MW403_220120	0958_QC102_220120	0958_MW142S_220120	0958_MW141S_220120
Sampling date / time				19-Jan-2022 09:39	20-Jan-2022 12:33	20-Jan-2022 12:41	20-Jan-2022 13:15	20-Jan-2022 13:38
Compound	CAS Number	LOR	Unit	EP2200662-001	EP2200662-009	EP2200662-010	EP2200662-011	EP2200662-012
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.09	<0.02	<0.02	<0.02	0.11
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.08	<0.02	<0.02	<0.02	0.10
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.67	<0.01	<0.01	<0.01	0.94
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.05	<0.02	<0.02	<0.02	0.07
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.40	<0.01	<0.01	<0.01	0.58
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	0.04
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.16	<0.02	<0.02	<0.02	0.25
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.02	<0.02	<0.02	<0.02	0.03
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.04	<0.01	<0.01	<0.01	0.05
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_MW402_220119	0958_MW403_220120	0958_QC102_220120	0958_MW142S_220120	0958_MW141S_220120
Sampling date / time				19-Jan-2022 09:39	20-Jan-2022 12:33	20-Jan-2022 12:41	20-Jan-2022 13:15	20-Jan-2022 13:38
Compound	CAS Number	LOR	Unit	EP2200662-001	EP2200662-009	EP2200662-010	EP2200662-011	EP2200662-012
				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	1.53	<0.01	<0.01	<0.01	2.17
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.07	<0.01	<0.01	<0.01	1.52
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.40	<0.01	<0.01	<0.01	2.00
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	116	107	119	115	110
13C8-PFOA	----	0.02	%	102	101	102	103	102



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0958_QC301_220119	0958_QC401_220119	0958_QC302_220120	0958_QC402_220120	----
Sampling date / time				19-Jan-2022 15:57	19-Jan-2022 15:58	20-Jan-2022 13:41	20-Jan-2022 13:42	----	
Compound	CAS Number	LOR	Unit	EP2200662-007	EP2200662-008	EP2200662-013	EP2200662-014	-----	
				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_220119	0958_QC401_220119	0958_QC302_220120	0958_QC402_220120	----
Sampling date / time					19-Jan-2022 15:57	19-Jan-2022 15:58	20-Jan-2022 13:41	20-Jan-2022 13:42	----
Compound	CAS Number	LOR	Unit		EP2200662-007	EP2200662-008	EP2200662-013	EP2200662-014	-----
				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		<0.01	<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	%		114	113	109	106	----
13C8-PFOA	----	0.02	%		103	103	98.4	101	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				0958_POT104_22011 9	0958_QC101_220119	0958_POT103_22011 9	0958_MW401_220119	0958_POT102_22011 9
Sampling date / time				19-Jan-2022 10:08	19-Jan-2022 10:09	19-Jan-2022 10:37	19-Jan-2022 10:39	19-Jan-2022 10:57
Compound	CAS Number	LOR	Unit	EP2200662-002	EP2200662-003	EP2200662-004	EP2200662-005	EP2200662-006
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.11	0.11	0.12	<0.02	0.10
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.09	0.09	0.09	<0.02	0.09
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.77	0.78	0.67	<0.01	0.68
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.06	0.06	0.04	<0.02	0.05
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.45	0.46	0.39	<0.01	0.38
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	0.03	0.04	<0.02	0.05
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.21	0.21	0.21	<0.02	0.25
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	0.05	0.05	0.04	<0.01	0.04
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: WATER
 (Matrix: WATER)

Sample ID

				0958_POT104_22011 9	0958_QC101_220119	0958_POT103_22011 9	0958_MW401_220119	0958_POT102_22011 9
Sampling date / time				19-Jan-2022 10:08	19-Jan-2022 10:09	19-Jan-2022 10:37	19-Jan-2022 10:39	19-Jan-2022 10:57
Compound	CAS Number	LOR	Unit	EP2200662-002	EP2200662-003	EP2200662-004	EP2200662-005	EP2200662-006
				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	1.79	1.81	1.62	<0.01	1.66
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.22	1.24	1.06	<0.01	1.06
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.64	1.66	1.49	<0.01	1.52
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	113	111	115	109	111
13C8-PFOA	----	0.02	%	107	106	102	106	100



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	: EP2200662	Page	: 1 of 7
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: 11 HARVEST TERRACE PO BOX 155 WEST PERTH WA, AUSTRALIA 6006	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 20-Jan-2022
Order number	: DEF19009/330	Date Analysis Commenced	: 25-Jan-2022
C-O-C number	: 32604	Issue Date	: 02-Feb-2022
Sampler	: [REDACTED]		
Site	: DEF19009/Gingin		
Quote number	: SY/139/19		
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.

<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: 4143306)									
EP2200662-011	0958_MW142S_220120	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: 4143306)									
EP2200662-011	0958_MW142S_220120	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: 4143306)									
EP2200662-011	0958_MW142S_220120	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

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 Work Order : EP2200662
 Client : CARDNO (WA) 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: 4143306) - continued									
EP2200662-011	0958_MW142S_220120	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: 4143306)									
EP2200662-011	0958_MW142S_220120	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: 4143306)									
EP2200662-011	0958_MW142S_220120	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 (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4143306)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	92.6	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	85.8	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	88.8	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	84.4	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	84.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	77.0	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4144541)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	92.6	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	78.8	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	85.2	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	78.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	80.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	81.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4143306)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	84.8	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	89.2	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	110	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	91.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	84.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	91.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	96.2	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	84.6	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	95.3	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4144541)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	90.3	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	93.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	111	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	92.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	85.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	96.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.8	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: 4144541) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	93.0	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	0.625 µg/L	110	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4143306)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	89.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	83.8	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	95.8	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	88.3	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	93.0	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	86.2	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	90.8	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4144541)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	92.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	82.1	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	83.1	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	98.6	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	96.8	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	86.8	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	82.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4143306)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	88.0	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	81.8	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	88.2	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	99.2	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4144541)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	81.4	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	77.8	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	92.0	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	96.8	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: 4143306)							
EP2200662-004	0958_POT103_220119	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	94.0	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	82.2	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	115	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	130	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	90.0	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4143306)							
EP2200662-004	0958_POT103_220119	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	86.2	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	107	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	98.2	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	101	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	90.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	100	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	87.2	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	98.2	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTeDA)	72629-94-8	0.25 µg/L	91.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	105	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4143306)							
EP2200662-004	0958_POT103_220119	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	99.2	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	103	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	92.8	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	98.4	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	88.4	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	98.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4143306)							
EP2200662-004	0958_POT103_220119	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	95.6	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	90.0	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: 4143306) - continued							
EP2200662-004	0958_POT103_220119	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	91.0	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	93.0	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2200662	Page	: 1 of 5
Client	: CARDNO (WA) PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 20-Jan-2022
Site	: DEF19009/Gingin	Issue Date	: 02-Feb-2022
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 14
Order number	: DEF19009/330	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

- 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 Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	36	2.78	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	36	2.78	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_MW402_220119, 0958_QC101_220119, 0958_MW401_220119, 0958_QC301_220119,	0958_POT104_220119, 0958_POT103_220119, 0958_POT102_220119, 0958_QC401_220119	19-Jan-2022	31-Jan-2022	18-Jul-2022	✔	31-Jan-2022	18-Jul-2022	✔
HDPE (no PTFE) (EP231X) 0958_MW403_220120, 0958_MW142S_220120, 0958_QC302_220120,	0958_QC102_220120, 0958_MW141S_220120, 0958_QC402_220120	20-Jan-2022	31-Jan-2022	19-Jul-2022	✔	31-Jan-2022	19-Jul-2022	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0958_MW402_220119, 0958_QC101_220119, 0958_MW401_220119, 0958_QC301_220119,	0958_POT104_220119, 0958_POT103_220119, 0958_POT102_220119, 0958_QC401_220119	19-Jan-2022	31-Jan-2022	18-Jul-2022	✔	31-Jan-2022	18-Jul-2022	✔
HDPE (no PTFE) (EP231X) 0958_MW403_220120, 0958_MW142S_220120, 0958_QC302_220120,	0958_QC102_220120, 0958_MW141S_220120, 0958_QC402_220120	20-Jan-2022	31-Jan-2022	19-Jul-2022	✔	31-Jan-2022	19-Jul-2022	✔



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
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW402_220119, 0958_QC101_220119, 0958_MW401_220119, 0958_QC301_220119,	0958_POT104_220119, 0958_POT103_220119, 0958_POT102_220119, 0958_QC401_220119	19-Jan-2022	31-Jan-2022	18-Jul-2022	✔	31-Jan-2022	18-Jul-2022	✔
HDPE (no PTFE) (EP231X) 0958_MW403_220120, 0958_MW142S_220120, 0958_QC302_220120,	0958_QC102_220120, 0958_MW141S_220120, 0958_QC402_220120	20-Jan-2022	31-Jan-2022	19-Jul-2022	✔	31-Jan-2022	19-Jul-2022	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW402_220119, 0958_QC101_220119, 0958_MW401_220119, 0958_QC301_220119,	0958_POT104_220119, 0958_POT103_220119, 0958_POT102_220119, 0958_QC401_220119	19-Jan-2022	31-Jan-2022	18-Jul-2022	✔	31-Jan-2022	18-Jul-2022	✔
HDPE (no PTFE) (EP231X) 0958_MW403_220120, 0958_MW142S_220120, 0958_QC302_220120,	0958_QC102_220120, 0958_MW141S_220120, 0958_QC402_220120	20-Jan-2022	31-Jan-2022	19-Jul-2022	✔	31-Jan-2022	19-Jul-2022	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW402_220119, 0958_QC101_220119, 0958_MW401_220119, 0958_QC301_220119,	0958_POT104_220119, 0958_POT103_220119, 0958_POT102_220119, 0958_QC401_220119	19-Jan-2022	31-Jan-2022	18-Jul-2022	✔	31-Jan-2022	18-Jul-2022	✔
HDPE (no PTFE) (EP231X) 0958_MW403_220120, 0958_MW142S_220120, 0958_QC302_220120,	0958_QC102_220120, 0958_MW141S_220120, 0958_QC402_220120	20-Jan-2022	31-Jan-2022	19-Jul-2022	✔	31-Jan-2022	19-Jul-2022	✔



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	36	2.78	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	36	2.78	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.

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

Sample Receipt Advice

Company name: Cardno (WA)
Contact name: [REDACTED]
Project name: DEF19009/Gingin
Project ID: WA_0958_PFASOMP
Turnaround time: 5 Day
Date/Time received: Jan 21, 2022 3:57 PM
Eurofins reference: 857293

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 11.9 degrees Celsius.
- ✓ 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 Cardno (WA) email address.



ARL

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Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: DEF19009/Gingin
Project ID: WA_0958_PFASOMP

Order No.: DEF19009/330
Report #: 857293
Phone: [REDACTED]
Fax: [REDACTED]

Received: Jan 21, 2022 3:57 PM
Due: Jan 28, 2022
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Perth Laboratory - NATA # 2377 Site # 2370

Melbourne Laboratory - NATA # 1261 Site # 1254

Sydney Laboratory - NATA # 1261 Site # 18217

Brisbane Laboratory - NATA # 1261 Site # 20794

Mayfield Laboratory - NATA # 1261 Site # 25079

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_220119	Jan 19, 2022		Water	L22-Ja24071	X
2	0958_QC202_220120	Jan 20, 2022		Water	L22-Ja24072	X
Test Counts						2

Cardno Consulting WA
11 Harvest Terrace
West Perth
WA 6005



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 **857293-W**
Project name **DEF19009/Gingin**
Project ID **WA_0958_PFASOMP**
Received Date **Jan 21, 2022**

Client Sample ID			0958_QC201_2 20119	0958_QC202_2 20120
Sample Matrix			Water	Water
Eurofins Sample No.			L22-Ja24071	L22-Ja24072
Date Sampled			Jan 19, 2022	Jan 20, 2022
Test/Reference	LOR	Unit		
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.02	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	^{N09} 0.14	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.02	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
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	%	63	78
13C5-PFPeA (surr.)	1	%	87	96
13C5-PFHxA (surr.)	1	%	100	111
13C4-PFHpA (surr.)	1	%	94	103
13C8-PFOA (surr.)	1	%	110	93
13C5-PFNA (surr.)	1	%	114	116
13C6-PFDA (surr.)	1	%	82	100
13C2-PFUnDA (surr.)	1	%	94	103
13C2-PFDoDA (surr.)	1	%	94	90
13C2-PFTeDA (surr.)	1	%	77	78
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	%	82	96
D3-N-MeFOSA (surr.)	1	%	92	59

Client Sample ID			0958_QC201_2 20119	0958_QC202_2 20120
Sample Matrix			Water	Water
Eurofins Sample No.			L22-Ja24071	L22-Ja24072
Date Sampled			Jan 19, 2022	Jan 20, 2022
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonamido substances				
D5-N-EtFOSA (surr.)	1	%	115	62
D7-N-MeFOSE (surr.)	1	%	59	78
D9-N-EtFOSE (surr.)	1	%	63	64
D5-N-EtFOSAA (surr.)	1	%	66	103
D3-N-MeFOSAA (surr.)	1	%	39	82
Perfluoroalkyl sulfonic acids (PFASs)				
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	0.02	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 0.07	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.61	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.06	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.45	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	112	107
18O2-PFHxS (surr.)	1	%	73	110
13C8-PFOS (surr.)	1	%	94	109
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	%	67	63
13C2-6:2 FTSA (surr.)	1	%	29	75
13C2-8:2 FTSA (surr.)	1	%	49	125
13C2-10:2 FTSA (surr.)	1	%	29	107
PFASs Summations				
Sum (PFHxS + PFOS)*	0.01	ug/L	1.06	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.45	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	1.06	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	1.24	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	1.39	< 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)	Brisbane	Jan 25, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Brisbane	Jan 25, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Brisbane	Jan 25, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Brisbane	Jan 25, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name: Cardno (WA) Address: 11 Harvest Terrace West Perth WA 6005 Project Name: DEF19009/Gingin Project ID: WA_0958_PFASOMP	Order No.: DEF19009/330 Report #: 857293 Phone: [REDACTED] Fax: [REDACTED]	Received: Jan 21, 2022 3:57 PM Due: Jan 28, 2022 Priority: 5 Day Contact Name: [REDACTED]
Eurofins Analytical Services Manager : [REDACTED]		

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs)	
Perth Laboratory - NATA # 2377 Site # 2370							
Melbourne Laboratory - NATA # 1261 Site # 1254							
Sydney Laboratory - NATA # 1261 Site # 18217							
Brisbane Laboratory - NATA # 1261 Site # 20794							X
Mayfield Laboratory - NATA # 1261 Site # 25079							
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	0958_QC201_220119	Jan 19, 2022		Water	L22-Ja24071		X
2	0958_QC202_220120	Jan 20, 2022		Water	L22-Ja24072		X
Test Counts						2	

Internal Quality Control Review and Glossary

General

1. 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.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. 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

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/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 (PFASs)							
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)							
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)	%	79			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	82			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	87			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	76			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	78			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	75			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	87			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	72			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	76			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	140			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	80			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	96			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	87			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	87			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)			%	94			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)			%	80			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	66			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	88			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)									
Perfluorobutanesulfonic acid (PFBS)			%	79			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	91			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	72			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	73			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	78			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	91			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	86			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	77			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	74			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	94			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	89			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	85			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)	S22-Ja24270	NCP	%	84			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	S22-Ja24270	NCP	%	84			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	S22-Ja24270	NCP	%	85			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	S22-Ja24270	NCP	%	70			50-150	Pass	
Perfluorooctanoic acid (PFOA)	S22-Ja24270	NCP	%	70			50-150	Pass	
Perfluorononanoic acid (PFNA)	S22-Ja24270	NCP	%	88			50-150	Pass	
Perfluorodecanoic acid (PFDA)	S22-Ja24270	NCP	%	78			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	S22-Ja24270	NCP	%	72			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	S22-Ja24270	NCP	%	90			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	S22-Ja24270	NCP	%	99			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S22-Ja24270	NCP	%	87			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	S22-Ja24270	NCP	%	87			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	S22-Ja24270	NCP	%	93			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	S22-Ja24270	NCP	%	97			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	S22-Ja24270	NCP	%	98			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	S22-Ja24270	NCP	%	86			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	S22-Ja24270	NCP	%	85			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	S22-Ja24270	NCP	%	98			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	S22-Ja24270	NCP	%	84			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	S22-Ja24270	NCP	%	69			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	S22-Ja24270	NCP	%	78			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	S22-Ja24270	NCP	%	70			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	S22-Ja24270	NCP	%	84			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	S22-Ja24270	NCP	%	105			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	S22-Ja24270	NCP	%	91			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	S22-Ja24270	NCP	%	76			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)	S22-Ja24270	NCP	%	89			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	S22-Ja24270	NCP	%	91			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	S22-Ja24270	NCP	%	92			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	S22-Ja24270	NCP	%	114			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)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	L22-Ja24072	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)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	L22-Ja24072	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L22-Ja24072	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L22-Ja24072	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:



Analytical Services Manager
Senior Analyst-PFAS (QLD)




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



Groundwater and Tap water Field Records

PFAS OMP Quarterly Monitoring Event
Gingin Satellite Airfield

[illegible]

Date	Project ID	Unit Model	Ambient Air	Zero Oxygen	Standard Conc	Ambient Temp	Bump Test
19/01	DEF19009	YSI # 21405325	100% Sat Y	OY. Cal Y	pH 4.0 Y pH 7.0 Y EC 1413 Y	25.1	pH 4.00 = 4.05 pH 7.00 = 7.09 Temp = 25.1 EC = 1425
20/1	DEF19009	YSI # 21405325	Y	Y	pH 4.0 Y pH 7.0 Y EC 1413 Y	23.9	pH 4.00 = 4.07 pH 7.00 = 7.11 Temp = 23.9 EC = 1339

Bump Test with SY.	Test By	Signature
4.00 $\pm$ pH 0.2 Y 7.00 $\pm$ pH 0.2 Y EC $\pm$ 150 μ S/cm Y	A. Gibber	
4.00 $\pm$ pH 0.2 7.00 $\pm$ pH 0.2 EC $\pm$ pH 150 μ S/cm	A. Gibber	

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	✓	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	✓	174.70 mV
	pH slope	✓	55 to 60 mV/pH, ideal 59mV 58.56
	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 8 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	Calibration Point	Units	Instrument Readings				Units
				Before		After		
Temperature	Check Temp NATA		°C	NA		23.0		°C
pH 21G	pH 7.00	7.01	mV	7.12		7.01		pH
pH 21G	pH 4.00	4.00	mV	4.11		4.00		pH
Conductivity (21H100008)	2764 µS/cm at 25°C	2764	5.03	2755		2764		µS/cm
ORP (Reference check only) 21O	Zobell A & B	235	mV	220.01		235.1		mV
Zero DO (21G100131)	NaSO3 in distilled water	0.0	NA	0.1		0.0		%
100% DO (21G100131)	100% Air Saturation	100.0	uA	100		100.0		%

Calibrated by: Andrew Glover

Calibration Date: 19/01/22

APPENDIX

E

DATA QUALITY REVIEW

Data Quality Review PFAS Ongoing Monitoring Plan Q1 2022 Quarterly Monitoring

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 19 to 20 January 2022 and is in accordance with the proposed scope of work, as documented in the SAQP (ref DEF19009_Report04.1_Gingin Satellite Airfield_ OMP PFAS_SAQP) issued to the client and in general compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i> and NEPM “National Environment Protection (Assessment of Site Contamination) Measure”.</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 Q1 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 generally in compliant with required timeframes.	
Background samples	No background samples were collected during the course of the investigation.		
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>		
Data Precision & Accuracy			
QC sample Frequency	QC sample type	SAQP required frequency	Sample Collected
	Blind duplicate	1 in 10 primary samples (10%)	1 for 3 tap water samples (33%) 1 for 5 groundwater samples (20%)
	Split duplicate	1 in 10 primary samples (10%)	1 for 3 tap water samples (33%) 1 for 5 groundwater samples (20%)
	Rinsate	1 per YSI per day	2 for 2 day (100%)
	Field Blank	1 per day	2 for 2 day (100%)

QA/QC Aspects	Evidence & Evaluation								
QC Testing – Blind Replicates (Primary Lab)	<ul style="list-style-type: none"> RPD Acceptance Criteria: <table border="1"> <thead> <tr> <th>Magnitude of Results</th><th>Acceptable RPD range</th></tr> </thead> <tbody> <tr> <td>< 10 x LOR</td><td>No limits</td></tr> <tr> <td>10 – 20 LOR</td><td>0% - 50%</td></tr> <tr> <td>> 20 x LOR</td><td>0% - 20%</td></tr> </tbody> </table> <p>Groundwater</p> <ul style="list-style-type: none"> Primary Groundwater Samples Analysed: 5 Blind Replicate Samples Analysed: 1 <p>All RPDs were within acceptance criteria.</p> <p>Tap water</p> <ul style="list-style-type: none"> Primary tap water Samples Analysed: 3 Blind Replicate Samples Analysed: 1 <p>All RPDs were within acceptance criteria.</p>	Magnitude of Results	Acceptable RPD range	< 10 x LOR	No limits	10 – 20 LOR	0% - 50%	> 20 x LOR	0% - 20%
Magnitude of Results	Acceptable RPD range								
< 10 x LOR	No limits								
10 – 20 LOR	0% - 50%								
> 20 x LOR	0% - 20%								
QC Testing – Field Splits (Secondary Lab)	<ul style="list-style-type: none"> RPD Acceptance Criteria: <table border="1"> <thead> <tr> <th>Magnitude of Results</th><th>Acceptable RPD range</th></tr> </thead> <tbody> <tr> <td>< 10 x LOR</td><td>No limits</td></tr> <tr> <td>10 – 20 LOR</td><td>0% - 50%</td></tr> <tr> <td>> 20 x LOR</td><td>0% - 20%</td></tr> </tbody> </table> <p>Groundwater</p> <ul style="list-style-type: none"> Primary Groundwater Samples Analysed: 5 Blind Replicate Samples Analysed: 1 <p>All RPDs were within acceptance criteria.</p> <p>Tap water</p> <ul style="list-style-type: none"> Primary tap water Samples Analysed: 3 Blind Replicate Samples Analysed: 1 <p>All RPDs were within acceptance criteria with the exception of QC sample QC201 which reported the following RPD exceedances:</p> <ul style="list-style-type: none"> PFHxS (23%) Sum of PFAS (WA DER List) (28%) Sum of PFAS (25%) <p>These relatively minor exceedances are likely due to the difference of laboratory methods or the low concentrations of analytes under review. This is not considered to have impacted the reliability of the dataset.</p>	Magnitude of Results	Acceptable RPD range	< 10 x LOR	No limits	10 – 20 LOR	0% - 50%	> 20 x LOR	0% - 20%
Magnitude of Results	Acceptable RPD range								
< 10 x LOR	No limits								
10 – 20 LOR	0% - 50%								
> 20 x LOR	0% - 20%								
Field Blanks	Field Blanks were collected at a rate of one per fieldwork 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, laboratory control samples and laboratory duplicates.</p> <p>The following Quality Control sample frequency non-conformance was reported:</p> <ul style="list-style-type: none"> EP2108063 <ul style="list-style-type: none"> Laboratory duplicate (PFAS): expected rate: 10%, actual: 2.78%. Matrix Spike (PFAS): expected rate: 5%, actual: 2.78%. <p>No Method Blank value outliers were 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 Accreditation No. 1261</p>								

QA/QC Aspects	Evidence & Evaluation
Calibration of Field Equipment	All equipment used during the investigation was calibrated by the supplier prior to use. The equipment calibration certificates are provided in Appendix D.
Decontamination and Equipment Blanks	Rinsate blanks were collected at a rate of one per day when reusable equipment (water quality meter) 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 investigation is considered valid and complete.

APPENDIX

F

INFORMATION ABOUT ENVIRONMENTAL REPORTS

About Site Environmental Assessment Reports

1. Introduction

This document explains the Environmental Site Assessment (ESA) process and the context that applies to the use of Environmental Reports issued by Cardno.

2. What is an ESA?

Environmental Site Assessments (ESA) are undertaken for a range of purposes, specific to the brief issued by the client in each case. The scope may include one or a combination of any of the following:

- ☐ A factual report of the condition of a portion of the site or one aspect of an entire site.
- ☐ Assessment of the contamination levels in soil to be removed from a site – a waste classification assessment.
- ☐ Validation of the success of remediation of a site or a portion of a site.
- ☐ Provision of a professional opinion about the suitability of a site for one or more uses, in terms of its contamination status.

The scope of any ESA needs to be defined at the outset.

An ESA is not an Environmental Audit. Such audits are undertaken in accordance with the provisions of regulations enacted in various states of Australia, and are referred to as Site Audits in some jurisdictions. Statutory audits provide certification by EPA accredited auditors that a site is suitable for one or more uses. An ESA may provide similar advice but cannot be used in place of an audit if the latter is required by regulation in any instance. However in some circumstances and jurisdictions an ESA is sufficient to provide “environmental sign-off” of a site.

An ESA may be undertaken for due diligence purposes, to establish whether the site has been impacted to the extent that some beneficial uses of the site may be precluded. Due diligence audits in many cases may be completed as non-statutory Audits, although in some jurisdictions they can also be statutory audits, if defined as such at the outset.

3. The ESA Process

The Client generally initiates the ESA process by specifying a brief which identifies the specific objectives of the assessment. If not, it is the consultants’ duty to so specify the ESA

In the case of an ESA to provide an opinion about the suitability of the site for use, it would be conducted in accordance with NEPM (Site Assessment). Such ESA would not commence until a thorough site history assessment (Phase 1 Assessment: to identify the potential for significant contamination at a site) is conducted. However, where the history is unclear, a broad screening of chemical parameters can be used to test environmental media. This normally includes a broad range of organic and inorganic compounds and elements, often referred to as an Environmental Screen.

(In the case of an ESA for a purpose other than to provide an opinion about the suitability of the site for use, it is not always necessary to undertake a Phase 1 assessment.)

The ESA requires sampling of soil at representative locations across the site. A NATA accredited laboratory performs the analysis of soil. It is impractical for all of the soil to be assessed. The ESA is often based on a statistical method of grid or random sampling, augmented by targeted sampling at locations known or suspected to be contaminated. Guidance on sampling strategy and density is provided in Australian Standard AS4482.1–2005. However, some considerable degree of judgement is still required in the application of any sampling and testing strategy. For example the blanket application of the “hot spot” method presented in this standard is often inappropriate given its limitations.

The field program also investigates the likelihood of contamination below the site surface. Field investigations must sample and test fill as well as the natural soils. If contamination is found then it is common for further work to be undertaken to characterise, to the extent practical, its vertical and horizontal extent. However, where fill is encountered and testing shows it to be uncontaminated, it must be realised that the heterogeneous nature of the material might mean that not all pockets of contaminated material can be detected using normal sampling regimes.

EPA guidelines for auditors, that may be relevant for an ESA, indicate the need in all cases to consider the potential for groundwater contamination in any site. This does not mean all sites need to be drilled to sample groundwater, but it is most often the case. Most hydrogeological settings and groundwater conditions are complex and vary in space and time. The condition of groundwater is investigated to identify if any beneficial use or environmental value of groundwater is precluded due to contamination.

As previously stated for soil, all groundwater at the site cannot be tested. The environmental investigations are conducted in accordance with industry standards and guidelines (e.g. EPA Vic Pub 668). This provides a level of confidence that a sufficiently comprehensive assessment of the groundwater at the site is achieved.

Where an investigation shows that groundwater is polluted, consideration should be given to assessing the risks and the need for and practicality of any clean up.

4. Environmental Assessment Report

The ESA Report details the findings of the ESA. It provides summary information on the site definition, the reasons for the assessment and other relevant facts. It reviews the scope and quality of the site investigations, laboratory testing and data analyses undertaken. These reports also present a review of the contamination status of the site, the need for any further clean up, and an opinion on the suitability of the site for a range of beneficial uses and land uses such as “residential – low density”, “commercial” etc, as appropriate.

However, as noted above, some ESA have a narrow scope such as for classification of waste soil for removal from site, and do not make conclusions on suitability of site for use.

The ESA Report generally includes copies of other documents and reports, necessary to support the assessment findings, presented as appendices. These can contain more detailed information than the body of the ESA Report. Care should be taken to also read the appended documents and the ESA report in full.

Cardno generally issues reports in electronic form (e-Report) on CD ROM. ESA Reports are issued in this format as Adobe Acrobat™ PDF files. However, a paper copy of the executive summary of the ESA Report is generally issued to the client, and others as required by the brief or by regulation.

5. Limitations of Environmental Assessment Report

The ESA Report is prepared in a manner that can be easily read by a lay person with a legitimate interest in the contamination status of the site, such as the site owner or occupier, EPA and Local Planning Authority. The ESA report is not intended for use by other parties or for other purposes. Anyone who uses the assessment report for purposes other than specified in the report, does so at their own risk.

The site should only be used for one or more of the beneficial uses and land uses identified in the ESA as suitable.

The conditions and qualifications may apply to the suitability of the site for use, and it is the responsibility of the Client to be cognizant of and accept these in accepting the report. Cardno are only responsible for the issuing of the ESA report but accepts no liability for the costs incurred in the implementation of ESA findings.

The ESA provides a “snapshot” of the site conditions at the time of the site investigation. Consequently, the report may not be valid at a later time if there has been any change to the contamination status of the site in that time. Verification of the status of the site may be required in cases where a significant time has elapsed, or site conditions have changed since the assessment and audit.

The ESA is necessarily limited by constraints such as time, cost and available information; although normal professional practice at the time has been applied with all due care to prepare the report. A necessary requirement of this process is the horizontal and vertical interpolation of data from discrete locations. However, site conditions are generally not homogenous and some discrepancies will occur between the actual and predicted results at locations not directly sampled. There is a risk that contamination may occur at the site and not be identified by a competent investigation and assessment. The approach adopted in sampling (a combination of statistically based grid and judgmental sampling) seeks to reduce, but cannot eliminate, this risk.

Where unexpected occurrences of contamination arise, subsequent to the issue of the ESA Report, Cardno should be permitted to make an interpretation of these facts in relation to the ESA Report findings. Consequently, the Client should inform Cardno and seek their opinion. Cardno accepts no liability for costs incurred due to such

unexpected occurrences, given the inherent uncertainties in the assessment process.

Cardno uses information provided by other parties as the basis for the ESA, and reliance on this information is at the discretion of Cardno. However, however Cardno cannot guarantee any of the facts, findings or conclusions presented by other parties. Cardno will not be liable for the use of information, provided by others that is subsequently found to be intentionally misleading.

The ESA Report is not and does not purport to be anything other than a contaminated land ESA. It is not a geotechnical report and bore logs reproduced are for interpretation of the likely distribution of contamination. They are not intended for geotechnical interpretations and may not be adequate for this purpose.

The ESA Report is not intended to be a comprehensive analysis of the presence and associated risk of asbestos in buildings and services. Where asbestos in buildings and services is known or likely, the report may only caution that an appropriately qualified person be engaged to undertake demolition to avoid contamination of the site.

Cardno

13 August 2015

PFAS OMP Biannual Sampling Event Factual Report

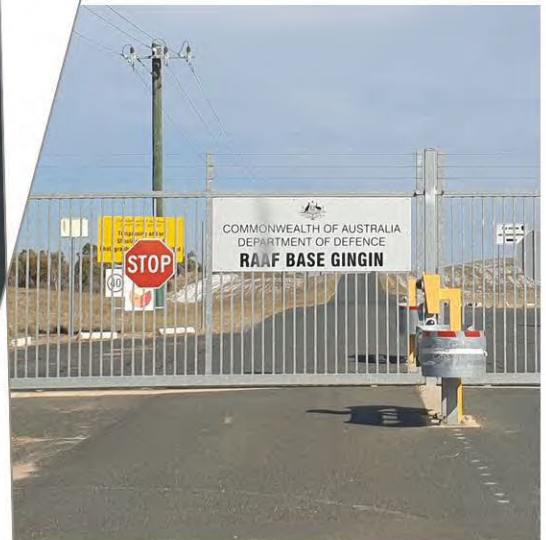
Post-Summer 2022

Gingin Satellite Airfield

DEF19009

Prepared for
Department of Defence

8 August 2022



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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
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
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 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 the following changes were made:

- > Redundant tap water monitoring locations POT101 and POT105 were removed from the sampling plan.

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-summer 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 Sites¹.
- > 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
On-Site – Source Areas	Former fuel farm (SA01) - 0958_MW112S, 0958_MW113S, 0958_MW101I, 0958_MW102D, 0958_MW301, 0958_MW302, 0958_MW303.
	Fire house and Refuelling area (SA02) - 0958_MW504, 0958_MW104I, 0958_MW105D, 0958_MW304, 0958_MW305, 0958_MW306.
	Powerhouse (SA03) - 0958_MW307, 0958_MW308, 0958_MW309, 0958_MW310.
	Landfills - 0958_MW106S, 0958_MW107S, 0958_MW108S, 0958_MW109S, 0958_MW110S.
On-Site – secondary sources	Sewage system and leach field (SA04) : 0958_MW114S
	Site Drainage - 0958_MW115S
	Water Supply Infrastructure – 0958_MW505, 0958_MW312, 0958_MW313, 0958_MW111S
	Abstraction bore 1 - 0958_MW401
On-site - other	Abstraction bore 2 – 0958_MW402
	Airside perimeter – 0958_MW116S, 0958_MW117I, 0958_MW118D, 0958_MW119S, 0958_MW120I, 0958_MW121D, 0958_MW122S, 0958_MW123I, 0958_MW124D
	Site boundary – 0958_MW125S, 0958_MW126I, 0958_MW128S, 0958_MW129I, 0958_MW130D, 0958_MW131D, 0958_MW132I, 0958_MW133D, 0958_MW134D, 0958_MW135I, 0958_MW136D, 0958_MW138S, 0958_MW139I, 0958_MW140D
Off-Site	Background - 0958_MW137S
	Water Corporation Production bores ⁽¹⁾ : Pinjar Production P140, Pinjar Production P145
	Public land ⁽²⁾ : 0958_MW143S, 0958_MW142S, 0958_MW141S, 0958_MW403

Note: (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)

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.

2.2 Tap Water Monitoring

Water samples were collected from the tap water monitoring locations listed in Table 2-2 in accordance with the SAQP (Cardno, 2021) 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
On-Site	0958_POT102; 0958_POT103; 0958_POT104.

2.3 Data Management

All the data included in the 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 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.
MW111S		This well was found dry. The impact on the OMP is moderate as this location is quite isolated. However, a large number of wells are monitored within the nearby source areas.
MW134D		This well was found dry. Impact on the OMP is limited as two other adjacent wells (including deep well MW136D) were sampled.
MW143S		This well was found dry. It is consistently found dry, the impact on the OMP is significant as there is no other bore nearby targeting potential offsite migration of impacted groundwater.
MW310		This well was found dry. Impact on the OMP is limited as there is other bores within the powerhouse source area
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.

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	<p>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.</p> <p>A selection of wells including both shallow and deep were gauged in a snap gauging event on the first day of sampling for the purpose of inferring the groundwater contours and flow direction.</p>
Groundwater Field Parameters	<p>Groundwater field parameters were recorded via a down-hole water quality meter (positioned within the mid screen interval) 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 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	<p>HydraSleeve were deployed with top weight sample collection to begin at the lowest point.</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 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.</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 (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 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.

A sample labelling mistake was identified and the sample IDs were subsequently corrected in the laboratory documentation (ALS Reference EP2204288).

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 weather event or site activities that could have impacted the monitoring event or results obtained were noted during the post-summer 2022 monitoring event.

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 slightly acidic, water colour was generally clear and, in some instances, cloudy. DO readings indicate aerobic groundwater conditions.

4.2.1.2 Groundwater gauging

Groundwater depth ranged from 55.42 mAHD (MW403) to 66.28 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 detect 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	0.56 ²	2.76 (MW309)	51	4
Sum of PFHxS and PFOS	MW101I, MW102D, MW104I, MW105D, MW109S, MW110S, MW114S, MW115S, MW119S, MW123I, MW138S, MW141S, MW301, MW302, MW303, MW304, MW305, MW306, MW308, MW309, MW312, MW313, MW402 MW504, MW505.	0.07 ²	151 (MW309)	51	25

Notes:

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

Findings are summarised as follows:

- > MW136D, located at the southwest boundary, recorded a first time detect of Sum of PFOS and PFHxS (0.01 µg/L detected).
- > No new exceedance of a guideline value was reported for the groundwater monitoring locations during the post-summer 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 to near neutral, water was mostly clear and 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 detect 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	0.04	3	0
Sum of PFHxS and PFOS	POT102, POT103, POT104.	0.07 ²	1.03 (POT102)	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 detect 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

No changes to the monitoring network condition were noted during the post-summer 2022 event.

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 2022 groundwater and tap water monitoring event at Gingin Satellite Airfield as part of the PFAS OMP. Groundwater sampling and testing was undertaken at 51 monitoring wells on- and off-site, two abstraction bores and three tap water locations. Seven groundwater monitoring wells couldn't be sampled as these wells were found to be dry (6) or destroyed (1).

The groundwater laboratory results reported the following:

- > Of the 51 groundwater samples tested, Sum of PFOS and PFHxS (25 samples) and PFOA (4 samples) reported exceedances of the adopted assessment criteria.
- > MW136D, located at the southwest boundary, recorded a first time detect of Sum of PFOS and PFHxS (0.01 µg/L detected).
- > No new exceedance of a guideline value was reported for the groundwater monitoring locations during the post-summer 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 detect 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 2022 monitoring event were generally of the same order of magnitude as historical events.

The next OMP sampling event for Gingin Satellite Airfield is the quarterly monitoring event (Q3 2022), scheduled for July 2022.

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*'.

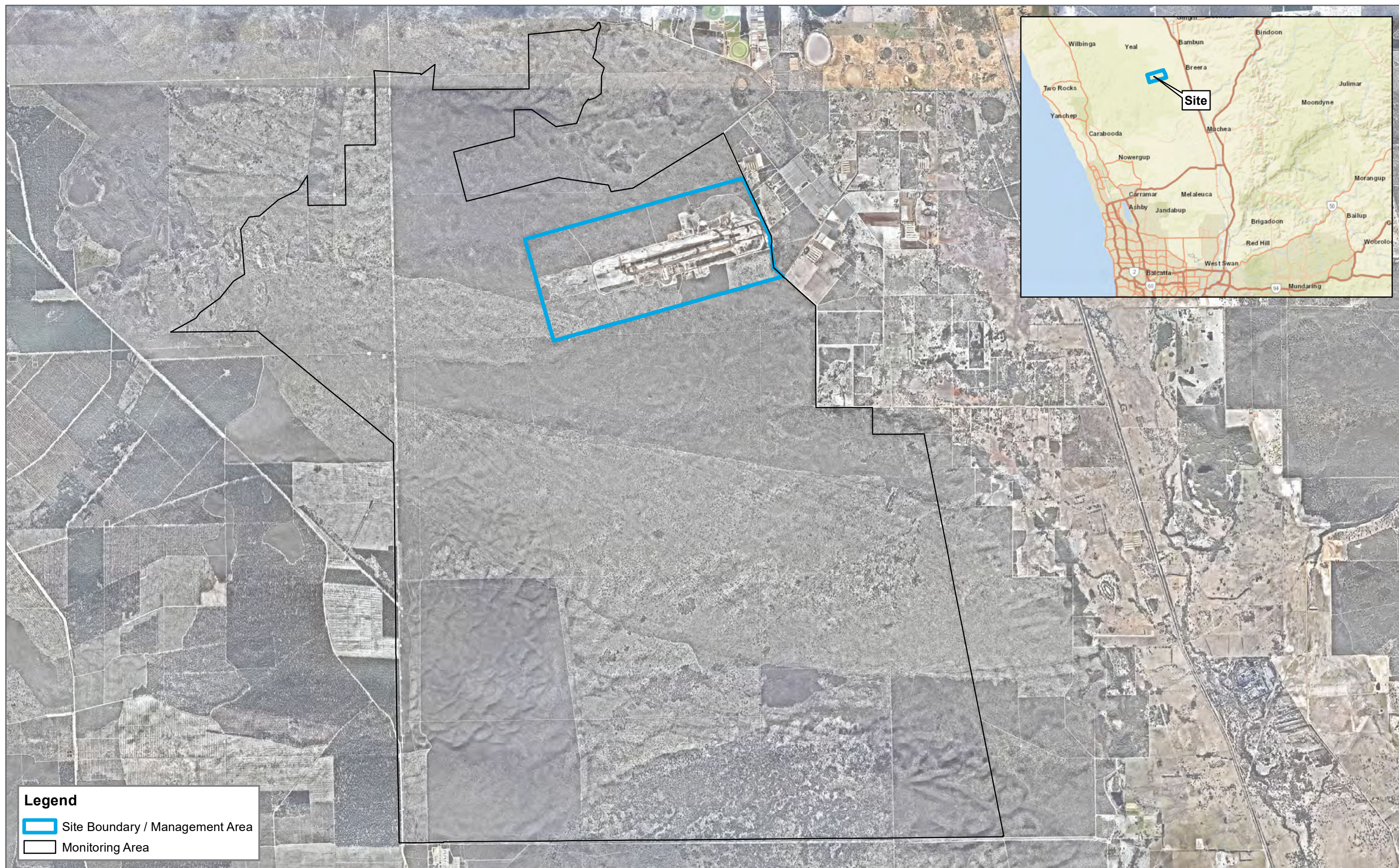
Site Specific References

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.
16. Cardno, March 2021, PFAS OMP Quarterly Sampling Event Factual Report – January 2021.
17. Cardno, April 2021, PFAS OMP – 2020 Annual Interpretive Report.
18. Cardno, August 2021, PFAS OMP Biannual Monitoring Factual Report – post-summer 2021.
19. Cardno, August 2021, PFAS OMP Quarterly Sampling Event Factual Report – July 2021.
20. Cardno, May 2022, PFAS OMP – *draft* 2021 Annual Interpretive Report.
21. Department of Defence, 2018a, Gingin Satellite Airfield PFAS Ongoing Monitoring Plan.
22. Department of Defence, 2018b, Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan
23. Jacobs, 2018a, Preliminary Conceptual Site Model - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0001).
24. Jacobs, 2018b, Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0002).
25. Jacobs, 2018c, Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-003).
26. Jacobs, 2018d, Tier 2 Human Health Risk Assessment – Offsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0005).
27. Jacobs, 2018e, Tier 3 Human Health Risk Assessment – Onsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0006).
28. Jacobs, 2019, PFAS Ongoing Groundwater Monitoring Report (No. IS219200-0000-NP-RPT-0008).

APPENDIX

A

FIGURES



Legend

Site Boundary / Management Area

Monitoring Area

FIGURE 1
 1:60,000 Scale at A3

Meters

0 1,000 2,000

Site Location

BIANNUAL SAMPLING EVENT
 GINGIN SATELLITE AIRFIELD
 DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
 Date: 2021-10-25 | Project: DEF19009
 Coordinate System: GDA 1994 MGA Zone 50
 Map: DEF19009_WA_0958-GS-001_RegionalLocation 02.mxd
 Aerial Imagery Supplied by Nearmap

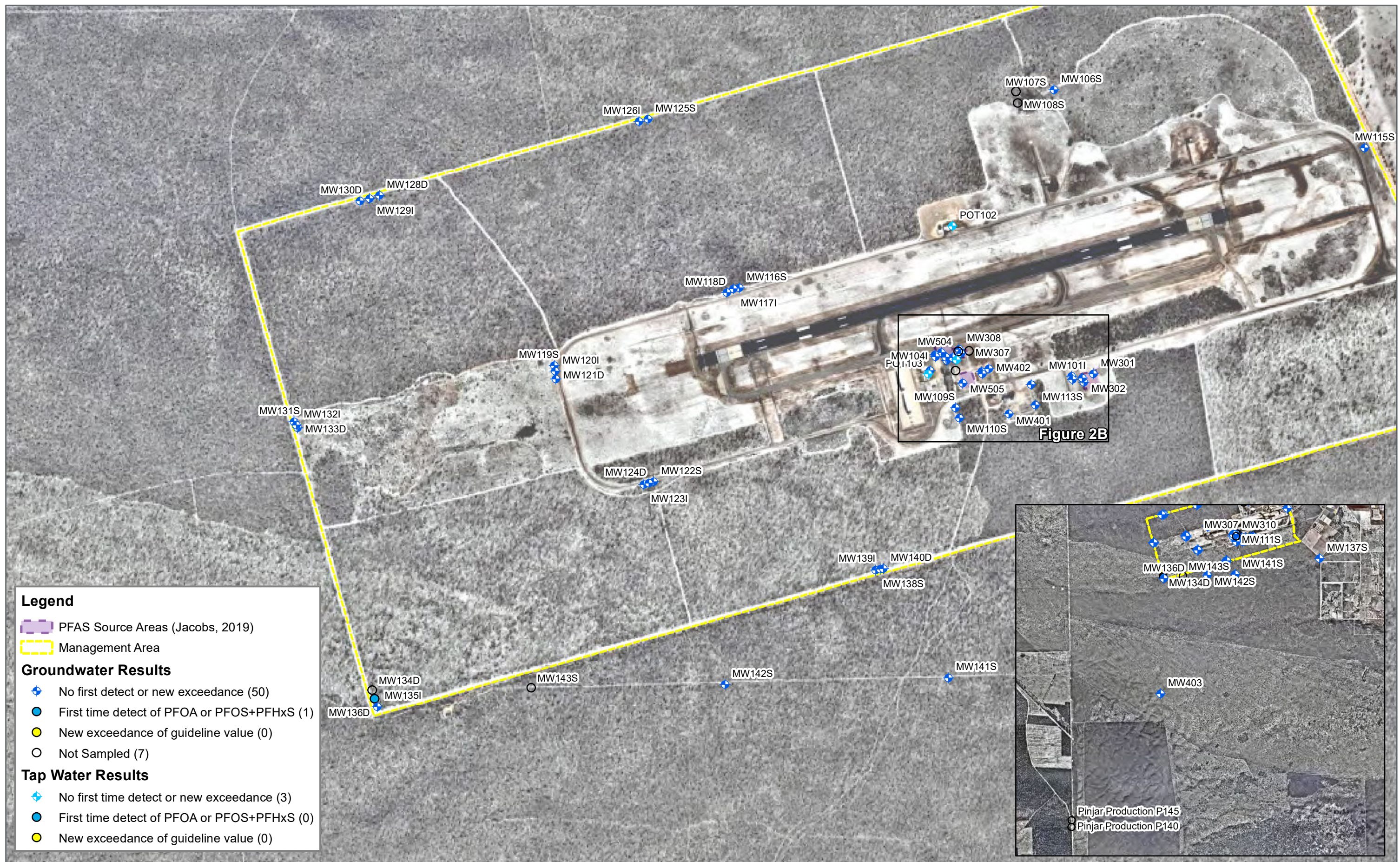


FIGURE 2A
1:12,500 Scale at A3

Meters
0 200 400

Monitoring Locations & Results

BIANNUAL SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-06-01 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-002A_Apr22PFASResults 01.mxd
Aerial Imagery Supplied by Nearmap



FIGURE 2B
1:1,750 Scale at A3

Meters
0 50 100

Monitoring Locations & Results

BIANNUAL SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-05-06 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-002B_Apr22PFASResults 01.mxd
Aerial Imagery Supplied by Nearmap

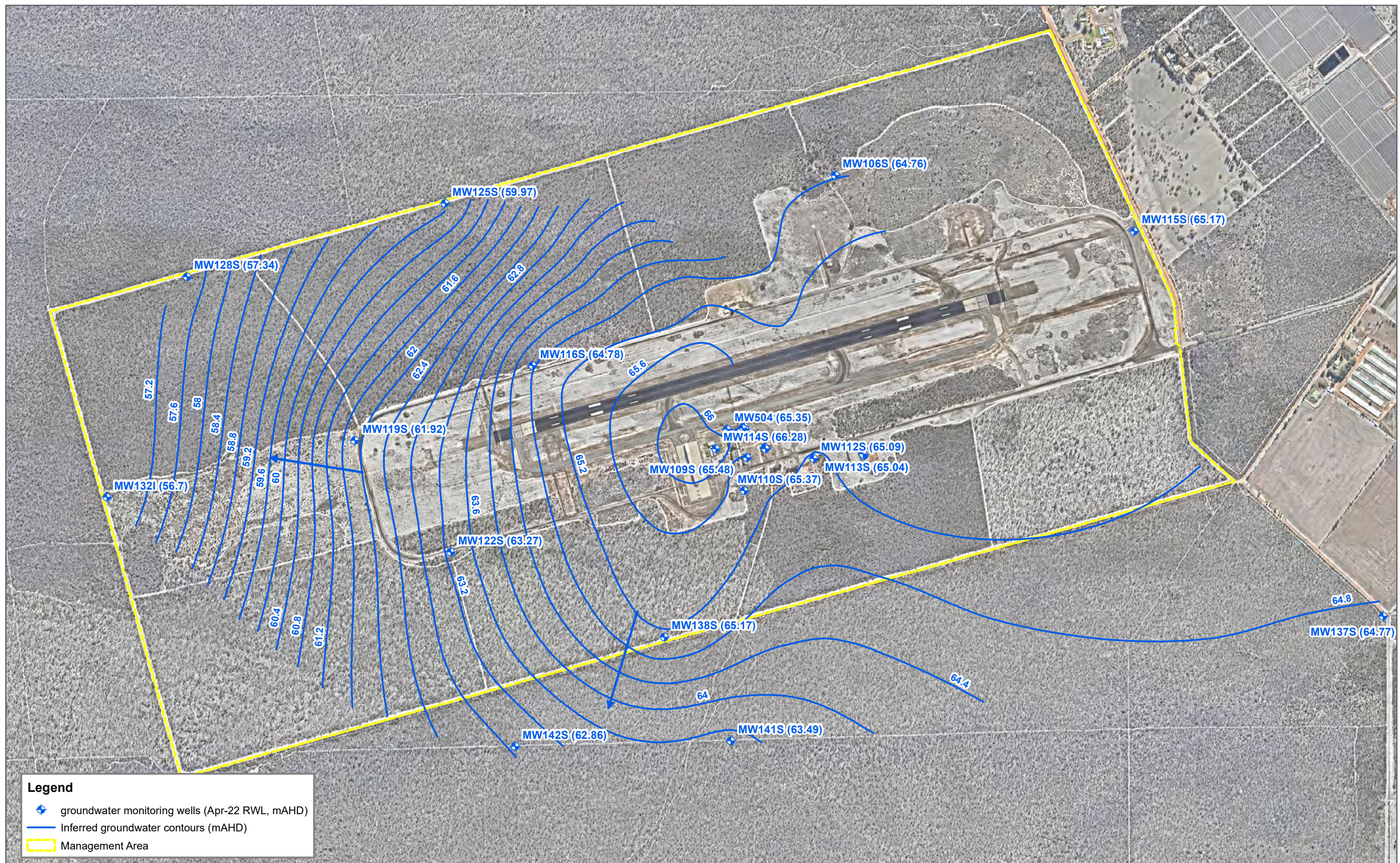


FIGURE 3
1:13,000 Scale at A3

Meters
0 200 400

Inferred Groundwater Contours (Shallow Aquifer)

BIANNUAL SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-05-06 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-003_Apr-22ShallowGWContours 01.mxd
Aerial Imagery Supplied by Nearmap (October 2020)

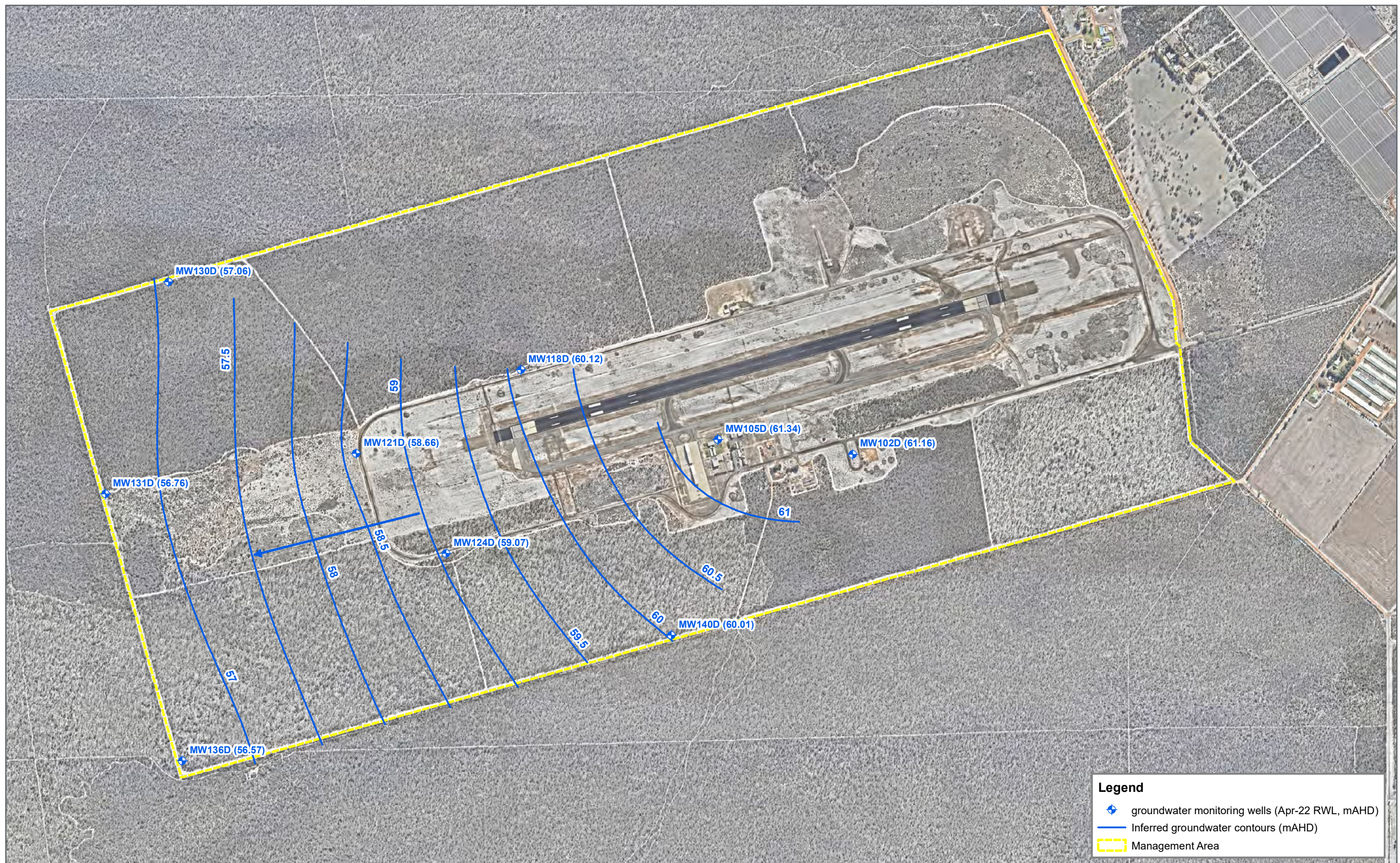


FIGURE 4
1:13,000 Scale at A3

Meters
0 200 400

Inferred Groundwater Contours (Deep Aquifer)

BIANNUAL SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-05-06 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-004_Apr-22DeepGWContours 01.mxd
Aerial Imagery Supplied by Nearmap (October 2020)

APPENDIX

B

DATA ASSESSMENT TABLES

	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)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluoroheptanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDDoA)	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)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOSSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSSE)	Sum of PFHxS and PFOS	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	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
0.01	0.01	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	0.05	0.01	0.01	0.01	0.02	0.05	0.02	0.05	0.05	0.02	0.05	0.01	0.01
LOR - Limit of Reporting											0.56																			0.07	
PFAS NEMP 2020 Drinking Water											10																			2	
PFAS NEMP 2020 Recreational Water																															

Location ID	Date	Field ID	Sample Type	Lab Report No.																															
MW101I	11/04/2022	0958_MW101I_220411	Normal	EP2204288	0.07	0.06	0.38	<0.02	0.20	<0.02	<0.1	<0.02	0.05	<0.02	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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.58	0.78
MW102D	11/04/2022	0958_MW102D_220411	Normal	EP2204288	<0.02	<0.02	0.04	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.08	0.08
MW104I	11/04/2022	0958_MW104I_220411	Normal	EP2204288	0.10	0.10	0.60	0.04	0.28	<0.02	<0.1	0.04	0.19	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.88	1.40
MW104I	11/04/2022	0958_QC102_220411	Field Duplicate	EP2204288	0.10	0.10	0.61	0.04	0.26	<0.02	<0.1	0.05	0.19	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.87	1.41
MW104I	11/04/2022	0958_QC202_220411	Interlab Duplicate	881198	0.07	0.06	0.41	0.02	0.26	<0.01	0.09	0.03	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	<0.05	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	0.67	1.1
MW105D	11/04/2022	0958_MW105D_220411	Normal	EP2204288	<0.02	0.02	0.20	<0.02	0.19	<0.02	<0.1	<0.02	0.04	<0.02	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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.39	0.47
MW106S	13/04/2022	0958_MW106S_220413	Normal	EP2204360	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW109S	11/04/2022	0958_MW109S_220411	Normal	EP2204288	<0.02	<0.02	0.18	0.02	0.61	<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	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.79	0.82
MW110S	11/04/2022	0958_MW110S_220411	Normal	EP2204288	<0.02	<0.02	0.03	<0.02	0.06	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09
MW112S	11/04/2022	0958_MW112S_220411	Normal	EP2204288	<0.02	<0.02	0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02
MW113S	11/04/2022	0958_MW113S_220411	Normal	EP2204288	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW114S	11/04/2022	0958_MW114S_220411	Normal	EP2204288	0.08	0.09	0.57	<0.02	0.69	<0.02	<0.1	0.03	0.12	<0.02	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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.26	1.60
MW115S	13/04/2022	0958_MW115S_220413	Normal	EP2204360	<0.02	<0.02	0.07	<0.02	0.07	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.14	0.14
MW116S	13/04/2022	0958_MW116S_220413	Normal	EP2204360	<0.02	<0.02	0.04	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.04	0.04
MW117I	13/04/2022	0958_MW117I_220413	Normal	EP2204360	<0.02	<0.02	0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02
MW118D	13/04/2022	0958_MW118D_220413	Normal	EP2204360	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW118D	13/04/2022	0958_QC107_220413	Field Duplicate	EP2204360	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW118D	13/04/2022	0958_QC207_220413	Interlab Duplicate	881198	<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	<0.01	<0.05	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW119S	13/04/2022	0958_MW119S_220413	Normal	EP2204360	<0.02	<0.02	0.04	<0.02	0.04	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.08	0.08
MW120I	13/04/2022	0958_MW120I_220413	Normal	EP2204360	<0.02	<0.02	<0.01	<0.02	0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.01	0.01
MW121D	13/04/2022	0958_MW121D_220413	Normal	EP2204360	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW122S	13/04/2022	0958_MW122S_220413	Normal	EP2204360	<0.02	<0.02	<0.01	<0.02	0.06	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.06	0.06
MW123I	13/04/2022	0958_MW123I_220413	Normal	EP2204360	<0.02	<0.02	0.04	<0.02	0.05	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09
MW124D	13/04/2022	0958_MW124D_220413	Normal	EP2204360	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW124D	13/04/2022	0958_QC106_220413	Field Duplicate	EP2204360	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<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	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW124D	13/04/2022	0958_QC206_220413	Interlab Duplicate	881198	<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	<0.01	<0.05	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.01	<0.01
MW125S																																			

		Date	11/04/2022	11/04/2022		11/04/2022	11/04/2022		11/04/2022	11/04/2022		11/04/2022	11/04/2022	
		Field ID	0958_MW308_220411	0958_QC101_220411		0958_MW308_220411	0958_QC201_220411		0958_MW104I_220411	0958_QC102_220411		0958_MW104I_220411	0958_QC202_220411	
		Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water	
		Lab Report Number	EP2204288	EP2204288	RPD	EP2204288	881198	RPD	EP2204288	EP2204288	RPD	EP2204288	881198	RPD
	Unit	LOR												
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01					0.09						0.02	
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	0.51	0.50	2	0.51	0.43	17	0.10	0.10	0	0.10	0.07	35
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	1.16	0.94	21	1.16	0.93	22	0.10	0.10	0	0.10	0.06	50
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	10.4	10.7	3	10.4	13	22	0.60	0.61	2	0.60	0.41	38
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	2.12	2.12	0	2.12	1.1	63	0.04	0.04	0	0.04	0.02	67
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	37.7	36.8	2	37.7	50	28	0.28	0.26	7	0.28	0.26	7
Perfluorononanesulfonic acid (PFNS)	µg/L	0.01					<0.01						<0.01	
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01	0.11	0.10	10	0.11	<0.01	167	<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	0.22	75	<0.1	<0.1	0	<0.1	0.09	0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	0.43	0.43	0	0.43	0.33	26	0.04	0.05	22	0.04	0.03	29
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	3.28	3.28	0	3.28	3.0	9	0.19	0.19	0	0.19	0.11	53
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	0.36	0.36	0	0.36	0.31	15	0.02	0.02	0	0.02	0.01	67
Perfluorooctanoic acid (PFOA)	µg/L	0.01	1.26	1.34	6	1.26	1.3	3	0.03	0.04	29	0.03	0.02	40
Perfluorononanoic acid (PFNA)	µg/L	0.01	0.02	0.02	0	0.02	0.02	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 (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
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	0.06	0.06	0	0.06	<0.05	18	<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	48.1	47.5	1	48.1	63	27	0.88	0.87	1	0.88	0.67	27
Sum of PFAS	µg/L	0.01	57.5	56.8	1	57.5	70.73	21	1.40	1.41	1	1.40	1.1	24
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01					64.3						0.69	

*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

		Date	11/04/2022	11/04/2022		11/04/2022	11/04/2022		12/04/2022	12/04/2022		12/04/2022	12/04/2022		12/04/2022	12/04/2022	
		Field ID	0958_POT103_220411	0958_QC103_220411		0958_POT103_220411	0958_QC203_220411		0958_MW1321_220412	0958_QC104_220412		0958_MW1321_220412	0958_QC204_220412		0958_MW403_220412	0958_QC105_220412	
		Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
		Lab Report Number	EP2204288	EP2204288	RPD	EP2204288	881198	RPD	EP2204301	EP2204301	RPD	EP2204301	881198	RPD	EP2204301	EP2204301	RPD
	Unit	LOR															
PFAS - Perfluoroalkyl Sulfonic Acids																	
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01					0.03						<0.01				
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	0.09	0.11	20	0.09	0.07	25	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	0.09	0.08	12	0.09	0.06	40	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.66	0.61	8	0.66	0.54	20	0.03	0.03	0	0.03	<0.01	100	<0.01	<0.01	0
Perfluorohexptane sulfonic acid (PFHpS)	µg/L	0.01	0.05	0.04	22	0.05	0.04	22	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.37	0.34	8	0.37	0.44	17	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	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	0.12	18	<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	0.05	18	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	0.29	0.30	3	0.29	0.21	32	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluoroheptanoic acid (PFHpA)	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
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.04	0.04	0	0.04	0.03	29	<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 (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	1.03	0.95	8	1.03	0.98	5	0.03	0.03	0	0.03	<0.01	100	<0.01	<0.01	0
Sum of PFAS	µg/L	0.01	1.67	1.60	4	1.67	1.61	4	0.03	0.03	0	0.03	<0.1	0	<0.01	<0.01	0
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01					1.01						<0.01				

		Date	12/04/2022	12/04/2022		13/04/2022	13/04/2022		13/04/2022	13/04/2022		13/04/2022	13/04/2022		13/04/2022	13/04/2022	
		Field ID	0958_MW403_220412	0958_QC205_220412		0958_MW124D_220413	0958_QC106_220413		0958_MW124D_220413	0958_QC206_220413		0958_MW118D_220413	0958_QC107_220413		0958_MW118D_220413	0958_QC207_220413	
		Matrix Type	Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
		Lab Report Number	EP2204301	881198	RPD	EP2204360	EP2204360	RPD	EP2204360	881198	RPD	EP2204360	EP2204360	RPD	EP2204360	881198	RPD
	Unit	LOR															
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	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluoropentane sulfonic acid (PFPeS)	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
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluoroheptane sulfonic acid (PFHpS)	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
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
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	<0.02	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	<0.1	<0.1	0	<0.1	<0.05	0
Perfluoropentanoic acid (PFPeA)	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
Perfluorohexanoic acid (PFHxA)	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
Perfluoroheptanoic acid (PFHpA)	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
Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.02	<0.01	0	<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	<0.01	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 (PFTriDA)	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	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Sum of PFAS	µg/L	0.01	<0.01	<0.1	0	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.01	0	<0.01	<0.1	0
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01		<0.01						<0.01						<0.01	

APPENDIX

C

LABORATORY CERTIFICATES OF ANALYSIS



CHAIN OF CUSTODY

COC#: 36205

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

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

Other comments:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW401		11/04/2022 09:35 AM	Water	ALS: 2 Non ALS: 0	No	X		
002	0958_MW116S		11/04/2022 09:47 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_MW112S		11/04/2022 09:57 AM	Water	ALS: 2 Non ALS: 0	No	X		
004	0958_MW402		11/04/2022 10:07 AM	Water	ALS: 2 Non ALS: 0	No	X		
005	0958_MW313		11/04/2022 10:21 AM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab qaqc
006	0958_MW312		11/04/2022 10:31 AM	Water	ALS: 2 Non ALS: 0	No	X		
007	0958_MW505		11/04/2022 10:43 AM	Water	ALS: 2 Non ALS: 0	No	X		
008	0958_POT104		11/04/2022 11:00 AM	Water	ALS: 2 Non ALS: 0	No	X		
009	0958_MW308		11/04/2022 11:18 AM	Water	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 36205

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFASOMP

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DATE TIME:

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DATE TIME:

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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:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsale WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0958_QC101		11/04/2022 11:19 AM	Water	ALS: 2 Non ALS: 0	No	X		
011	0958_MW309		11/04/2022 11:32 AM	Water	ALS: 2 Non ALS: 0	No	X		
012	0958_MW304		11/04/2022 11:50 AM	Water	ALS: 2 Non ALS: 0	No	X		
013	0958_MW305		11/04/2022 12:12 PM	Water	ALS: 2 Non ALS: 0	No	X		
014	0958_MW306		11/04/2022 12:23 PM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab qcqc
015	0958_MW504		11/04/2022 01:29 PM	Water	ALS: 2 Non ALS: 0	No	X		
016	0958_MW104I		11/04/2022 01:43 PM	Water	ALS: 2 Non ALS: 0	No	X		
017	0958_QC102		11/04/2022 01:43 PM	Water	ALS: 2 Non ALS: 0	No	X		
018	0958_MW105D		11/04/2022 01:59 PM	Water	ALS: 2 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

CO#: 36205 ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

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RELINQUISHED BY:

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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

Other comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19

/ ES2019CARBSD0002

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0958_MW114S		11/04/2022 02:17 PM	Water	ALS: 2 Non ALS: 0	No	X		
020	0958_POT105		11/04/2022 02:26 PM	Water	ALS: 2 Non ALS: 0	No	X		
021	0958_QC103		11/04/2022 02:27 PM	Water	ALS: 2 Non ALS: 0	No	X		
022	0958_MW110S		11/04/2022 02:39 PM	Water	ALS: 2 Non ALS: 0	No	X		
023	0958_MW109S		11/04/2022 02:51 PM	Water	ALS: 2 Non ALS: 0	No	X		
024	0958_MW101I		11/04/2022 03:12 PM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab qaqc
025	0958_MW102D		11/04/2022 03:23 PM	Water	ALS: 2 Non ALS: 0	No	X		
026	0958_MW301		11/04/2022 03:36 PM	Water	ALS: 2 Non ALS: 0	No	X		
027	0958_MW303		11/04/2022 03:45 PM	Water	ALS: 2 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 36205

ALS Laboratory: EP Perth

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ORDER NO: DEF19009/330

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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:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
028	0958_MW302		11/04/2022 03:52 PM	Water	ALS: 2 Non ALS: 0	No	X		
029	0958_QC301		11/04/2022 04:06 PM	Water	ALS: 0 Non ALS: 0	No	X		forgot to scan bottles
030	0958_QC401		11/04/2022 04:07 PM	Water	ALS: 0 Non ALS: 0	No	X		forgot to scan bottles



CHAIN OF CUSTODY

COC#: 36205

ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

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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:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW401	HDPE (no PTFE)	20 mL	00352106011660	Grey	No	
001	0958_MW401	HDPE (no PTFE)	20 mL	00352106011657	Grey	No	
002	0958_MW116S	HDPE (no PTFE)	20 mL	00352106011668	Grey	No	
002	0958_MW116S	HDPE (no PTFE)	20 mL	00352106011543	Grey	No	
003	0958_MW112S	HDPE (no PTFE)	20 mL	00352106011501	Grey	No	
003	0958_MW112S	HDPE (no PTFE)	20 mL	00352106011573	Grey	No	
004	0958_MW402	HDPE (no PTFE)	20 mL	00352106011640	Grey	No	
004	0958_MW402	HDPE (no PTFE)	20 mL	00352106011529	Grey	No	
005	0958_MW313	HDPE (no PTFE)	20 mL	00352106011530	Grey	No	
005	0958_MW313	HDPE (no PTFE)	20 mL	00352106011590	Grey	No	
005	0958_MW313	HDPE (no PTFE)	20 mL	00352106011509	Grey	No	
005	0958_MW313	HDPE (no PTFE)	20 mL	00352106011553	Grey	No	
006	0958_MW312	HDPE (no PTFE)	20 mL	00352106011631	Grey	No	
006	0958_MW312	HDPE (no PTFE)	20 mL	00352106011587	Grey	No	
007	0958_MW505	HDPE (no PTFE)	20 mL	00352106011525	Grey	No	
007	0958_MW505	HDPE (no PTFE)	20 mL	00352106011636	Grey	No	
008	0958_POT104	HDPE (no PTFE)	20 mL	00352106011558	Grey	No	
008	0958_POT104	HDPE (no PTFE)	20 mL	00352106011634	Grey	No	
009	0958_MW308	HDPE (no PTFE)	20 mL	00352106011726	Grey	No	
009	0958_MW308	HDPE (no PTFE)	20 mL	00352106011669	Grey	No	
010	0958_QC101	HDPE (no PTFE)	20 mL	00352106011505	Grey	No	
010	0958_QC101	HDPE (no PTFE)	20 mL	00352106011774	Grey	No	
011	0958_MW309	HDPE (no PTFE)	20 mL	00352106011647	Grey	No	
011	0958_MW309	HDPE (no PTFE)	20 mL	00352106011534	Grey	No	
012	0958_MW304	HDPE (no PTFE)	20 mL	00352106011506	Grey	No	
012	0958_MW304	HDPE (no PTFE)	20 mL	00352106011570	Grey	No	



CHAIN OF CUSTODY

COC#: 36205 ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

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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:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

013	0958_MW305	HDPE (no PTFE)	20 mL	00352106011503	Grey	No	
013	0958_MW305	HDPE (no PTFE)	20 mL	00352106011564	Grey	No	
014	0958_MW306	HDPE (no PTFE)	20 mL	00352106011578	Grey	No	
014	0958_MW306	HDPE (no PTFE)	20 mL	00352106011518	Grey	No	
014	0958_MW306	HDPE (no PTFE)	20 mL	00352106011630	Grey	No	
014	0958_MW306	HDPE (no PTFE)	20 mL	00352106011533	Grey	No	
015	0958_MW504	HDPE (no PTFE)	20 mL	00352106011652	Grey	No	
015	0958_MW504	HDPE (no PTFE)	20 mL	00352106011521	Grey	No	
016	0958_MW104I	HDPE (no PTFE)	20 mL	00352106011601	Grey	No	
016	0958_MW104I	HDPE (no PTFE)	20 mL	00352106011577	Grey	No	
017	0958_QC102	HDPE (no PTFE)	20 mL	00352106011793	Grey	No	
017	0958_QC102	HDPE (no PTFE)	20 mL	00352106011683	Grey	No	
018	0958_MW105D	HDPE (no PTFE)	20 mL	00352106011684	Grey	No	
018	0958_MW105D	HDPE (no PTFE)	20 mL	00352106011560	Grey	No	
019	0958_MW114S	HDPE (no PTFE)	20 mL	00352106011617	Grey	No	
019	0958_MW114S	HDPE (no PTFE)	20 mL	00352106011539	Grey	No	
020	0958_POT105	HDPE (no PTFE)	20 mL	00352106011588	Grey	No	
020	0958_POT105	HDPE (no PTFE)	20 mL	00352106011528	Grey	No	
021	0958_QC103	HDPE (no PTFE)	20 mL	00352106011524	Grey	No	
021	0958_QC103	HDPE (no PTFE)	20 mL	00352106011727	Grey	No	
022	0958_MW110S	HDPE (no PTFE)	20 mL	00352106011679	Grey	No	
022	0958_MW110S	HDPE (no PTFE)	20 mL	00352106011646	Grey	No	
023	0958_MW109S	HDPE (no PTFE)	20 mL	00352106011612	Grey	No	
023	0958_MW109S	HDPE (no PTFE)	20 mL	00352106011703	Grey	No	
024	0958_MW101I	HDPE (no PTFE)	20 mL	00352106011593	Grey	No	
024	0958_MW101I	HDPE (no PTFE)	20 mL	00352106011717	Grey	No	
024	0958_MW101I	HDPE (no PTFE)	20 mL	00352106011608	Grey	No	



CHAIN OF CUSTODY

COC#: 36205

ALS Laboratory: EP Perth

RELINQUISHED BY:

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RELINQUISHED BY:

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DATE TIME:

DATE TIME:

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CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

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TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

024	0958_MW1011	HDPE (no PTFE)	20 mL	00352106011619	Grey	No	
025	0958_MW102D	HDPE (no PTFE)	20 mL	00352106011628	Grey	No	
025	0958_MW102D	HDPE (no PTFE)	20 mL	00352106011606	Grey	No	
026	0958_MW301	HDPE (no PTFE)	20 mL	00352106011690	Grey	No	
026	0958_MW301	HDPE (no PTFE)	20 mL	00352106011778	Grey	No	
027	0958_MW303	HDPE (no PTFE)	20 mL	00352106011789	Grey	No	
027	0958_MW303	HDPE (no PTFE)	20 mL	00352106011527	Grey	No	
028	0958_MW302	HDPE (no PTFE)	20 mL	00352106011532	Grey	No	
028	0958_MW302	HDPE (no PTFE)	20 mL	00352106011566	Grey	No	

Total Bottle Count: ALS: 62, Non ALS: 0

**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : EP2204288**

Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Lauren Biagioni
Address	: Ground Floor, 226 Adelaide Terrace Perth 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: [REDACTED]	E-mail	: Lauren.biagioni@alsglobal.com
Telephone	: ----	Telephone	: 08 9406 1307
Facsimile	: ----	Facsimile	: [REDACTED]
Project	: WA_0958_PFASOMP	Page	: 1 of 3
Order number	: DEF19009/330	Quote number	: ES2022MWH AUS0002 (SY/139/19 B)
C-O-C number	: 36205	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: DEF19009/Gingin - GW AG		
Sampler	: [REDACTED]		

Dates

Date Samples Received	: 12-Apr-2022 12:00	Issue Date	: 14-Apr-2022
Client Requested Due Date	: 28-Apr-2022	Scheduled Reporting Date	: 28-Apr-2022

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 3.7 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 30 / 30

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)
EP2204288-001	11-Apr-2022 09:35	0958_MW401_220411	✓
EP2204288-002	11-Apr-2022 09:47	0958_MW116S_220411	✓
EP2204288-003	11-Apr-2022 09:57	0958_MW112S_220411	✓
EP2204288-004	11-Apr-2022 10:07	0958_MW402_220411	✓
EP2204288-005	11-Apr-2022 10:21	0958_MW313_220411	✓
EP2204288-006	11-Apr-2022 10:31	0958_MW312_220411	✓
EP2204288-007	11-Apr-2022 10:43	0958_MW505_220411	✓
EP2204288-008	11-Apr-2022 11:00	0958_POT104_220411	✓
EP2204288-009	11-Apr-2022 11:18	0958_MW308_220411	✓
EP2204288-010	11-Apr-2022 11:19	0958_QC101_220411	✓
EP2204288-011	11-Apr-2022 11:32	0958_MW309_220411	✓
EP2204288-012	11-Apr-2022 11:50	0958_MW304_220411	✓
EP2204288-013	11-Apr-2022 12:12	0958_MW305_220411	✓
EP2204288-014	11-Apr-2022 12:23	0958_MW306_220411	✓
EP2204288-015	11-Apr-2022 13:29	0958_MW504_220411	✓
EP2204288-016	11-Apr-2022 13:43	0958_MW104I_220411	✓
EP2204288-017	11-Apr-2022 13:43	0958_QC102_220411	✓
EP2204288-018	11-Apr-2022 13:59	0958_MW105D_220411	✓
EP2204288-019	11-Apr-2022 14:17	0958_MW114S_220411	✓
EP2204288-020	11-Apr-2022 14:26	0958_POT105_220411	✓
EP2204288-021	11-Apr-2022 14:27	0958_QC103_220411	✓
EP2204288-022	11-Apr-2022 14:39	0958_MW110S_220411	✓
EP2204288-023	11-Apr-2022 14:51	0958_MW109S_220411	✓
EP2204288-024	11-Apr-2022 15:12	0958_MW101I_220411	✓
EP2204288-025	11-Apr-2022 15:23	0958_MW102D_220411	✓
EP2204288-026	11-Apr-2022 15:36	0958_MW301_220411	✓
EP2204288-027	11-Apr-2022 15:45	0958_MW303_220411	✓
EP2204288-028	11-Apr-2022 15:52	0958_MW302_220411	✓
EP2204288-029	11-Apr-2022 16:06	0958_QC301_220411	✓
EP2204288-030	11-Apr-2022 16:07	0958_QC401_220411	✓

Proactive Holding Time Report

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



Requested Deliverables

ACCOUNTS ADDRESS

- A4 - AU Tax Invoice (INV)

Email accounts.au@stantec.com



- A4 - AU Tax Invoice (INV)

Email



Derp Lab Reports

- EDI Format - ESDAT (ESDAT)

Email



- *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



Email



CERTIFICATE OF ANALYSIS

Work Order : EP2204288 Amendment : 1 Client : STANTEC AUSTRALIA PTY LTD Contact : [REDACTED] Address : GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000 Telephone : ---- Project : WA_0958_PFASOMP Order number : DEF19009/330 C-O-C number : 36205 Sampler : [REDACTED] Site : DEF19009/Gingin - GW AG Quote number : SY/139/19 B No. of samples received : 30 No. of samples analysed : 30	Page : 1 of 17 Laboratory : Environmental Division Perth Contact : [REDACTED] Address : 26 Rigali Way Wangara Western Australia Australia 6065 Telephone : [REDACTED] Date Samples Received : 12-Apr-2022 12:00 Date Analysis Commenced : 20-Apr-2022 Issue Date : 05-Aug-2022 16:54
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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]	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.
- Amendment (05-08-2022): This report has been amended as a result of a request to change sample identification numbers (IDs) received from [REDACTED] on 05-08-2022, for samples EP2204288-002 & EP2204288-020. 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_MW401_220411	0958_MW113S_220411	0958_MW112S_220411	0958_MW402_220411	0958_MW313_220411
Sampling date / time				11-Apr-2022 09:35	11-Apr-2022 09:47	11-Apr-2022 09:57	11-Apr-2022 10:07	11-Apr-2022 10:21	
Compound	CAS Number	LOR	Unit	EP2204288-001	EP2204288-002	EP2204288-003	EP2204288-004	EP2204288-005	
				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	0.18	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	0.16	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.02	1.21	0.14	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	0.09	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	0.55	0.08	
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	0.06	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	0.28	0.03	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	0.05	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	0.06	<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_MW401_220411	0958_MW113S_220411 1	0958_MW112S_220411 1	0958_MW402_220411	0958_MW313_220411
Sampling date / time				11-Apr-2022 09:35	11-Apr-2022 09:47	11-Apr-2022 09:57	11-Apr-2022 10:07	11-Apr-2022 10:21
Compound	CAS Number	LOR	Unit	EP2204288-001	EP2204288-002	EP2204288-003	EP2204288-004	EP2204288-005
				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	2.64	0.25
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.02	1.76	0.22
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.02	2.39	0.25
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	104	87.2	85.4	95.0	92.3
13C8-PFOA	----	0.02	%	85.5	83.1	86.3	85.7	83.7



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW312_220411	0958_MW505_220411	0958_MW308_220411	0958_QC101_220411	0958_MW309_220411
Sampling date / time				11-Apr-2022 10:31	11-Apr-2022 10:43	11-Apr-2022 11:18	11-Apr-2022 11:19	11-Apr-2022 11:32	
Compound	CAS Number	LOR	Unit	EP2204288-006	EP2204288-007	EP2204288-009	EP2204288-010	EP2204288-011	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.07	0.04	0.51	0.50	1.42	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.06	0.04	1.16	0.94	3.45	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.49	0.35	10.4	10.7	29.4	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	2.12	2.12	3.48	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.75	0.24	37.7	36.8	122	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.11	0.10	0.04	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.1	0.1	0.3	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.03	0.03	0.43	0.43	0.76	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.11	0.09	3.28	3.28	4.60	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.36	0.36	1.11	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	0.01	1.26	1.34	2.76	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.02	0.02	0.06	
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	0.03	
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_220411	0958_MW505_220411	0958_MW308_220411	0958_QC101_220411	0958_MW309_220411
Sampling date / time				11-Apr-2022 10:31	11-Apr-2022 10:43	11-Apr-2022 11:18	11-Apr-2022 11:19	11-Apr-2022 11:32
Compound	CAS Number	LOR	Unit	EP2204288-006	EP2204288-007	EP2204288-009	EP2204288-010	EP2204288-011
				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	0.06	0.06	0.15
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	1.53	0.80	57.5	56.8	170
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.24	0.59	48.1	47.5	151
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.47	0.76	54.1	53.6	162
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	90.5	98.3	94.8	95.6	112
13C8-PFOA	----	0.02	%	79.5	81.3	80.1	84.9	80.7



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW304_220411	0958_MW305_220411	0958_MW306_220411	0958_MW504_220411	0958_MW1041_220411
Sampling date / time					11-Apr-2022 11:50	11-Apr-2022 12:12	11-Apr-2022 12:23	11-Apr-2022 13:29	11-Apr-2022 13:43
Compound	CAS Number	LOR	Unit	EP2204288-012	EP2204288-013	EP2204288-014	EP2204288-015	EP2204288-016	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.34	0.10	0.62	0.16	0.10	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.38	0.10	0.83	0.46	0.10	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	3.54	0.82	3.15	5.84	0.60	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.22	0.10	0.25	1.01	0.04	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	2.83	3.16	3.24	10.0	0.28	
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	0.19	0.07	0.23	0.16	0.04	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.70	0.20	1.07	0.92	0.19	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.10	0.03	0.14	0.08	0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.18	0.08	0.20	0.49	0.03	
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_MW304_220411	0958_MW305_220411	0958_MW306_220411	0958_MW504_220411	0958_MW1041_220411
Sampling date / time					11-Apr-2022 11:50	11-Apr-2022 12:12	11-Apr-2022 12:23	11-Apr-2022 13:29	11-Apr-2022 13:43
Compound	CAS Number	LOR	Unit	EP2204288-012	EP2204288-013	EP2204288-014	EP2204288-015	EP2204288-016	
				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	8.58	4.66	9.83	19.1	1.40	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	6.37	3.98	6.39	15.8	0.88	
Sum of PFAS (WA DER List)	----	0.01	µg/L	7.98	4.46	8.75	17.6	1.26	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	95.8	97.7	95.8	90.4	97.7	
13C8-PFOA	----	0.02	%	86.1	78.2	84.5	84.9	81.4	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_QC102_220411	0958_MW105D_220411	0958_MW114S_220411	0958_MW110S_220411	0958_MW109S_220411
				1	1	1	1	1
Sampling date / time				11-Apr-2022 13:43	11-Apr-2022 13:59	11-Apr-2022 14:17	11-Apr-2022 14:39	11-Apr-2022 14:51
Compound	CAS Number	LOR	Unit	EP2204288-017	EP2204288-018	EP2204288-019	EP2204288-022	EP2204288-023
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.10	<0.02	0.08	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.10	0.02	0.09	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.61	0.20	0.57	0.03	0.18
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	<0.02	<0.02	<0.02	0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.26	0.19	0.69	0.06	0.61
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	0.05	<0.02	0.03	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.19	0.04	0.12	<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	0.04	0.02	0.02	<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_QC102_220411	0958_MW105D_220411	0958_MW114S_220411	0958_MW110S_220411	0958_MW109S_220411
					1	1	1	1
Sampling date / time				11-Apr-2022 13:43	11-Apr-2022 13:59	11-Apr-2022 14:17	11-Apr-2022 14:39	11-Apr-2022 14:51
Compound	CAS Number	LOR	Unit	EP2204288-017	EP2204288-018	EP2204288-019	EP2204288-022	EP2204288-023
				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	1.41	0.47	1.60	0.09	0.82
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.87	0.39	1.26	0.09	0.79
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.27	0.45	1.51	0.09	0.80
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	99.7	100	96.1	99.2	99.9
13C8-PFOA	----	0.02	%	80.9	82.2	85.3	97.2	97.1



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW101I_22041 1	0958_MW102D_22041 1	0958_MW301_220411	0958_MW303_220411	0958_MW302_220411
Sampling date / time				11-Apr-2022 15:12	11-Apr-2022 15:23	11-Apr-2022 15:36	11-Apr-2022 15:45	11-Apr-2022 15:52
Compound	CAS Number	LOR	Unit	EP2204288-024	EP2204288-025	EP2204288-026	EP2204288-027	EP2204288-028
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.07	<0.02	1.00	0.42	0.09
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.06	<0.02	2.25	0.99	0.12
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.38	0.04	10.4	5.96	1.43
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	1.71	0.44	0.13
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.20	0.04	69.1	39.9	1.21
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.06	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.2	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.51	0.32	0.04
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.05	<0.02	4.31	2.21	0.18
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.68	0.31	0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	<0.01	2.39	0.60	0.14
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_MW101I_22041 1	0958_MW102D_22041 1	0958_MW301_220411	0958_MW303_220411	0958_MW302_220411
Sampling date / time					11-Apr-2022 15:12	11-Apr-2022 15:23	11-Apr-2022 15:36	11-Apr-2022 15:45	11-Apr-2022 15:52
Compound	CAS Number	LOR	Unit	EP2204288-024	EP2204288-025	EP2204288-026	EP2204288-027	EP2204288-028	
				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	0.78	0.08	92.6	51.2	3.36	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.58	0.08	79.5	45.9	2.64	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.72	0.08	88.6	49.7	3.11	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	96.3	98.8	89.1	98.3	95.1	
13C8-PFOA	----	0.02	%	98.1	96.9	94.2	98.6	98.5	



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

				0958_POT104_22041 1	0958_POT103_22041 1	0958_QC103_220411	----	----
Sampling date / time				11-Apr-2022 11:00	11-Apr-2022 14:26	11-Apr-2022 14:27	----	----
Compound	CAS Number	LOR	Unit	EP2204288-008	EP2204288-020	EP2204288-021	-----	-----
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.07	0.09	0.11	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.07	0.09	0.08	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.44	0.66	0.61	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	0.05	0.04	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.25	0.37	0.34	----	----
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	0.04	0.06	0.06	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.20	0.29	0.30	----	----
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	0.03	0.04	0.04	----	----
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_22041 1	0958_POT103_22041 1	0958_QC103_220411	----	----
Sampling date / time				11-Apr-2022 11:00	11-Apr-2022 14:26	11-Apr-2022 14:27	----	----
Compound	CAS Number	LOR	Unit	EP2204288-008	EP2204288-020	EP2204288-021	-----	-----
				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	1.14	1.67	1.60	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.69	1.03	0.95	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.03	1.53	1.48	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	102	101	93.6	----	----
13C8-PFOA	----	0.02	%	80.4	84.6	99.4	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0958_QC301_220411	0958_QC401_220411	----	----	----
Sampling date / time					11-Apr-2022 16:06	11-Apr-2022 16:07	----	----	----
Compound	CAS Number	LOR	Unit	EP2204288-029	EP2204288-030	-----	-----	-----	
				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: WATER
 (Matrix: WATER)

Sample ID

				0958_QC301_220411	0958_QC401_220411	----	----	----
Sampling date / time				11-Apr-2022 16:06	11-Apr-2022 16:07	----	----	----
Compound	CAS Number	LOR	Unit	EP2204288-029	EP2204288-030	-----	-----	-----
Result				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	%	101	93.5	----	----	----
13C8-PFOA	----	0.02	%	97.1	99.1	----	----	----



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: 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	: EP2204288	Page	: 1 of 11
Amendment	: 1		
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 Western Australia Australia 6065
Telephone	: ---	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 12-Apr-2022
Order number	: DEF19009/330	Date Analysis Commenced	: 20-Apr-2022
C-O-C number	: 36205	Issue Date	: 05-Aug-2022
Sampler	: [REDACTED]		
Site	: DEF19009/Gingin - GW AG		
Quote number	: SY/139/19 B		
No. of samples received	: 30		
No. of samples analysed	: 30		



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: 4304840)									
EP2204288-001	0958_MW401_220411	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
EP2204288-011	0958_MW309_220411	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	29.4	26.4	11.1	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	122	129	5.7	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.42	1.44	1.3	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	3.45	3.32	3.8	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	3.48	3.10	11.9	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.04	0.04	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4306423)									
EP2204288-021	0958_QC103_220411	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.61	0.60	0.0	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.34	0.35	0.0	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.11	0.11	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.08	0.09	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	0.05	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2204288-024	0958_MW101I_220411	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.38	0.37	3.2	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.20	0.18	6.0	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.07	0.06	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.06	0.06	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**

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: 4306423) - continued									
EP2204288-024	0958_MW101I_220411	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: 4304840)									
EP2204288-001	0958_MW401_220411	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
EP2204288-011	0958_MW309_220411	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	2.76	2.80	1.6	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.76	0.81	6.3	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	4.60	4.74	3.1	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	1.11	1.15	3.5	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.06	0.05	17.9	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	0.3	0.3	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4306423)									
EP2204288-021	0958_QC103_220411	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	0.06	0.06	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.30	0.31	0.0	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.02	0.03	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
EP2204288-024	0958_MW101I_220411	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	0.02	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	0.05	0.05	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: 4306423) - continued									
EP2204288-024	0958_MW101I_220411	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: 4304840)									
EP2204288-001	0958_MW401_220411	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
EP2204288-011	0958_MW309_220411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.03	<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: 4306423)									
EP2204288-021	0958_QC103_220411	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: 4306423) - continued									
EP2204288-021	0958_QC103_220411	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
EP2204288-024	0958_MW101I_220411	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: 4304840)							
EP2204288-001	0958_MW401_220411	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
EP2204288-011	0958_MW309_220411	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	0.15	0.17	10.5	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: 4306423)									
EP2204288-021	0958_QC103_220411	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 : EP2204288 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: 4306423) - continued									
EP2204288-021	0958_QC103_220411	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
EP2204288-024	0958_MW101I_220411	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: 4304840)									
EP2204288-001	0958_MW401_220411	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EP2204288-011	0958_MW309_220411	EP231X: Sum of PFAS	----	0.01	µg/L	170	173	2.2	0% - 20%
EP231P: PFAS Sums (QC Lot: 4306423)									
EP2204288-021	0958_QC103_220411	EP231X: Sum of PFAS	----	0.01	µg/L	1.60	1.64	2.5	0% - 20%
EP2204288-024	0958_MW101I_220411	EP231X: Sum of PFAS	----	0.01	µg/L	0.78	0.76	2.6	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 (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4304840)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	121	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	104	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	103	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	104	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	89.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	81.4	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4306423)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	122	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	105	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	104	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	91.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	93.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	101	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4304840)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	98.9	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	116	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	126	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	118	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	101	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	121	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	118	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	104	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	82.8	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	81.6	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	73.0	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4306423)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	91.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	104	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	119	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	108	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	103	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	107	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	109	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: 4306423) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	108	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	108	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4304840)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	115	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	88.6	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	76.4	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	88.9	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	63.8	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	92.6	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	79.2	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4306423)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	98.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	86.8	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	83.5	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	111	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	99.0	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	88.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	113	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4304840)								
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	116	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	127	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	120	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4306423)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	141	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	97.8	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	114	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	95.4	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: 4304840)							
EP2204288-002	0958_MW113S_220411	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	120	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	109	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	105	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	106	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	84.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	84.2	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4306423)							
EP2204288-022	0958_MW110S_220411	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	128	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	104	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	92.8	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	87.4	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	90.2	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	95.0	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4304840)							
EP2204288-002	0958_MW113S_220411	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	98.0	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	113	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	116	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	117	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	101	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	121	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	118	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	97.8	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	86.4	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	73.6	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4306423)							
EP2204288-022	0958_MW110S_220411	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	84.8	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	119	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	117	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	104	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	105	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	104	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	112	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	116	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: 4306423) - continued							
EP2204288-022	0958_MW110S_220411	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	106	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	126	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4304840)							
EP2204288-002	0958_MW113S_220411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	114	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	96.5	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	85.2	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	87.1	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	62.6	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	109	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	82.2	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4306423)							
EP2204288-022	0958_MW110S_220411	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	100	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	89.5	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	97.6	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	104	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	101	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	102	65.0	136
		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: 4304840)							
EP2204288-002	0958_MW113S_220411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	100	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	117	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	120	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	122	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4306423)							
EP2204288-022	0958_MW110S_220411	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	130	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	99.6	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	130	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: 4306423) - continued							
EP2204288-022	0958_MW110S_220411	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	95.0	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order : EP2204288

Page : 1 of 6

Amendment : 1

Client : STANTEC AUSTRALIA PTY LTD

Laboratory : Environmental Division Perth

Contact : [REDACTED]

Telephone : [REDACTED]

Project : WA_0958_PFASOMP

Date Samples Received : 12-Apr-2022

Site : DEF19009/Gingin - GW AG

Issue Date : 05-Aug-2022

Sampler : [REDACTED]

No. of samples received : 30

Order number : DEF19009/330

No. of samples analysed : 30

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)		11-Apr-2022	27-Apr-2022	08-Oct-2022	✔	27-Apr-2022	08-Oct-2022	✔
0958_MW401_220411,	0958_MW113S_220411,							
0958_MW112S_220411,	0958_MW402_220411,							
0958_MW313_220411,	0958_MW312_220411,							
0958_MW505_220411,	0958_POT104_220411,							
0958_MW308_220411,	0958_QC101_220411,							
0958_MW309_220411,	0958_MW304_220411,							
0958_MW305_220411,	0958_MW306_220411,							
0958_MW504_220411,	0958_MW104I_220411,							
0958_QC102_220411,	0958_MW105D_220411,							
0958_MW114S_220411,	0958_POT103_220411,							
0958_QC103_220411,	0958_MW110S_220411,							
0958_MW109S_220411,	0958_MW101I_220411,							
0958_MW102D_220411,	0958_MW301_220411,							
0958_MW303_220411,	0958_MW302_220411,							
0958_QC301_220411,	0958_QC401_220411							



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)		11-Apr-2022	27-Apr-2022	08-Oct-2022	✔	27-Apr-2022	08-Oct-2022	✔
0958_MW401_220411,	0958_MW113S_220411,							
0958_MW112S_220411,	0958_MW402_220411,							
0958_MW313_220411,	0958_MW312_220411,							
0958_MW505_220411,	0958_POT104_220411,							
0958_MW308_220411,	0958_QC101_220411,							
0958_MW309_220411,	0958_MW304_220411,							
0958_MW305_220411,	0958_MW306_220411,							
0958_MW504_220411,	0958_MW104I_220411,							
0958_QC102_220411,	0958_MW105D_220411,							
0958_MW114S_220411,	0958_POT103_220411,							
0958_QC103_220411,	0958_MW110S_220411,							
0958_MW109S_220411,	0958_MW101I_220411,							
0958_MW102D_220411,	0958_MW301_220411,							
0958_MW303_220411,	0958_MW302_220411,							
0958_QC301_220411,	0958_QC401_220411							
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)		11-Apr-2022	27-Apr-2022	08-Oct-2022	✔	27-Apr-2022	08-Oct-2022	✔
0958_MW401_220411,	0958_MW113S_220411,							
0958_MW112S_220411,	0958_MW402_220411,							
0958_MW313_220411,	0958_MW312_220411,							
0958_MW505_220411,	0958_POT104_220411,							
0958_MW308_220411,	0958_QC101_220411,							
0958_MW309_220411,	0958_MW304_220411,							
0958_MW305_220411,	0958_MW306_220411,							
0958_MW504_220411,	0958_MW104I_220411,							
0958_QC102_220411,	0958_MW105D_220411,							
0958_MW114S_220411,	0958_POT103_220411,							
0958_QC103_220411,	0958_MW110S_220411,							
0958_MW109S_220411,	0958_MW101I_220411,							
0958_MW102D_220411,	0958_MW301_220411,							
0958_MW303_220411,	0958_MW302_220411,							
0958_QC301_220411,	0958_QC401_220411							



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_220411, 0958_MW112S_220411, 0958_MW313_220411, 0958_MW505_220411, 0958_MW308_220411, 0958_MW309_220411, 0958_MW305_220411, 0958_MW504_220411, 0958_QC102_220411, 0958_MW114S_220411, 0958_QC103_220411, 0958_MW109S_220411, 0958_MW102D_220411, 0958_MW303_220411, 0958_QC301_220411,	0958_MW113S_220411, 0958_MW402_220411, 0958_MW312_220411, 0958_POT104_220411, 0958_QC101_220411, 0958_MW304_220411, 0958_MW306_220411, 0958_MW104I_220411, 0958_MW105D_220411, 0958_POT103_220411, 0958_MW110S_220411, 0958_MW101I_220411, 0958_MW301_220411, 0958_MW302_220411, 0958_QC401_220411	11-Apr-2022	27-Apr-2022	08-Oct-2022	✔	27-Apr-2022	08-Oct-2022	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW401_220411, 0958_MW112S_220411, 0958_MW313_220411, 0958_MW505_220411, 0958_MW308_220411, 0958_MW309_220411, 0958_MW305_220411, 0958_MW504_220411, 0958_QC102_220411, 0958_MW114S_220411, 0958_QC103_220411, 0958_MW109S_220411, 0958_MW102D_220411, 0958_MW303_220411, 0958_QC301_220411,	0958_MW113S_220411, 0958_MW402_220411, 0958_MW312_220411, 0958_POT104_220411, 0958_QC101_220411, 0958_MW304_220411, 0958_MW306_220411, 0958_MW104I_220411, 0958_MW105D_220411, 0958_POT103_220411, 0958_MW110S_220411, 0958_MW101I_220411, 0958_MW301_220411, 0958_MW302_220411, 0958_QC401_220411	11-Apr-2022	27-Apr-2022	08-Oct-2022	✔	27-Apr-2022	08-Oct-2022	✔



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.



ALS COC#: 36245 ALS Laboratory: EP Perth

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA 0958 PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

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

SAMPLER MOBILE:

/ ES2019CARBSD0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?	Yes	No	N/A
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Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
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Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW138S		12/04/2022 09:59 AM	Water	ALS: 2 Non ALS: 0	No	X		
002	0958_MW139I		12/04/2022 10:04 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_MW140D		12/04/2022 10:16 AM	Water	ALS: 2 Non ALS: 0	No	X		
004	0958_MW135I		12/04/2022 10:50 AM	Water	ALS: 2 Non ALS: 0	No	X		
005	0958_MW136D		12/04/2022 11:01 AM	Water	ALS: 2 Non ALS: 0	No	X		
006	0958_MW132I		12/04/2022 11:44 AM	Water	ALS: 2 Non ALS: 0	No	X		
007	0958_QC104		12/04/2022 11:45 AM	Water	ALS: 2 Non ALS: 0	No	X		
008	0958_MW133D		12/04/2022 11:55 AM	Water	ALS: 2 Non ALS: 0	No	X		
009	0958_MW131D		12/04/2022 12:05 PM	Water	ALS: 2 Non ALS: 0	No	X		



ALS Laboratory: EP Perth

RECEIVED BY:

DATE TIME:

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

Biohazard info:

Other comments:



CHAIN OF CUSTODY

COC#: 36245

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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	Rinsate WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0958_MW137S		12/04/2022 03:32 PM	Water	ALS: 2 Non ALS: 0	No	X		
020	0958_QC301		12/04/2022 03:36 PM	Water	ALS: 2 Non ALS: 0	No	X		
021	0958_QC401		12/04/2022 03:36 PM	Water	ALS: 2 Non ALS: 0	No	X		



ALS Laboratory: EP Perth

RECEIVED BY:

DATE TIME:

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

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:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW138S	HDPE (no PTFE)	20 mL	00352106011556	Grey	No	
001	0958_MW138S	HDPE (no PTFE)	20 mL	00352106011520	Grey	No	
002	0958_MW139I	HDPE (no PTFE)	20 mL	00352106011562	Grey	No	
002	0958_MW139I	HDPE (no PTFE)	20 mL	00352106011589	Grey	No	
003	0958_MW140D	HDPE (no PTFE)	20 mL	00352106011664	Grey	No	
003	0958_MW140D	HDPE (no PTFE)	20 mL	00352106011709	Grey	No	
004	0958_MW135I	HDPE (no PTFE)	20 mL	00352106017676	Grey	No	
004	0958_MW135I	HDPE (no PTFE)	20 mL	00352106017712	Grey	No	
005	0958_MW136D	HDPE (no PTFE)	20 mL	00352106017783	Grey	No	
005	0958_MW136D	HDPE (no PTFE)	20 mL	00352106017706	Grey	No	
006	0958_MW132I	HDPE (no PTFE)	20 mL	00352106017643	Grey	No	
006	0958_MW132I	HDPE (no PTFE)	20 mL	00352106017778	Grey	No	
007	0958_QC104	HDPE (no PTFE)	20 mL	00352106017646	Grey	No	
007	0958_QC104	HDPE (no PTFE)	20 mL	00352106012813	Grey	No	
008	0958_MW133D	HDPE (no PTFE)	20 mL	00352106017697	Grey	No	
008	0958_MW133D	HDPE (no PTFE)	20 mL	00352106017749	Grey	No	
009	0958_MW131D	HDPE (no PTFE)	20 mL	00352106012749	Grey	No	
009	0958_MW131D	HDPE (no PTFE)	20 mL	00352106012752	Grey	No	
010	0958_MW130D	HDPE (no PTFE)	20 mL	00352109017779	Grey	No	
010	0958_MW130D	HDPE (no PTFE)	20 mL	00352106017707	Grey	No	
010	0958_MW130D	HDPE (no PTFE)	20 mL	00352106017715	Grey	No	
010	0958_MW130D	HDPE (no PTFE)	20 mL	00352106012777	Grey	No	
011	0958_MW129I	HDPE (no PTFE)	20 mL	00352106012765	Grey	No	
011	0958_MW129I	HDPE (no PTFE)	20 mL	00352106012775	Grey	No	
012	0958_MW128S	HDPE (no PTFE)	20 mL	00352106017629	Grey	No	
012	0958_MW128S	HDPE (no PTFE)	20 mL	00352106017762	Grey	No	

**CHAIN OF CUSTODY**

COC#: 36245

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA 0958 PFASOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

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:

013	0958_MW125S	HDPE (no PTFE)	20 mL	00352106012831	Grey	No	
013	0958_MW125S	HDPE (no PTFE)	20 mL	00352106017612	Grey	No	
014	0958_MW403	HDPE (no PTFE)	20 mL	00352106012819	Grey	No	
014	0958_MW403	HDPE (no PTFE)	20 mL	00352106017770	Grey	No	
015	0958_MW126I	HDPE (no PTFE)	20 mL	00352106017730	Grey	No	
015	0958_MW126I	HDPE (no PTFE)	20 mL	00352106017737	Grey	No	
016	0958_QC105	HDPE (no PTFE)	20 mL	00352106012750	Grey	No	
016	0958_QC105	HDPE (no PTFE)	20 mL	00352106017666	Grey	No	
017	0958_MW142	HDPE (no PTFE)	20 mL	00352106017616	Grey	No	
017	0958_MW142	HDPE (no PTFE)	20 mL	00352106012820	Grey	No	
017	0958_MW142	HDPE (no PTFE)	20 mL	00352106017701	Grey	No	
017	0958_MW142	HDPE (no PTFE)	20 mL	00352106017718	Grey	No	
018	0958_MW141	HDPE (no PTFE)	20 mL	00352106017723	Grey	No	
018	0958_MW141	HDPE (no PTFE)	20 mL	00352106017768	Grey	No	
019	0958_MW137S	HDPE (no PTFE)	20 mL	00352106011645	Grey	No	
019	0958_MW137S	HDPE (no PTFE)	20 mL	00352106011516	Grey	No	
020	0958_QC301	HDPE (no PTFE)	20 mL	00352101071539	Grey	No	
020	0958_QC301	HDPE (no PTFE)	20 mL	00352101071421	Grey	No	
021	0958_QC401	HDPE (no PTFE)	20 mL	00352010008551	Grey	No	
021	0958_QC401	HDPE (no PTFE)	20 mL	00352101072111	Grey	No	

Total Bottle Count: ALS: 46, Non ALS: 0

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2204301

<p>Client : STANTEC AUSTRALIA PTY LTD</p> <p>Contact : [REDACTED]</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 : DEF19009/330</p> <p>C-O-C number : 36245</p> <p>Site : DEF19009/Gingin</p> <p>Sampler : [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : Lauren Biagioni</p> <p>Address : 26 Rigali Way Wangara WA Australia 6065</p> <p>E-mail : Lauren.biagioni@alsglobal.com</p> <p>Telephone : 08 9406 1307</p> <p>Facsimile : [REDACTED]</p> <p>Page : 1 of 3</p> <p>Quote number : EP2017MWHAUS0015 (EN/222)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

Date Samples Received : 13-Apr-2022 12:00	Issue Date : 19-Apr-2022
Client Requested Due : 29-Apr-2022	Scheduled Reporting Date : 29-Apr-2022
Date	

Delivery Details

Mode of Delivery : Carrier	Security Seal : Not Available
No. of coolers/boxes : 1	Temperature : 4.4 - Ice present
Receipt Detail :	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)
EP2204301-001	12-Apr-2022 09:59	0958_MW138S_220412	✓
EP2204301-002	12-Apr-2022 10:04	0958_MW139I_220412	✓
EP2204301-003	12-Apr-2022 10:16	0958_MW140D_220412	✓
EP2204301-004	12-Apr-2022 10:50	0958_MW135I_220412	✓
EP2204301-005	12-Apr-2022 11:01	0958_MW136D_220412	✓
EP2204301-006	12-Apr-2022 11:44	0958_MW132I_220412	✓
EP2204301-007	12-Apr-2022 11:45	0958_QC104_220412	✓
EP2204301-008	12-Apr-2022 11:55	0958_MW133D_220412	✓
EP2204301-009	12-Apr-2022 12:05	0958_MW131D_220412	✓
EP2204301-010	12-Apr-2022 12:23	0958_MW130D_220412	✓
EP2204301-011	12-Apr-2022 12:43	0958_MW129I_220412	✓
EP2204301-012	12-Apr-2022 12:46	0958_MW128S_220412	✓
EP2204301-013	12-Apr-2022 13:19	0958_MW125S_220412	✓
EP2204301-014	12-Apr-2022 15:15	0958_MW403_220412	✓
EP2204301-015	12-Apr-2022 13:10	0958_MW126I_220412	✓
EP2204301-016	12-Apr-2022 15:16	0958_QC105_220412	✓
EP2204301-017	12-Apr-2022 15:17	0958_MW142_220412	✓
EP2204301-018	12-Apr-2022 15:18	0958_MW141_220412	✓
EP2204301-019	12-Apr-2022 15:32	0958_MW137S_220412	✓
EP2204301-020	12-Apr-2022 15:36	0958_QC301_220412	✓
EP2204301-021	12-Apr-2022 15:36	0958_QC401_220412	✓

Proactive Holding Time Report

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



Requested Deliverables

ACCOUNTS ADDRESS

- A4 - AU Tax Invoice (INV)

Email accounts.au@stantec.com

- A4 - AU Tax Invoice (INV)

Email

Derp Lab Reports

- *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

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- *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)

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CERTIFICATE OF ANALYSIS

Work Order : **EP2204301**
Client : **STANTEC AUSTRALIA PTY LTD**
Contact : [REDACTED]
Address : GROUND FLOOR 226 ADELAIDE TERRACE
 PERTH 6000
Telephone : ----
Project : WA_0958_PFASOMP
Order number : DEF19009/330
C-O-C number : 36245
Sampler : [REDACTED]
Site : DEF19009/Gingin
Quote number : EN/222
No. of samples received : 21
No. of samples analysed : 21

Page : 1 of 13
Laboratory : Environmental Division Perth
Contact : Lauren Biagioni
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : 08 9406 1307
Date Samples Received : 13-Apr-2022 12:00
Date Analysis Commenced : 20-Apr-2022
Issue Date : 02-May-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]	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 Contact 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_MW138S_22041 2	0958_MW139I_22041 2	0958_MW140D_22041 2	0958_MW135I_22041 2	0958_MW136D_22041 2
Sampling date / time				12-Apr-2022 09:59	12-Apr-2022 10:04	12-Apr-2022 10:16	12-Apr-2022 10:50	12-Apr-2022 11:01
Compound	CAS Number	LOR	Unit	EP2204301-001	EP2204301-002	EP2204301-003	EP2204301-004	EP2204301-005
				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	<0.01	<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	0.07	<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_MW138S_22041 2	0958_MW139I_22041 2	0958_MW140D_22041 2	0958_MW135I_22041 2	0958_MW136D_22041 2
Sampling date / time				12-Apr-2022 09:59	12-Apr-2022 10:04	12-Apr-2022 10:16	12-Apr-2022 10:50	12-Apr-2022 11:01
Compound	CAS Number	LOR	Unit	EP2204301-001	EP2204301-002	EP2204301-003	EP2204301-004	EP2204301-005
				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	0.11	<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	0.19	<0.01	<0.01	<0.01	0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.08	<0.01	<0.01	<0.01	0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.19	<0.01	<0.01	<0.01	0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	95.3	90.9	102	94.7	94.9
13C8-PFOA	----	0.02	%	97.3	93.3	95.9	94.1	92.0



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0958_MW132I_22041 2	0958_QC104_220412	0958_MW133D_22041 2	0958_MW131D_22041 2	0958_MW130D_22041 2
Sampling date / time				12-Apr-2022 11:44	12-Apr-2022 11:45	12-Apr-2022 11:55	12-Apr-2022 12:05	12-Apr-2022 12:23	
Compound	CAS Number	LOR	Unit	EP2204301-006	EP2204301-007	EP2204301-008	EP2204301-009	EP2204301-010	
				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	0.03	0.03	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 (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_MW132I_22041 2	0958_QC104_220412	0958_MW133D_22041 2	0958_MW131D_22041 2	0958_MW130D_22041 2
Sampling date / time				12-Apr-2022 11:44	12-Apr-2022 11:45	12-Apr-2022 11:55	12-Apr-2022 12:05	12-Apr-2022 12:23
Compound	CAS Number	LOR	Unit	EP2204301-006	EP2204301-007	EP2204301-008	EP2204301-009	EP2204301-010
				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	0.03	0.03	0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.03	0.03	0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.03	0.03	0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	97.2	95.4	93.2	94.9	91.1
13C8-PFOA	----	0.02	%	95.7	97.5	94.3	94.4	96.8



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW129I_22041 2	0958_MW128S_22041 2	0958_MW125S_22041 2	0958_MW403_220412	0958_MW126I_22041 2
Sampling date / time				12-Apr-2022 12:43	12-Apr-2022 12:46	12-Apr-2022 13:19	12-Apr-2022 15:15	12-Apr-2022 13:10
Compound	CAS Number	LOR	Unit	EP2204301-011	EP2204301-012	EP2204301-013	EP2204301-014	EP2204301-015
				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	<0.01	<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 (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_MW129I_22041 2	0958_MW128S_22041 2	0958_MW125S_22041 2	0958_MW403_220412	0958_MW126I_22041 2
Sampling date / time				12-Apr-2022 12:43	12-Apr-2022 12:46	12-Apr-2022 13:19	12-Apr-2022 15:15	12-Apr-2022 13:10
Compound	CAS Number	LOR	Unit	EP2204301-011	EP2204301-012	EP2204301-013	EP2204301-014	EP2204301-015
				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	<0.01	<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	%	95.2	92.6	93.5	95.3	90.9
13C8-PFOA	----	0.02	%	93.9	95.4	95.2	94.9	97.6



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_QC105_220412	0958_MW142_220412	0958_MW141_220412	0958_MW137S_220412	----
Sampling date / time				12-Apr-2022 15:16	12-Apr-2022 15:17	12-Apr-2022 15:18	12-Apr-2022 15:32	----
Compound	CAS Number	LOR	Unit	EP2204301-016	EP2204301-017	EP2204301-018	EP2204301-019	-----
				Result	Result	Result	Result	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.06	<0.02	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.08	<0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.52	<0.01	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.05	<0.02	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.40	<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	0.12	<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	0.04	<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: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_QC105_220412	0958_MW142_220412	0958_MW141_220412	0958_MW137S_220412	----
Sampling date / time				12-Apr-2022 15:16	12-Apr-2022 15:17	12-Apr-2022 15:18	12-Apr-2022 15:32	----
Compound	CAS Number	LOR	Unit	EP2204301-016	EP2204301-017	EP2204301-018	EP2204301-019	-----
				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	1.29	<0.01	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.92	<0.01	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	1.16	<0.01	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	92.2	96.4	99.8	94.2	----
13C8-PFOA	----	0.02	%	93.0	92.6	94.0	95.8	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0958_QC301_220412	0958_QC401_220412	----	----	----
Sampling date / time					12-Apr-2022 15:36	12-Apr-2022 15:36	----	----	----
Compound	CAS Number	LOR	Unit	EP2204301-020	EP2204301-021	-----	-----	-----	
				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_220412	0958_QC401_220412	----	----	----
Sampling date / time				12-Apr-2022 15:36	12-Apr-2022 15:36	----	----	----
Compound	CAS Number	LOR	Unit	EP2204301-020	EP2204301-021	-----	-----	-----
				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	%	98.2	102	----	----	----
13C8-PFOA	----	0.02	%	92.1	99.0	----	----	----



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) EP231C: Perfluoroalkyl Sulfonamides

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

(WATER) EP231P: PFAS Sums

(WATER) EP231A: Perfluoroalkyl Sulfonic Acids

(WATER) EP231B: Perfluoroalkyl Carboxylic Acids

(WATER) EP231S: PFAS Surrogate

QUALITY CONTROL REPORT

Work Order	: EP2204301	Page	: 1 of 11
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Lauren Biagioni
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1307
Project	: WA_0958_PFASOMP	Date Samples Received	: 13-Apr-2022
Order number	: DEF19009/330	Date Analysis Commenced	: 20-Apr-2022
C-O-C number	: 36245	Issue Date	: 02-May-2022
Sampler	: [REDACTED]		
Site	: DEF19009/Gingin		
Quote number	: EN/222		
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]	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: 4307557)									
EP2204301-001	0958_MW138S_220412	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	0.07	0.07	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
EP2204301-011	0958_MW129I_220412	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
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4307866)									
EP2204360-001	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.06	0.05	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
EP2204360-009	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit



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: 4307866) - continued									
EP2204360-009	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: 4307557)									
EP2204301-001	0958_MW138S_220412	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
EP2204301-011	0958_MW129I_220412	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
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4307866)									
EP2204360-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (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
EP2204360-009	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: 4307866) - continued									
EP2204360-009	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: 4307557)									
EP2204301-001	0958_MW138S_220412	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
EP2204301-011	0958_MW129I_220412	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: 4307866)									
EP2204360-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: **WATER**

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: 4307866) - continued									
EP2204360-001	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2204360-009	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: 4307557)							
EP2204301-001	0958_MW138S_220412	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	0.11	0.11	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
EP2204301-011	0958_MW129I_220412	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: 4307866)									
EP2204360-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2204301
 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: 4307866) - continued									
EP2204360-001	Anonymous	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
EP2204360-009	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: 4307557)									
EP2204301-001	0958_MW138S_220412	EP231X: Sum of PFAS	----	0.01	µg/L	0.19	0.18	5.4	0% - 50%
EP2204301-011	0958_MW129I_220412	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4307866)									
EP2204360-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.06	0.05	18.2	No Limit
EP2204360-009	Anonymous	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: 4307557)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	120	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	107	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	94.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	97.6	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	94.4	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4307866)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	121	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	110	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	97.0	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	89.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	95.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	100	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4307557)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	91.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	112	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	104	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	112	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	114	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	127	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	106	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	116	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	123	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	122	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4307866)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	86.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	98.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	113	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	130	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	124	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	110	69.0	133



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				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4307866) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	114	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	132	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	119	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4307557)								
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	88.3	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	121	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	112	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	134	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	94.8	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4307866)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	113	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	85.6	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	91.4	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	115	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	107	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	123	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4307557)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	127	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	132	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	129	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	106	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4307866)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	116	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	96.2	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	135	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	99.4	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: 4307557)							
EP2204301-002	0958_MW139I_220412	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	114	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	105	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	91.6	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	91.2	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	95.0	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	97.6	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4307866)							
EP2204360-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	109	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	104	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	91.4	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	87.2	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	91.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4307557)							
EP2204301-002	0958_MW139I_220412	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	90.2	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	110	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	110	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	90.4	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	110	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	124	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	128	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.8	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	117	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	128	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	127	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4307866)							
EP2204360-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	78.3	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	92.4	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	92.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	99.4	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	105	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	121	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	117	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	104	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: 4307866) - continued							
EP2204360-002	Anonymous	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	109	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	108	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4307557)							
EP2204301-002	0958_MW139I_220412	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	111	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	91.0	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	94.4	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	125	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	118	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	93.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4307866)							
EP2204360-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	95.4	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	73.5	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	76.2	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	95.6	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	93.9	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	91.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4307557)							
EP2204301-002	0958_MW139I_220412	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	107	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	108	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	104	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	103	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4307866)							
EP2204360-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	93.0	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	83.8	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	126	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: 4307866) - continued							
EP2204360-002	Anonymous	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	106	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2204301	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: 08 9406 1307
Project	: WA_0958_PFASOMP	Date Samples Received	: 13-Apr-2022
Site	: DEF19009/Gingin	Issue Date	: 02-May-2022
Sampler	: [REDACTED]	No. of samples received	: 21
Order number	: DEF19009/330	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.



Matrix: **WATER**

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

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW138S_220412, 0958_MW140D_220412, 0958_MW136D_220412, 0958_QC104_220412, 0958_MW131D_220412, 0958_MW129I_220412, 0958_MW125S_220412, 0958_MW126I_220412, 0958_MW142_220412, 0958_MW137S_220412, 0958_QC401_220412	0958_MW139I_220412, 0958_MW135I_220412, 0958_MW132I_220412, 0958_MW133D_220412, 0958_MW130D_220412, 0958_MW128S_220412, 0958_MW403_220412, 0958_QC105_220412, 0958_MW141_220412, 0958_QC301_220412,	12-Apr-2022	28-Apr-2022	09-Oct-2022	✔	28-Apr-2022	09-Oct-2022	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0958_MW138S_220412, 0958_MW140D_220412, 0958_MW136D_220412, 0958_QC104_220412, 0958_MW131D_220412, 0958_MW129I_220412, 0958_MW125S_220412, 0958_MW126I_220412, 0958_MW142_220412, 0958_MW137S_220412, 0958_QC401_220412	0958_MW139I_220412, 0958_MW135I_220412, 0958_MW132I_220412, 0958_MW133D_220412, 0958_MW130D_220412, 0958_MW128S_220412, 0958_MW403_220412, 0958_QC105_220412, 0958_MW141_220412, 0958_QC301_220412,	12-Apr-2022	28-Apr-2022	09-Oct-2022	✔	28-Apr-2022	09-Oct-2022	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW138S_220412, 0958_MW140D_220412, 0958_MW136D_220412, 0958_QC104_220412, 0958_MW131D_220412, 0958_MW129I_220412, 0958_MW125S_220412, 0958_MW126I_220412, 0958_MW142_220412, 0958_MW137S_220412, 0958_QC401_220412	0958_MW139I_220412, 0958_MW135I_220412, 0958_MW132I_220412, 0958_MW133D_220412, 0958_MW130D_220412, 0958_MW128S_220412, 0958_MW403_220412, 0958_QC105_220412, 0958_MW141_220412, 0958_QC301_220412,	12-Apr-2022	28-Apr-2022	09-Oct-2022	✔	28-Apr-2022	09-Oct-2022	✔



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	37	10.81	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	2	37	5.41	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.

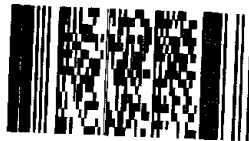
Analytical Methods	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically 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#: 36304 ALS Laboratory: EP Perth		RELINQUISHED BY: DATE TIME:	RECEIVED BY: <i>Forre</i> DATE TIME: 13/4/22 1400	RELINQUISHED BY: DATE TIME:	RECEIVED BY: DATE TIME:
CLIENT: CARBSD - CARDNO (WA) PTY LTD PROJECT: WA_0958_PASOMP		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:	
SITE: DEF19009/Gingin - GW AG ORDER NO: DEF19009/330 PROJECT MANAGER: Maelle Bourdais PRIMARY SAMPLER: Maelle Bourdais EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au EMAIL INVOICES TO: claire.armstrong@cardno.com.au		CONTACT PH: SAMPLER MOBILE: QUOTE NO: SY/139/19 / ES2019CARBSD0002			

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0958_MW122S		13/04/2022 09:55 AM	Water	ALS: 2 Non ALS: 0	No	X		
002	0958_MW124D		13/04/2022 10:05 AM	Water	ALS: 2 Non ALS: 0	No	X		
003	0958_QC106		13/04/2022 10:06 AM	Water	ALS: 2 Non ALS: 0	No	X		
004	0958_MW123I		13/04/2022 10:15 AM	Water	ALS: 2 Non ALS: 0	No	X		
005	0958_MW121D		13/04/2022 10:31 AM	Water	ALS: 2 Non ALS: 0	No	X		
006	0958_MW120I		13/04/2022 10:42 AM	Water	ALS: 4 Non ALS: 0	No	X		extra PFAS bottles for lab qaqc
007	0958_MW119S		13/04/2022 10:56 AM	Water	ALS: 2 Non ALS: 0	No	X		
008	0958_MW118D		13/04/2022 11:21 AM	Water	ALS: 2 Non ALS: 0	No	X		
009	0958_QC107		13/04/2022 11:22 AM	Water	ALS: 2 Non ALS: 0	No	X		

Environmental Division
Perth

Work Order Reference
EP2204360



Telephone : - 61-8-9406 1301



ALS Laboratory: EP Perth

RECEIVED BY:

DATE TIME:

PROJECT: WA 0958 PFASOMP

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19

/ ES2019CARBSD0002

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

LABORATORY USE ONLY (Circle)

Custody Seal intact?	Yes	No	N/A
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Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
--	-----	----	-----

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

extra PFAS bottles for
lab qacc



CHAIN OF CUSTODY

ALS COC#: 36304

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

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:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW122S	HDPE (no PTFE)	20 mL	00352106011665	Grey	No	
001	0958_MW122S	HDPE (no PTFE)	20 mL	00352106011615	Grey	No	
002	0958_MW124D	HDPE (no PTFE)	20 mL	00352106011547	Grey	No	
002	0958_MW124D	HDPE (no PTFE)	20 mL	00352106011607	Grey	No	
003	0958_QC106	HDPE (no PTFE)	20 mL	00352106011568	Grey	No	
003	0958_QC106	HDPE (no PTFE)	20 mL	00352106011571	Grey	No	
004	0958_MW123I	HDPE (no PTFE)	20 mL	00352106011519	Grey	No	
004	0958_MW123I	HDPE (no PTFE)	20 mL	00352106011697	Grey	No	
005	0958_MW121D	HDPE (no PTFE)	20 mL	00352106011788	Grey	No	
005	0958_MW121D	HDPE (no PTFE)	20 mL	00352106011591	Grey	No	
006	0958_MW120I	HDPE (no PTFE)	20 mL	00352106011763	Grey	No	
006	0958_MW120I	HDPE (no PTFE)	20 mL	00352106011643	Grey	No	
006	0958_MW120I	HDPE (no PTFE)	20 mL	00352106011538	Grey	No	
006	0958_MW120I	HDPE (no PTFE)	20 mL	00352106011565	Grey	No	
007	0958_MW119S	HDPE (no PTFE)	20 mL	00352106011554	Grey	No	
007	0958_MW119S	HDPE (no PTFE)	20 mL	00352106011541	Grey	No	
008	0958_MW118D	HDPE (no PTFE)	20 mL	00352106011694	Grey	No	
008	0958_MW118D	HDPE (no PTFE)	20 mL	00352106011729	Grey	No	
009	0958_QC107	HDPE (no PTFE)	20 mL	00352106011768	Grey	No	
009	0958_QC107	HDPE (no PTFE)	20 mL	00352106011555	Grey	No	
010	0958_MW117I	HDPE (no PTFE)	20 mL	00352106011502	Grey	No	
010	0958_MW117I	HDPE (no PTFE)	20 mL	00352106011550	Grey	No	
011	0958_MW116S	HDPE (no PTFE)	20 mL	00352106011715	Grey	No	
011	0958_MW116S	HDPE (no PTFE)	20 mL	00352106011659	Grey	No	
012	0958_POT102	HDPE (no PTFE)	20 mL	00352106011724	Grey	No	
012	0958_POT102	HDPE (no PTFE)	20 mL	00352106011713	Grey	No	

**CHAIN OF CUSTODY**

COC#: 36304

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

CLIENT: CARBSD - CARDNO (WA) PTY LTD

PROJECT: WA_0958_PFSOMP

SITE: DEF19009/Gingin - GW AG

ORDER NO: DEF19009/330

PROJECT MANAGER: Maelle Bourdais

PRIMARY SAMPLER: Maelle Bourdais

EMAIL REPORTS TO: derp.labreports@esdat.com.au, maelle.bourdais@cardno.com.au

EMAIL INVOICES TO: claire.armstrong@cardno.com.au

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19

SAMPLER MOBILE:

/ ES2019CARBSD0002

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:

012	0958_POT102	HDPE (no PTFE)	20 mL	00352106011561	Grey	No	
012	0958_POT102	HDPE (no PTFE)	20 mL	00352106011511	Grey	No	
013	0958_MW106S	HDPE (no PTFE)	20 mL	00352106011548	Grey	No	
013	0958_MW106S	HDPE (no PTFE)	20 mL	00352106011507	Grey	No	
014	0958_MW115S	HDPE (no PTFE)	20 mL	00352106011616	Grey	No	
014	0958_MW115S	HDPE (no PTFE)	20 mL	00352106011549	Grey	No	
015	0958_QC301	HDPE (no PTFE)	20 mL	00352101038056	Grey	No	
015	0958_QC301	HDPE (no PTFE)	20 mL	00352010008641	Grey	No	
016	0958_QC401	HDPE (no PTFE)	20 mL	00352101070851	Grey	No	
016	0958_QC401	HDPE (no PTFE)	20 mL	00352010008542	Grey	No	

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

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2204360

<p>Client : STANTEC AUSTRALIA PTY LTD</p> <p>Contact : [REDACTED]</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 : DEF19009/330</p> <p>C-O-C number : 36304</p> <p>Site : DEF19009/Gingin</p> <p>Sampler : [REDACTED]</p>	<p>Laboratory : Environmental Division Perth</p> <p>Contact : Lauren Biagioni</p> <p>Address : 26 Rigali Way Wangara WA Australia 6065</p> <p>E-mail : Lauren.biagioni@alsglobal.com</p> <p>Telephone : 08 9406 1307</p> <p>Facsimile : [REDACTED]</p> <p>Page : 1 of 3</p> <p>Quote number : EP2017MWHAUS0015 (EN/222)</p> <p>QC Level : NEPM 2013 B3 & ALS QC Standard</p>
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Dates

Date Samples Received : 13-Apr-2022 14:00	Issue Date : 19-Apr-2022
Client Requested Due Date : 29-Apr-2022	Scheduled Reporting Date : 29-Apr-2022

Delivery Details

Mode of Delivery : Client Drop Off	Security Seal : Not Available
No. of coolers/boxes : 1	Temperature : 2.3 - Ice present
Receipt Detail :	No. of samples received / analysed : 16 / 16

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)
EP2204360-001	13-Apr-2022 09:55	0958_MW122S_220413	✓
EP2204360-002	13-Apr-2022 10:05	0958_MW124D_220413	✓
EP2204360-003	13-Apr-2022 10:06	0958_QC106_220413	✓
EP2204360-004	13-Apr-2022 10:15	0958_MW123I_220413	✓
EP2204360-005	13-Apr-2022 10:31	0958_MW121D_220413	✓
EP2204360-006	13-Apr-2022 10:42	0958_MW120I_220413	✓
EP2204360-007	13-Apr-2022 10:56	0958_MW119S_220413	✓
EP2204360-008	13-Apr-2022 11:21	0958_MW118D_220413	✓
EP2204360-009	13-Apr-2022 11:22	0958_QC107_220413	✓
EP2204360-010	13-Apr-2022 11:34	0958_MW117I_220413	✓
EP2204360-011	13-Apr-2022 11:44	0958_MW116S_220413	✓
EP2204360-012	13-Apr-2022 11:55	0958_POT102_220413	✓
EP2204360-013	13-Apr-2022 12:24	0958_MW106S_220413	✓
EP2204360-014	13-Apr-2022 12:40	0958_MW115S_220413	✓
EP2204360-015	13-Apr-2022 12:43	0958_QC301_220413	✓
EP2204360-016	13-Apr-2022 12:44	0958_QC401_220413	✓

Proactive Holding Time Report

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



Requested Deliverables

ACCOUNTS ADDRESS

- A4 - AU Tax Invoice (INV)

Email accounts.au@stantec.com

- A4 - AU Tax Invoice (INV)

Email

Derp Lab Reports

- *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

- *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 : **EP2204360**
Client : **STANTEC AUSTRALIA PTY LTD**
Contact : [REDACTED]
Address : GROUND FLOOR 226 ADELAIDE TERRACE
 PERTH 6000
Telephone : ----
Project : WA_0958_PFASOMP
Order number : DEF19009/330
C-O-C number : 36304
Sampler : [REDACTED]
Site : DEF19009/Gingin
Quote number : EN/222
No. of samples received : 16
No. of samples analysed : 16

Page : 1 of 13
Laboratory : Environmental Division Perth
Contact : Lauren Biagioni
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : 08 9406 1307
Date Samples Received : 13-Apr-2022 14:00
Date Analysis Commenced : 20-Apr-2022
Issue Date : 29-Apr-2022 14:25



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 Contact 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: Positive result for analytes Perfluorooctane sulfonic acid (PFOS) and Perfluorohexane sulfonic acid (PFHxS) on samples EP2204360_006 and EP2204360_010 respectively have been confirmed by re-extraction and re-analysis.
- 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_MW122S_22041 3	0958_MW124D_22041 3	0958_QC106_220413	0958_MW123I_22041 3	0958_MW121D_22041 3
Sampling date / time				13-Apr-2022 09:55	13-Apr-2022 10:05	13-Apr-2022 10:06	13-Apr-2022 10:15	13-Apr-2022 10:31	
Compound	CAS Number	LOR	Unit	EP2204360-001	EP2204360-002	EP2204360-003	EP2204360-004	EP2204360-005	
				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	<0.01	0.04	<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.06	<0.01	<0.01	0.05	<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 (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

				0958_MW122S_22041 3	0958_MW124D_22041 3	0958_QC106_220413	0958_MW123I_22041 3	0958_MW121D_22041 3
Sampling date / time				13-Apr-2022 09:55	13-Apr-2022 10:05	13-Apr-2022 10:06	13-Apr-2022 10:15	13-Apr-2022 10:31
Compound	CAS Number	LOR	Unit	EP2204360-001	EP2204360-002	EP2204360-003	EP2204360-004	EP2204360-005
				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	0.06	<0.01	<0.01	0.09	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.06	<0.01	<0.01	0.09	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.06	<0.01	<0.01	0.09	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	98.1	96.8	96.9	99.4	99.1
13C8-PFOA	----	0.02	%	93.2	96.4	95.1	94.4	89.3



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW120I_22041 3	0958_MW119S_22041 3	0958_MW118D_22041 3	0958_QC107_220413	0958_MW117I_22041 3
Sampling date / time				13-Apr-2022 10:42	13-Apr-2022 10:56	13-Apr-2022 11:21	13-Apr-2022 11:22	13-Apr-2022 11:34
Compound	CAS Number	LOR	Unit	EP2204360-006	EP2204360-007	EP2204360-008	EP2204360-009	EP2204360-010
				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	0.02
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	0.04	<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

				0958_MW120I_22041 3	0958_MW119S_22041 3	0958_MW118D_22041 3	0958_QC107_220413	0958_MW117I_22041 3
Sampling date / time				13-Apr-2022 10:42	13-Apr-2022 10:56	13-Apr-2022 11:21	13-Apr-2022 11:22	13-Apr-2022 11:34
Compound	CAS Number	LOR	Unit	EP2204360-006	EP2204360-007	EP2204360-008	EP2204360-009	EP2204360-010
				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	0.01	0.08	<0.01	<0.01	0.02
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.01	0.08	<0.01	<0.01	0.02
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.01	0.08	<0.01	<0.01	0.02
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	92.5	101	99.8	95.8	93.3
13C8-PFOA	----	0.02	%	92.6	98.7	93.6	91.0	93.2



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW116S_22041 3	0958_MW106S_22041 3	0958_MW115S_22041 3	----	----
Sampling date / time				13-Apr-2022 11:44	13-Apr-2022 12:24	13-Apr-2022 12:40	----	----
Compound	CAS Number	LOR	Unit	EP2204360-011	EP2204360-013	EP2204360-014	-----	-----
				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	0.04	<0.01	0.07	----	----
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	0.07	----	----
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_MW116S_22041 3	0958_MW106S_22041 3	0958_MW115S_22041 3	----	----
Sampling date / time				13-Apr-2022 11:44	13-Apr-2022 12:24	13-Apr-2022 12:40	----	----
Compound	CAS Number	LOR	Unit	EP2204360-011	EP2204360-013	EP2204360-014	-----	-----
				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	0.04	<0.01	0.14	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.04	<0.01	0.14	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.04	<0.01	0.14	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	100	91.6	100	----	----
13C8-PFOA	----	0.02	%	97.6	91.5	94.9	----	----



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

0958_POT102_22041
3

Sampling date / time

13-Apr-2022 11:55

Compound

CAS Number

LOR

Unit

EP2204360-012

Result

EP231A: Perfluoroalkyl Sulfonic Acids

Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.06	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.35	----	----	----	----
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	0.14	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	----	----	----	----
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_POT102_22041
3

Sampling date / time

13-Apr-2022 11:55

Compound

CAS Number

LOR

Unit

EP2204360-012

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	0.91	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.57	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.82	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	----	0.02	%	94.3	----	----	----	----
13C8-PFOA	----	0.02	%	93.6	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0958_QC301_220413	0958_QC401_220413	----	----	----
Sampling date / time					13-Apr-2022 12:43	13-Apr-2022 12:44	----	----	----
Compound	CAS Number	LOR	Unit	EP2204360-015	EP2204360-016	-----	-----	-----	
				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_220413	0958_QC401_220413	----	----	----
Sampling date / time				13-Apr-2022 12:43	13-Apr-2022 12:44	----	----	----
Compound	CAS Number	LOR	Unit	EP2204360-015	EP2204360-016	-----	-----	-----
				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	%	95.9	90.8	----	----	----
13C8-PFOA	----	0.02	%	92.7	91.6	----	----	----



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	: EP2204360	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Lauren Biagioni
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1307
Project	: WA_0958_PFASOMP	Date Samples Received	: 13-Apr-2022
Order number	: DEF19009/330	Date Analysis Commenced	: 20-Apr-2022
C-O-C number	: 36304	Issue Date	: 29-Apr-2022
Sampler	: [REDACTED]		
Site	: DEF19009/Gingin		
Quote number	: EN/222		
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: 4307866)									
EP2204360-001	0958_MW122S_220413	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	0.06	0.05	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
EP2204360-009	0958_QC107_220413	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: 4307866)									
EP2204360-001	0958_MW122S_220413	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: 4307866) - continued									
EP2204360-009	0958_QC107_220413	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: 4307866)									
EP2204360-001	0958_MW122S_220413	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
EP2204360-009	0958_QC107_220413	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: 4307866)									
EP2204360-001	0958_MW122S_220413	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 : EP2204360
 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: 4307866) - continued									
EP2204360-001	0958_MW122S_220413	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
EP2204360-009	0958_QC107_220413	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: 4307866)									
EP2204360-001	0958_MW122S_220413	EP231X: Sum of PFAS	----	0.01	µg/L	0.06	0.05	18.2	No Limit
EP2204360-009	0958_QC107_220413	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: 4307866)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	121	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	110	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	97.0	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	89.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	95.2	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	100	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4307866)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	86.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	98.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	113	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	130	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	124	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	110	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	114	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	132	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	119	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4307866)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	113	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	85.6	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	91.4	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	115	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	107	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	123	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4307866)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	116	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	96.2	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	135	67.0	138



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: 4307866) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	99.4	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: 4307866)							
EP2204360-002	0958_MW124D_220413	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	109	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	104	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	91.4	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	87.2	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	91.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4307866)							
EP2204360-002	0958_MW124D_220413	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	78.3	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	92.4	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	92.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	99.4	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	105	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	121	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	117	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	104	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	109	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	108	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4307866)							
EP2204360-002	0958_MW124D_220413	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	95.4	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	73.5	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	76.2	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	95.6	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	93.9	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	107	65.0	136



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: 4307866) - continued							
EP2204360-002	0958_MW124D_220413	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	91.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4307866)							
EP2204360-002	0958_MW124D_220413	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	93.0	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	83.8	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	126	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	106	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2204360	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: 08 9406 1307
Project	: WA_0958_PFASOMP	Date Samples Received	: 13-Apr-2022
Site	: DEF19009/Gingin	Issue Date	: 29-Apr-2022
Sampler	: [REDACTED]	No. of samples received	: 16
Order number	: DEF19009/330	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

- **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_MW122S_220413,	0958_MW124D_220413,	13-Apr-2022	28-Apr-2022	10-Oct-2022	✔	28-Apr-2022	10-Oct-2022	✔
0958_QC106_220413,	0958_MW123I_220413,							
0958_MW121D_220413,	0958_MW120I_220413,							
0958_MW119S_220413,	0958_MW118D_220413,							
0958_QC107_220413,	0958_MW117I_220413,							
0958_MW116S_220413,	0958_POT102_220413,							
0958_MW106S_220413,	0958_MW115S_220413,							
0958_QC301_220413,	0958_QC401_220413							
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)								
0958_MW122S_220413,	0958_MW124D_220413,	13-Apr-2022	28-Apr-2022	10-Oct-2022	✔	28-Apr-2022	10-Oct-2022	✔
0958_QC106_220413,	0958_MW123I_220413,							
0958_MW121D_220413,	0958_MW120I_220413,							
0958_MW119S_220413,	0958_MW118D_220413,							
0958_QC107_220413,	0958_MW117I_220413,							
0958_MW116S_220413,	0958_POT102_220413,							
0958_MW106S_220413,	0958_MW115S_220413,							
0958_QC301_220413,	0958_QC401_220413							
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)								
0958_MW122S_220413,	0958_MW124D_220413,	13-Apr-2022	28-Apr-2022	10-Oct-2022	✔	28-Apr-2022	10-Oct-2022	✔
0958_QC106_220413,	0958_MW123I_220413,							
0958_MW121D_220413,	0958_MW120I_220413,							
0958_MW119S_220413,	0958_MW118D_220413,							
0958_QC107_220413,	0958_MW117I_220413,							
0958_MW116S_220413,	0958_POT102_220413,							
0958_MW106S_220413,	0958_MW115S_220413,							
0958_QC301_220413,	0958_QC401_220413							

Page : 3 of 5
 Work Order : EP2204360
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0958_PFASOMP



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_MW122S_220413,	0958_MW124D_220413,	13-Apr-2022	28-Apr-2022	10-Oct-2022	✔	28-Apr-2022	10-Oct-2022	✔
0958_QC106_220413,	0958_MW123I_220413,							
0958_MW121D_220413,	0958_MW120I_220413,							
0958_MW119S_220413,	0958_MW118D_220413,							
0958_QC107_220413,	0958_MW117I_220413,							
0958_MW116S_220413,	0958_POT102_220413,							
0958_MW106S_220413,	0958_MW115S_220413,							
0958_QC301_220413,	0958_QC401_220413							
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)								
0958_MW122S_220413,	0958_MW124D_220413,	13-Apr-2022	28-Apr-2022	10-Oct-2022	✔	28-Apr-2022	10-Oct-2022	✔
0958_QC106_220413,	0958_MW123I_220413,							
0958_MW121D_220413,	0958_MW120I_220413,							
0958_MW119S_220413,	0958_MW118D_220413,							
0958_QC107_220413,	0958_MW117I_220413,							
0958_MW116S_220413,	0958_POT102_220413,							
0958_MW106S_220413,	0958_MW115S_220413,							
0958_QC301_220413,	0958_QC401_220413							



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	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	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.



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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

Company Name : Cardno (WA) Pty Ltd	Contact Name : Maelle Bourdais	Purchase Order : DEF19009	COC Number : DEF19009 -01
Office Address : 11 Harvest Terrace, West perth, WA, 6005		PROJECT Number : WA_0958_PFASOMP	Eurofins mgt quote ID :
	Email for COC/SRN/Results : maelle.bourdais@cardno.com.au derp.labreports@esdat.com.au	PROJECT Name : WA_0958_PFASOMP	Data output format: PDF; ESDAT

Eurofins | mgt DI water batch number:

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

Sample comments:

[illegible]

881198

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool WA 6106
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NATA # 2377 Site # 2370

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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NATA # 1261 Site # 1254

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Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

Eurofins Environment Testing NZ Limited

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Phone : +64 9 526 45 51
IANZ # 1327

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

Sample Receipt Advice

Company name: Cardno (WA)
Contact name: [REDACTED]
Project name: WA_0958_PFASOMP
Project ID: WA_0958_PFASOMP
Turnaround time: 5 Day
Date/Time received: Apr 20, 2022 11:09 AM
Eurofins reference: 881198

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 16.6 degrees Celsius.
- ✓ 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 Cardno (WA) email address.



ARL

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

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IANZ # 1290

Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: WA_0958_PFASOMP
Project ID: WA_0958_PFASOMP

Order No.: DEF19009
Report #: 881198
Phone: [REDACTED]
Fax: [REDACTED]

Received: Apr 20, 2022 11:09 AM
Due: Apr 28, 2022
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Perth Laboratory - NATA # 2377 Site # 2370**Melbourne Laboratory - NATA # 1261 Site # 1254****Sydney Laboratory - NATA # 1261 Site # 18217****Brisbane Laboratory - NATA # 1261 Site # 20794****Mayfield Laboratory - NATA # 1261 Site # 25079****External Laboratory**

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_220411	Apr 11, 2022		Water	L22-Ap0039294	X
2	0958_QC202_220411	Apr 11, 2022		Water	L22-Ap0039295	X
3	0958_QC203_220411	Apr 11, 2022		Water	L22-Ap0039296	X
4	0958_QC204_220412	Apr 12, 2022		Water	L22-Ap0039297	X
5	0958_QC205_220412	Apr 12, 2022		Water	L22-Ap0039298	X
6	0958_QC206_	Apr 13, 2022		Water	L22-	X



ARL

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Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: WA_0958_PFASOMP
Project ID: WA_0958_PFASOMP

Order No.: DEF19009
Report #: 881198
Phone: [REDACTED]
Fax: [REDACTED]

Received: Apr 20, 2022 11:09 AM
Due: Apr 28, 2022
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Perth Laboratory - NATA # 2377 Site # 2370**Melbourne Laboratory - NATA # 1261 Site # 1254****Sydney Laboratory - NATA # 1261 Site # 18217****Brisbane Laboratory - NATA # 1261 Site # 20794****Mayfield Laboratory - NATA # 1261 Site # 25079****External Laboratory**

	220413				Ap0039299	
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7	0958_QC207_220413	Apr 13, 2022		Water	L22-Ap0039300	X
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Test Counts

7

Cardno Consulting WA
11 Harvest Terrace
West Perth
WA 6005



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 **881198-W**
Project name **WA_0958_PFASOMP**
Project ID **WA_0958_PFASOMP**
Received Date **Apr 20, 2022**

Client Sample ID			0958_QC201_2 20411	0958_QC202_2 20411	0958_QC203_2 20411	0958_QC204_2 20412
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L22- Ap0039294	L22- Ap0039295	L22- Ap0039296	L22- Ap0039297
Date Sampled			Apr 11, 2022	Apr 11, 2022	Apr 11, 2022	Apr 12, 2022
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.22	0.09	0.12	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	^{N09} 0.33	^{N09} 0.03	^{N09} 0.05	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	^{N09} 3.0	^{N09} 0.11	^{N09} 0.21	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.31	^{N09} 0.01	^{N09} 0.02	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 1.3	^{N09} 0.02	^{N09} 0.03	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	0.02	< 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	%	103	104	97	102
13C5-PFPeA (surr.)	1	%	91	95	95	98
13C5-PFHxA (surr.)	1	%	74	103	95	99
13C4-PFHpA (surr.)	1	%	79	84	82	79
13C8-PFOA (surr.)	1	%	67	81	79	76
13C5-PFNA (surr.)	1	%	87	80	94	79
13C6-PFDA (surr.)	1	%	66	55	71	62
13C2-PFUnDA (surr.)	1	%	51	41	66	44
13C2-PFDoDA (surr.)	1	%	67	46	82	50
13C2-PFTeDA (surr.)	1	%	70	48	56	48
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	%	55	57	81	51
D3-N-MeFOSA (surr.)	1	%	27	33	20	32

Client Sample ID			0958_QC201_2 20411	0958_QC202_2 20411	0958_QC203_2 20411	0958_QC204_2 20412
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L22- Ap0039294	L22- Ap0039295	L22- Ap0039296	L22- Ap0039297
Date Sampled			Apr 11, 2022	Apr 11, 2022	Apr 11, 2022	Apr 12, 2022
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
D5-N-EtFOSA (surr.)	1	%	22	27	15	26
D7-N-MeFOSE (surr.)	1	%	37	34	60	35
D9-N-EtFOSE (surr.)	1	%	32	27	44	27
D5-N-EtFOSAA (surr.)	1	%	76	40	74	51
D3-N-MeFOSAA (surr.)	1	%	49	42	80	55
Perfluoroalkyl sulfonic acids (PFSA's)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	0.43	0.07	0.07	< 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	0.09	0.02	0.03	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 0.93	^{N09} 0.06	^{N09} 0.06	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 1.3	^{N09} 0.41	^{N09} 0.54	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 1.1	^{N09} 0.02	^{N09} 0.04	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 50	^{N09} 0.26	^{N09} 0.44	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	86	94	96	92
18O2-PFHxS (surr.)	1	%	88	94	91	93
13C8-PFOS (surr.)	1	%	91	69	88	73
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	%	74	95	67	92
13C2-6:2 FTSA (surr.)	1	%	82	83	73	88
13C2-8:2 FTSA (surr.)	1	%	64	74	86	74
13C2-10:2 FTSA (surr.)	1	%	62	39	86	43
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	63	0.67	0.98	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	51.3	0.28	0.47	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	64.3	0.69	1.01	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	68.59	1	1.48	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	70.73	1.1	1.61	< 0.1

Client Sample ID			0958_QC205_2 20412	0958_QC206_2 20413	0958_QC207_2 20413
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L22- Ap0039298	L22- Ap0039299	L22- Ap0039300
Date Sampled			Apr 12, 2022	Apr 13, 2022	Apr 13, 2022
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	< 0.01	< 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
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	%	104	106	108
13C5-PFPeA (surr.)	1	%	99	104	100
13C5-PFHxA (surr.)	1	%	102	103	106
13C4-PFHpA (surr.)	1	%	79	79	81
13C8-PFOA (surr.)	1	%	75	75	78
13C5-PFNA (surr.)	1	%	80	74	71
13C6-PFDA (surr.)	1	%	63	48	46
13C2-PFUnDA (surr.)	1	%	55	33	28
13C2-PFDoDA (surr.)	1	%	74	34	32
13C2-PFTeDA (surr.)	1	%	57	44	33
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	%	68	64	48
D3-N-MeFOSA (surr.)	1	%	40	33	33
D5-N-EtFOSA (surr.)	1	%	34	28	31
D7-N-MeFOSE (surr.)	1	%	59	33	34
D9-N-EtFOSE (surr.)	1	%	49	29	28
D5-N-EtFOSAA (surr.)	1	%	67	35	24
D3-N-MeFOSAA (surr.)	1	%	59	43	30
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	< 0.01	< 0.01	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01

Client Sample ID			0958_QC205_2 20412	0958_QC206_2 20413	0958_QC207_2 20413
Sample Matrix			Water	Water	Water
Eurofins Sample No.			L22- Ap0039298	L22- Ap0039299	L22- Ap0039300
Date Sampled			Apr 12, 2022	Apr 13, 2022	Apr 13, 2022
Test/Reference	LOR	Unit			
Perfluoroalkyl sulfonic acids (PFASs)					
13C3-PFBS (surr.)	1	%	95	93	94
18O2-PFHxS (surr.)	1	%	85	95	98
13C8-PFOS (surr.)	1	%	82	62	62
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	%	78	90	97
13C2-6:2 FTSA (surr.)	1	%	76	85	87
13C2-8:2 FTSA (surr.)	1	%	78	67	59
13C2-10:2 FTSA (surr.)	1	%	74	43	32
PFASs Summations					
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	< 0.01	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	< 0.01	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	< 0.01	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	< 0.05	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	< 0.1	< 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 21, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Apr 21, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAAs)	Melbourne	Apr 21, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Apr 21, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Apr 20, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name:	Cardno (WA)	Order No.:	DEF19009	Received:	Apr 20, 2022 11:09 AM
Address:	11 Harvest Terrace West Perth WA 6005	Report #:	881198	Due:	Apr 28, 2022
Project Name:	WA_0958_PFASOMP	Phone:	[REDACTED]	Priority:	5 Day
Project ID:	WA_0958_PFASOMP	Fax:	[REDACTED]	Contact Name:	[REDACTED]
Eurofins Analytical Services Manager : [REDACTED]					

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs)
Perth Laboratory - NATA # 2377 Site # 2370						
Melbourne Laboratory - NATA # 1261 Site # 1254						X
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
External Laboratory						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	0958_QC201_220411	Apr 11, 2022		Water	L22-Ap0039294	X
2	0958_QC202_220411	Apr 11, 2022		Water	L22-Ap0039295	X
3	0958_QC203_220411	Apr 11, 2022		Water	L22-Ap0039296	X
4	0958_QC204_220412	Apr 12, 2022		Water	L22-Ap0039297	X
5	0958_QC205_220412	Apr 12, 2022		Water	L22-Ap0039298	X
6	0958_QC206_	Apr 13, 2022		Water	L22-	X

Company Name: Cardno (WA)
Address: 11 Harvest Terrace
West Perth
WA 6005

Project Name: WA_0958_PFASOMP
Project ID: WA_0958_PFASOMP

Order No.: DEF19009
Report #: 881198
Phone: [REDACTED]
Fax: [REDACTED]

Received: Apr 20, 2022 11:09 AM
Due: Apr 28, 2022
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Per- and Polyfluoroalkyl Substances (PFASs)

Perth Laboratory - NATA # 2377 Site # 2370						
Melbourne Laboratory - NATA # 1261 Site # 1254						X
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
External Laboratory						
	220413				Ap0039299	
7	0958_QC207_220413	Apr 13, 2022		Water	L22-Ap0039300	X
Test Counts						7

Internal Quality Control Review and Glossary

General

1. 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.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. 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

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/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)	%	95			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	85			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	87			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	95			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	90			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	87			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	92			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	105			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	107			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	124			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	123			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	106			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	140			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	51			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)			%	115			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)			%	135			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	86			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	105			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)									
Perfluorobutanesulfonic acid (PFBS)			%	85			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	94			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	94			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	112			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	102			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	80			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	94			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	58			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	103			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	120			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	147			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	77			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)									
				Result 1					
Perfluorobutanoic acid (PFBA)	M22-Ap0040632	NCP	%	132			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M22-Ap0040632	NCP	%	114			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Ap0040632	NCP	%	100			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Ap0040632	NCP	%	90			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M22-Ap0040632	NCP	%	86			50-150	Pass	
Perfluorononanoic acid (PFNA)	M22-Ap0040632	NCP	%	95			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M22-Ap0040632	NCP	%	87			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Ap0040632	NCP	%	113			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Ap0040632	NCP	%	104			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-Ap0040632	NCP	%	145			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Ap0040632	NCP	%	98			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	M22-Ap0040632	NCP	%	127			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Ap0040632	NCP	%	105			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Ap0040632	NCP	%	148			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M22-Ap0040632	NCP	%	134			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M22-Ap0040632	NCP	%	118			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Ap0040632	NCP	%	78			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Ap0040632	NCP	%	103			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-Ap0040632	NCP	%	105			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M22-Ap0040632	NCP	%	138			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Ap0040632	NCP	%	108			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Ap0040632	NCP	%	112			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M22-Ap0040632	NCP	%	97			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-Ap0040632	NCP	%	77			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-Ap0040632	NCP	%	102			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-Ap0040632	NCP	%	83			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-Ap0040632	NCP	%	86			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-Ap0040632	NCP	%	97			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-Ap0040632	NCP	%	51			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA)				Result 1					
Perfluorooctanesulfonic acid (PFOS)	M22-Ap0040632	NCP	%	93			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCA)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTTrDA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<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-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	M22-Ap0040631	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-Ap0040631	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSA)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M22-Ap0043505	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M22-Ap0043505	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M22-Ap0043505	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M22-Ap0043505	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M22-Ap0043505	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M22-Ap0043505	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M22-Ap0043505	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSA)				Result 1	Result 2	RPD		
Perfluorooctanesulfonic acid (PFOS)	M22-Ap0043505	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Sample Integrity

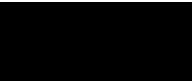
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	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 (VIC)



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

Monitoring Date	Monitoring Location	Sample_ID	Screen Interval	TOC (mAHD)	Well Depth (m)	SWL Time	SWL (mbTOC)	RWL (mAHD)	Other Observations on Bore/Site
11/04/2022	MW101I	0958_MW101I_220411	19.78-22.78	73.5	23.5	15:10	12.18	61.32	
11/04/2022	MW102D	0958_MW102D_220411	40.02-43.02	73.41	43.4	15:12	12.25	61.16	
11/04/2022	MW104I	0958_MW104I_220411	19.5-22.9	73.74	22.9	13:31	12.26	61.48	
11/04/2022	MW105D	0958_MW105D_220411	39-42.5	73.79	42.3	13:59	12.45	61.34	
13/04/2022	MW106S	0958_MW106S_220413	6.8-10.8	71.54	11	12:17	6.78	64.76	
13/04/2022	MW107S		5.5-9.5	71.6	9.5	12:13			Well dry, no sample collected
13/04/2022	MW108S		5.0-9.0	70.9	9	12:12			Bore dry, no sample collected
11/04/2022	MW109S	0958_MW109S_220411	5.8-10.3	73.45	10.3	14:42	7.97	65.48	
11/04/2022	MW110S	0958_MW110S_220411	6.5-10.0	73.74	10	14:38	8.37	65.37	
11/04/2022	MW111S		6.5-9.5	73.87	9.5	10:49			Blocked/dry at 8.28 no sample collected
11/04/2022	MW112S	0958_MW112S_220411	7.5-10.5	73.69	10.5	09:50	8.6	65.09	
11/04/2022	MW113S	0958_MW113S_220411	6.5-9.5	73.79	9.6	09:46	8.75	65.04	Mislabelled MW116 in CoC
11/04/2022	MW114S	0958_MW114S_220411	5.0-8.0	73.68	8	14:15	7.4	66.28	
13/04/2022	MW115S	0958_MW115S_220413	5.0-8.0	70.79	8	12:33	5.62	65.17	
13/04/2022	MW116S	0958_MW116S_220413	8.0-11.0	74.43	11	11:44	9.65	64.78	
13/04/2022	MW117I	0958_MW117I_220413	21.3-23.3	74.19	23	11:23	14	60.19	
13/04/2022	MW118D	0958_MW118D_220413	41.0 - 43.0	74.19	43	11:08	14.07	60.12	
13/04/2022	MW119S	0958_MW119S_220413	10.1-13.1	74.06	13.1	10:46	12.14	61.92	
13/04/2022	MW120I	0958_MW120I_220413	19.94-22.94	73.84	23	10:33	15.16	58.68	
13/04/2022	MW121D	0958_MW121D_220413	39.8-42.8	73.96	42.8	10:31	15.3	58.66	
13/04/2022	MW122S	0958_MW122S_220413	10.5-13.5	75.84	13.5	09:54	12.57	63.27	
13/04/2022	MW123I	0958_MW123I_220413	20-23	76.03	23	10:15	15.23	60.8	
13/04/2022	MW124D	0958_MW124D_220413	39.5-42.5	75.87	42.5	09:56	16.8	59.07	
12/04/2022	MW125S	0958_MW125S_220412	14.25-17.25	74.88	18	13:18	14.91	59.97	
12/04/2022	MW126I	0958_MW126I_220412	33.5-36.5	73.5	36.5	13:02	13.36	60.14	
12/04/2022	MW128D	0958_MW128D_220412	47-50	74.4	50	12:42	17.06	57.34	
12/04/2022	MW129I	0958_MW129I_220412	15.3-18.3	73.51	18	12:33	16.17	57.34	
12/04/2022	MW130D	0958_MW130D_220412	33.5-36.5	72.77	36.5	12:23	15.71	57.06	
12/04/2022	MW131D	0958_MW131D_220412	52.5-55.5	76.59	55.5	12:06	19.83	56.76	
12/04/2022	MW132I	0958_MW132I_220412	18.5-21.5	76.43	21	11:36	19.73	56.7	
12/04/2022	MW133D	0958_MW133D_220412	40.9-43.9	76.49	43.5	11:55	19.6	56.89	
12/04/2022	MW134D		53-56	78.48	56	10:54			Bore Dry, no sample collected
12/04/2022	MW135I	0958_MW135I_220412	21.1-23.6	77.67	24	10:49	21.16	56.51	
12/04/2022	MW136D	0958_MW136D_220412	41-44	78.24	44.9	10:55	21.67	56.57	
12/04/2022	MW137S	0958_MW137S_220412	4.7-8.7	73.12	8.7	15:24	8.35	64.77	
12/04/2022	MW138S	0958_MW138S_220412	9.0-15.0	74.17	15	09:57	9	65.17	
12/04/2022	MW139I	0958_MW139I_220412	27.0-30.0	73.99	30	10:00	14.05	59.94	
12/04/2022	MW140D	0958_MW140D_220412	51.5-54.5	73.9	54	10:16	13.89	60.01	
12/04/2022	MW141S	0958_MW141S_220412	13.5-16.5	74.36	16.5	15:23	10.87	63.49	
12/04/2022	MW142S	0958_MW142S_220412	12.4-15.4	76.34	15.5	15:21	13.48	62.86	
12/04/2022	MW143S		14-18.5	75.81	18.5	15:21			Bore Dry, no sample collected
11/04/2022	MW301	0958_MW301_220411	7_10	74.547	10	15:34	8.9	65.647	
11/04/2022	MW302	0958_MW302_220411	7_10	74.712	10	15:46	9.07	65.642	
11/04/2022	MW303	0958_MW303_220411	7_10	74.574	10	15:37	8.92	65.654	
11/04/2022	MW304	0958_MW304_220411	6.5-9.5	74.094	9.5	11:48	8.13	65.964	
11/04/2022	MW305	0958_MW305_220411	6-9	73.8848	9	12:11	7.83	66.055	
11/04/2022	MW306	0958_MW306_220411	6.0-9.0	73.965	9	12:13	7.98	65.985	
11/04/2022	MW307								Well destroyed
11/04/2022	MW308	0958_MW308_220411	6.0-9.0	73.691	9	11:16	7.8	65.891	
11/04/2022	MW309	0958_MW309_220411	6.5-9.5	73.899	9.5	11:31	7.97	65.929	
11/04/2022	MW310		6-9	73.8057	9	11:25	7.82	65.986	Insufficient volume for sample
11/04/2022	MW312	0958_MW312_220411	6.5-9.5	74.5413	9.5	10:26	8.63	65.911	
11/04/2022	MW313	0958_MW313_220411	7.5-10.5	74.6882	10.5	10:13	8.8	65.888	
11/04/2022	MW401	0958_MW401_220411	NA	NA	NA	09:29			
11/04/2022	MW402	0958_MW402_220411	NA	NA	NA	10:00			
12/04/2022	MW403	0958_MW403_220412	14-26	73.84	26	15:19	21.42	52.42	
11/04/2022	MW504	0958_MW504_220411	10-13	72.82	13	13:28	7.47	65.35	
11/04/2022	MW505	0958_MW505_220411	10_13	73.832	13	10:42	8.51	65.322	
13/04/2022	POT102	0958_POT102_220413				11:55			
11/04/2022	POT103	0958_POT103_220411				14:25			mislabelled POT105 in CoC
11/04/2022	POT104	0958_POT104_220411				10:53			

Monitoring Location	Sampling Method	Temp (°C)	DO (mg/L)	EC (us/Cm)	TDS (mg/L)	pH	Eh (mV)	QC Dup Sample #	Odour Comments	Colour
MW101I	Hydrasleeve	20.2	0.56	91.8	65.8	5.5	-55.6		Sulfidic	Cloudy, Yellow
MW102D	Hydrasleeve	20.1	1.65	230.8	165.5	6.27	-144.6		Sulfidic	Clear
MW104I	Hydrasleeve	21.4	0.82	106.3	74.3	5.66	38.4	QC102, QC202		Clear, Brown
MW105D	Hydrasleeve	20.6	1.32	185.4	131.5	5.82	-16.8			Clear
MW106S	Hydrasleeve	21.8	1.38	200.5	138.7	3.98	164.3		Slight sulfidic	Black, Clear
MW107S										
MW108S										
MW109S	Hydrasleeve	20.8	1.4	113.3	80.1	4.34	195.8			Brown, Cloudy
MW110S	Hydrasleeve	20.2	1.73	159.2	113.8	4.88	157.6			Brown, Clear
MW111S										
MW112S	Hydrasleeve	20.6	3.77	130.5	92.7	3.91	143.6			Brown, Clear
MW113S	Hydrasleeve	20.3	3.34	136.5	97.4	4.26	119			Brown, Clear
MW114S	Hydrasleeve	22	4.45	203.2	140.2	5.56	112.9			Cloudy, Brown
MW115S	Hydrasleeve	22.3	1.36	156.5	105.3	3.88	177.3			Brown, Clear
MW116S	Hydrasleeve	20.9	3.45	167.6	117.4	4	134.2			Brown, Clear
MW117I	Hydrasleeve	20.9	1.12	118	83.1	5.73	102.4			Clear
MW118D	Hydrasleeve	22	2.38	199	136.7	5.62	-134.8	QC107, QC207		Clear
MW119S	Hydrasleeve	20.4	3.61	132.5	94.5	3.99	141			Clear, Yellow
MW120I	Hydrasleeve	20.3	1.3	90.7	64.8	5.06	-71			Yellow, Clear
MW121D	Hydrasleeve	20.6	0.92	165	117	5.63	156		Slight sulfidic	Clear
MW122S	Hydrasleeve	20.4	5.16	273.9	194.9	3.8	143.7			Clear, Brown
MW123I	Hydrasleeve	20.7	0.86	130.7	92.5	5.33	-12.2			Brown, Clear
MW124D	Hydrasleeve	20.5	1.36	231.5	164.5	5.92	91.6	QC106, QC206		Clear
MW125S	Hydrasleeve	20.1	1.19	140.7	100.9	5.66	-134.5		Slight sulfidic	Cloudy, Yellow
MW126I	Hydrasleeve	20.4	0.7	176.4	125.7	5.53	-232.6		Slight sulfidic	Clear
MW128D	Hydrasleeve	21	0.61	205.4	144.4	5.6	122.1		Slight sulfidic	Cloudy, Yellow
MW129I	Hydrasleeve	20.1	0.42	171.1	122.7	5.35	-132.9		Slight sulfidic	Clear
MW130D	Hydrasleeve	21.4	0.99	201.9	141	6.11	-182.1		Slight sulfidic	Clear
MW131D	Hydrasleeve	20.1	1.35	141.3	101.4	5.68	-74.4			Cloudy, Yellow
MW132I	Hydrasleeve	21.2	2.9	115.6	81	5.82	-124.7	QC104, QC204		Clear
MW133D	Hydrasleeve	20.1	0.83	175.1	125.5	5.53	-104			Clear
MW134D										
MW135I	Hydrasleeve	19	1.39	205.2	150.5	6.54	-127.9			Cloudy, Brown
MW136D	Hydrasleeve	18.8	0.78	163	120.2	5.89	-177		Sulfidic	Clear
MW137S	Hydrasleeve	22.4	2.65	296	202.5	3.57	-46.1			Clear, Brown
MW138S	Hydrasleeve	19	1.61	230.7	169.3	4.75	102.3			Brown, Clear
MW139I	Hydrasleeve	18.9	0.83	174.6	128.5	5.51	-151.5			Clear
MW140D	Hydrasleeve	20.1	0.65	409.7	294	6.89	-57.5			Clear
MW141S	Hydrasleeve	20.1	1.05	240	172	4.04	-36			Clear, Yellow
MW142S	Hydrasleeve	22	4.04	302.9	208.5	4.25	106.1			Clear, Brown
MW143S										
MW301	Hydrasleeve	21.2	5.42	192.8	135.2	3.73	163.2			Brown
MW302	Hydrasleeve	21.7	5.57	159.6	110.7	3.63	200.6			Brown
MW303	Hydrasleeve	21.5	5.41	152.9	106.5	3.69	172			Brown
MW304	Hydrasleeve	22.5	1.39	324.3	221.4	5.7	129.8			Brown, Cloudy
MW305	Hydrasleeve	22.5	1.57	179.7	122.7	4.46	-92.2		Slight sulfidic	Brown, Cloudy
MW306	Hydrasleeve	23.1	2.25	291.7	197.1	4.07	155			Brown, Cloudy
MW307										
MW308	Hydrasleeve	23.2	3.64	125.4	84.4	5.21	146.2	QC101, QC201		Cloudy, Brown
MW309	Hydrasleeve	22.3	2.31	141.7	97	5.37	183.3			Cloudy, Brown
MW310										
MW312	Hydrasleeve	21.3	2.72	193.7	135.5	5.69	65.2			Cloudy, Brown
MW313	Hydrasleeve	21.3	6.01	180.8	126.5	4.26	110			Clear, Brown
MW401	Tap	20.3	2.96	415.5	295.6	6.66	-73.3			Clear
MW402	Tap	20.6	4.29	688	488.7	4.06	225.8			Clear
MW403	Hydrasleeve	21	3.1	323.7	227.9	5.65	-59.5	QC105, QC205		Clear, Brown
MW504	Hydrasleeve	22.5	1.51	123.5	84.9	5.15	48.1			Clear, Brown
MW505	Hydrasleeve	21.7	0.71	160.5	111.4	5.93	-54.3			Cloudy, Brown
POT102	Tap	21.1	4.88	1026	720	6.09	159.1			Clear
POT103	Tap	20.9	6.01	873	615	6.23	567.3	QC103, QC203		Clear
POT104	Tap	24	5.19	1074	712	6.97	767.2			Clear

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	✓	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	✓	174.70 mV
	pH slope	✓	55 to 60 mV/pH, ideal 59mV 58.56
	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 8 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:

				Instrument Readings				
Parameter	Standards	Calibration Point	Units	Before		After		Units
Temperature	Check Temp NATA		°C	NA		22.4		°C
pH 21G	pH 7.00	7.01	mV	7.11		7.01		pH
pH 21G	pH 4.00	4.00	mV	4.08		4.02		pH
Conductivity (21H100008)	1413 µS/cm at 25.0°C	2764	5.03	1520 @ 25.0		1413 @ 25.0		µS/cm
ORP (Reference check only) 21O	Zobell A & B	235	mV	238.4		240.1		mV
Zero DO (21G100131)	NaSO3 in distilled water	0.0	NA	0		0		%
100% DO (21G100131)	100% Air Saturation	100.0	uA	100				%

Calibrated by:

Calibration Date: 05/04/22

Date of Bump Test	Project 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	DEF9009	YSI #	100% Saturation? ☒ Y ☐ N	0% Calibration? ☒ Y ☐ N ☐ NA	pH 4.00 ☒ Y ☐ N pH 7.00 ☒ Y ☐ N EC: 1,413µS/cm ☒ Y ☐ N	19.0°C	pH 4.00: 4.06 pH 7.00: 7.00 EC:	pH 4.00: (± pH 0.2) ☒ Y ☐ N pH 7.00: (± pH 0.2) ☒ Y ☐ N EC: (± 150µS/cm) ☒ Y ☐ N			
12/4	DEF9009	YSI #	100% Saturation? ☒ Y ☐ N	0% Calibration? ☒ Y ☐ N ☐ NA	pH 4.00 ☒ Y ☐ N pH 7.00 ☒ Y ☐ N EC: 1,413µS/cm ☒ Y ☐ N	19.3°C	pH 4.00: 4.11 pH 7.00: 6.99 EC:	pH 4.00: (± pH 0.2) ☒ Y ☐ N pH 7.00: (± pH 0.2) ☒ Y ☐ N EC: (± 150µS/cm) ☒ Y ☐ N			
13/4	DEF9009	YSI #	100% Saturation? ☒ Y ☐ N	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: 4.16 pH 7.00: 7.04 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 ☒ N	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 ☒ N	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 ☒ N	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 ☒ N	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

Data Quality Review PFAS Ongoing Monitoring Plan Post-summer 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 on 11 to 13 April 2022 and is in accordance with the proposed scope of work, as documented in the SAQP (ref DEF19009_Gingin Satellite Airfield_OMP PFAS_SAQP_Rev6) issued to the client and in general compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i> and NEPM “National Environment Protection (Assessment of Site Contamination) Measure”.</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 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 generally in compliant with required timeframes.	
Background samples	MW137 is considered a background location.		
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> <p>A sample labelling mistake was identified for samples EP2204288-002 and EP2204288-020. An amended laboratory certificate of analysis was provided by ALS with corrected samples ID.</p>		
	Data Precision & Accuracy		
QC sample Frequency	QC sample type	SAQP required frequency	Sample Collected
	Blind duplicate	1 in 10 primary samples (10%)	1 for 3 tap water samples (33%) 6 for 51 groundwater samples (11.8%)
	Split duplicate	1 in 10 primary samples (10%)	1 for 3 tap water samples (33%) 6 for 51 groundwater samples (11.8%)
	Rinsate	1 per YSI per day	3 for 3 day (100%)

QA/QC Aspects		Evidence & Evaluation	
	Field Blank	1 per day	3 for 3 day (100%)

QC Testing –
Blind Replicates
(Primary Lab)

- RPD Acceptance Criteria:

Magnitude of Results	Acceptable RPD range
< 10 x LOR	No limits
10 – 20 LOR	0% - 50%
> 20 x LOR	0% - 20%

Groundwater

- Primary Groundwater Samples Analysed: 51
- Blind Replicate Samples Analysed: 6

All RPDs were within acceptance criteria with the exception of QC sample QC101 which reported the following RPD exceedance:

- PFPeS (21%)

This minor exceedance is not considered to have impacted the reliability of the dataset.

Tap water

- Primary tap water Samples Analysed: 3
- Blind Replicate Samples Analysed: 1

All RPDs were within acceptance criteria.

QC Testing –
Field Splits
(Secondary Lab)

- RPD Acceptance Criteria:

Magnitude of Results	Acceptable RPD range
< 10 x LOR	No limits
10 – 20 LOR	0% - 50%
> 20 x LOR	0% - 20%

Groundwater

- Primary Groundwater Samples Analysed: 51
- Blind Replicate Samples Analysed: 6

All RPDs were within acceptance criteria with the exception of QC201 (5 exceedances) and QC202 (2 exceedances). The exceedances reported were generally minor and likely due to the difference of laboratory methods or the low concentrations of analyte under review. This is not considered to have impacted the reliability of the dataset. As a conservative measure the highest concentration was adopted for the assessment.

Tap water

- Primary tap water Samples Analysed: 3
- Blind Replicate Samples Analysed: 1

All RPDs were within acceptance criteria with the exception of QC sample QC203 which reported the following RPD exceedance:

- PFHxA (32%)

This minor exceedance is likely due to the difference of laboratory methods or the low concentrations of analyte under review. This is not considered to have impacted the reliability of the dataset.

Field Blanks

Field Blanks were collected at a rate of one per fieldwork 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, laboratory control samples and laboratory duplicates.</p> <p>No Quality Control sample frequency non-conformance was reported: No Matrix Spike, Method Blank value outliers were reported.</p>
Laboratory Method Detection Limit	<p>Laboratory reports indicate the method detection limits were generally 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 Eurofins Accreditation No. 1261</p>
Calibration of Field Equipment	<p>All equipment used during the investigation was calibrated by the supplier prior to use.</p> <p>The equipment calibration certificates are provided in Appendix D.</p>
Decontamination and Equipment Blanks	<p>Rinsate blanks were collected at a rate of one per day when reusable equipment (water quality meter) was used.</p> <p>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>
Qualified Personnel	<p>Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.</p>
Sample Integrity	<p>Field Chain of Custody/Laboratory request forms can be found in Appendix C.</p>
Data Completeness	
Completeness of test program	<p>The scope of work undertaken was generally consistent with the SAQP.</p>
Validity of Data Set	<p>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 investigation is considered valid and complete.</p>

APPENDIX

F

INFORMATION ABOUT ENVIRONMENTAL REPORTS

About Site Environmental Assessment Reports

1. Introduction

This document explains the Environmental Site Assessment (ESA) process and the context that applies to the use of Environmental Reports issued by Cardno.

2. What is an ESA?

Environmental Site Assessments (ESA) are undertaken for a range of purposes, specific to the brief issued by the client in each case. The scope may include one or a combination of any of the following:

- ☐ A factual report of the condition of a portion of the site or one aspect of an entire site.
- ☐ Assessment of the contamination levels in soil to be removed from a site – a waste classification assessment.
- ☐ Validation of the success of remediation of a site or a portion of a site.
- ☐ Provision of a professional opinion about the suitability of a site for one or more uses, in terms of its contamination status.

The scope of any ESA needs to be defined at the outset.

An ESA is not an Environmental Audit. Such audits are undertaken in accordance with the provisions of regulations enacted in various states of Australia, and are referred to as Site Audits in some jurisdictions. Statutory audits provide certification by EPA accredited auditors that a site is suitable for one or more uses. An ESA may provide similar advice but cannot be used in place of an audit if the latter is required by regulation in any instance. However in some circumstances and jurisdictions an ESA is sufficient to provide “environmental sign-off” of a site.

An ESA may be undertaken for due diligence purposes, to establish whether the site has been impacted to the extent that some beneficial uses of the site may be precluded. Due diligence audits in many cases may be completed as non-statutory Audits, although in some jurisdictions they can also be statutory audits, if defined as such at the outset.

3. The ESA Process

The Client generally initiates the ESA process by specifying a brief which identifies the specific objectives of the assessment. If not, it is the consultants’ duty to so specify the ESA

In the case of an ESA to provide an opinion about the suitability of the site for use, it would be conducted in accordance with NEPM (Site Assessment). Such ESA would not commence until a thorough site history assessment (Phase 1 Assessment: to identify the potential for significant contamination at a site) is conducted. However, where the history is unclear, a broad screening of chemical parameters can be used to test environmental media. This normally includes a broad range of organic and inorganic compounds and elements, often referred to as an Environmental Screen.

(In the case of an ESA for a purpose other than to provide an opinion about the suitability of the site for use, it is not always necessary to undertake a Phase 1 assessment.)

The ESA requires sampling of soil at representative locations across the site. A NATA accredited laboratory performs the analysis of soil. It is impractical for all of the soil to be assessed. The ESA is often based on a statistical method of grid or random sampling, augmented by targeted sampling at locations known or suspected to be contaminated. Guidance on sampling strategy and density is provided in Australian Standard AS4482.1–2005. However, some considerable degree of judgement is still required in the application of any sampling and testing strategy. For example the blanket application of the “hot spot” method presented in this standard is often inappropriate given its limitations.

The field program also investigates the likelihood of contamination below the site surface. Field investigations must sample and test fill as well as the natural soils. If contamination is found then it is common for further work to be undertaken to characterise, to the extent practical, its vertical and horizontal extent. However, where fill is encountered and testing shows it to be uncontaminated, it must be realised that the heterogeneous nature of the material might mean that not all pockets of contaminated material can be detected using normal sampling regimes.

EPA guidelines for auditors, that may be relevant for an ESA, indicate the need in all cases to consider the potential for groundwater contamination in any site. This does not mean all sites need to be drilled to sample groundwater, but it is most often the case. Most hydrogeological settings and groundwater conditions are complex and vary in space and time. The condition of groundwater is investigated to identify if any beneficial use or environmental value of groundwater is precluded due to contamination.

As previously stated for soil, all groundwater at the site cannot be tested. The environmental investigations are conducted in accordance with industry standards and guidelines (e.g. EPA Vic Pub 668). This provides a level of confidence that a sufficiently comprehensive assessment of the groundwater at the site is achieved.

Where an investigation shows that groundwater is polluted, consideration should be given to assessing the risks and the need for and practicality of any clean up.

4. Environmental Assessment Report

The ESA Report details the findings of the ESA. It provides summary information on the site definition, the reasons for the assessment and other relevant facts. It reviews the scope and quality of the site investigations, laboratory testing and data analyses undertaken. These reports also present a review of the contamination status of the site, the need for any further clean up, and an opinion on the suitability of the site for a range of beneficial uses and land uses such as “residential – low density”, “commercial” etc, as appropriate.

However, as noted above, some ESA have a narrow scope such as for classification of waste soil for removal from site, and do not make conclusions on suitability of site for use.

The ESA Report generally includes copies of other documents and reports, necessary to support the assessment findings, presented as appendices. These can contain more detailed information than the body of the ESA Report. Care should be taken to also read the appended documents and the ESA report in full.

Cardno generally issues reports in electronic form (e-Report) on CD ROM. ESA Reports are issued in this format as Adobe Acrobat™ PDF files. However, a paper copy of the executive summary of the ESA Report is generally issued to the client, and others as required by the brief or by regulation.

5. Limitations of Environmental Assessment Report

The ESA Report is prepared in a manner that can be easily read by a lay person with a legitimate interest in the contamination status of the site, such as the site owner or occupier, EPA and Local Planning Authority. The ESA report is not intended for use by other parties or for other purposes. Anyone who uses the assessment report for purposes other than specified in the report, does so at their own risk.

The site should only be used for one or more of the beneficial uses and land uses identified in the ESA as suitable.

The conditions and qualifications may apply to the suitability of the site for use, and it is the responsibility of the Client to be cognizant of and accept these in accepting the report. Cardno are only responsible for the issuing of the ESA report but accepts no liability for the costs incurred in the implementation of ESA findings.

The ESA provides a “snapshot” of the site conditions at the time of the site investigation. Consequently, the report may not be valid at a later time if there has been any change to the contamination status of the site in that time. Verification of the status of the site may be required in cases where a significant time has elapsed, or site conditions have changed since the assessment and audit.

The ESA is necessarily limited by constraints such as time, cost and available information; although normal professional practice at the time has been applied with all due care to prepare the report. A necessary requirement of this process is the horizontal and vertical interpolation of data from discrete locations. However, site conditions are generally not homogenous and some discrepancies will occur between the actual and predicted results at locations not directly sampled. There is a risk that contamination may occur at the site and not be identified by a competent investigation and assessment. The approach adopted in sampling (a combination of statistically based grid and judgmental sampling) seeks to reduce, but cannot eliminate, this risk.

Where unexpected occurrences of contamination arise, subsequent to the issue of the ESA Report, Cardno should be permitted to make an interpretation of these facts in relation to the ESA Report findings. Consequently, the Client should inform Cardno and seek their opinion. Cardno accepts no liability for costs incurred due to such

unexpected occurrences, given the inherent uncertainties in the assessment process.

Cardno uses information provided by other parties as the basis for the ESA, and reliance on this information is at the discretion of Cardno. However, however Cardno cannot guarantee any of the facts, findings or conclusions presented by other parties. Cardno will not be liable for the use of information, provided by others that is subsequently found to be intentionally misleading.

The ESA Report is not and does not purport to be anything other than a contaminated land ESA. It is not a geotechnical report and bore logs reproduced are for interpretation of the likely distribution of contamination. They are not intended for geotechnical interpretations and may not be adequate for this purpose.

The ESA Report is not intended to be a comprehensive analysis of the presence and associated risk of asbestos in buildings and services. Where asbestos in buildings and services is known or likely, the report may only caution that an appropriately qualified person be engaged to undertake demolition to avoid contamination of the site.

Cardno

13 August 2015

PFAS OMP Quarterly Monitoring Event Factual Report

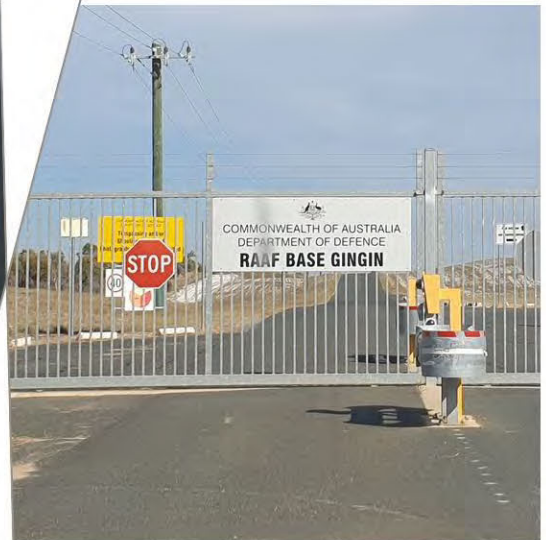
July 2022

Gingin Satellite Airfield

304700525

Prepared for
Department of Defence

10 October 2022



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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 & Abbreviations

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
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
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’ Rev 6.

The SAQP was reviewed prior to the sampling event and no changes 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 2022 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 Sites¹.

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 performed in general accordance with the SAQP (Cardno, 2022), 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 bores 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, 2022) 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.

2.4 Deviations from the OMP SAQP

The following deviations 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.
- > On-site tap water monitoring locations POT103 (internal tap at the kitchen sink in the Fire House) was inaccessible due to the building being locked and no keys available onsite. This has a limited impact on

the OMP, it is understood this building is no longer in use and therefore exposure to impacted water is unlikely.

- > To prevent risks of cross contamination of the groundwater monitoring wells, the water quality parameters were taken from water collected from the HydraSleeves rather than placing the water quality meter inside the well casing. This deviation doesn't impact the OMP.

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 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 and sampler's initials.</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).

Activity	Details
	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 Chain of Custody documentation are included in Appendix C.

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 via flow cell, and samples were analysed for the same analytical suite as the groundwater monitoring wells.

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.

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 (TDS ranging from 163.1 mg/L to 674 mg/L), and acidic (pH ranging 4.13 to 6.18). Groundwater temperature was on average 19°C, and DO readings mostly indicate aerobic groundwater condition (DO ranging from 1.34 mg/L to 4.8 mg/L). Field parameters were generally consistent with the previous monitoring events.

4.2.1.2 Groundwater gauging

Groundwater elevation was recorded from 52.43 mAHD (MW403) to 63.38 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	0.10 (MW402)	5	0
Sum of PFHxS and PFOS	MW402, MW141S	0.07 ²	2.27 (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 July 2022 quarterly monitoring event.
- > Two out of five groundwater samples (MW141S, MW402) reported Sum of PFOS and PFHxS concentrations above the drinking water guideline value. One (MW402) was above the recreational use value, which is similar to previous monitoring events.
- > 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 624 mg/L to 652 mg/L), and acidic (pH ranging 5.98 to 6.03). Tap water temperature was on average 19°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 (POT104, POT102)	2	0
Sum of PFHxS and PFOS	POT102, POT104	0.07 ²	0.31 (POT102)	2	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 first time detect of PFOA or Sum of PFOS and PFHxS were reported for the tap water locations during the July 2022 quarterly monitoring event.
- > Both 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.
- > Both 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

On-site tap water monitoring locations POT103 was inaccessible and unable to be sampled. Keys to the Fire House building should be located prior to the next monitoring event.

5 Summary and Conclusions

Cardno undertook the July 2022 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 bores and two on-site taps. One groundwater monitoring well couldn't be sampled as this well was found to be dry and one tap couldn't be sampled as the building where it is located was locked.

The groundwater laboratory results reported the following:

- > Of the five (5) groundwater samples tested, Sum of PFOS and PFHxS (2 samples) reported an exceedance of the HEPA (2020) drinking water guideline value. One of these samples was above the HEPA (2020) recreational use guideline value.
- > No exceedances of the guideline values for PFOA were reported for the groundwater samples.
- > No first time detect or new exceedance of guideline values were reported for the quarterly groundwater monitoring locations.

The tap water laboratory results reported the following:

- > Both 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.
- > Both samples reported PFOA concentrations above the laboratory LOR but below the adopted assessment criteria.
- > No first time detect 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 winter 2022), scheduled for September 2022. 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 Water Quality Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000).
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 2018) National Water Quality Management Strategy Australian Drinking Water Guidelines 6, August 2018
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, 2021, PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan.
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. Department of Defence, 2018a, Gingin Satellite Airfield PFAS Ongoing Monitoring Plan.
27. Department of Defence, 2018b, Gingin Satellite Airfield PFAS Investigation, PFAS Management Area Plan.
28. Jacobs, 2018a, Preliminary Conceptual Site Model - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0001).
29. Jacobs, 2018b, Sampling, Analysis and Quality Plan - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0002).
30. Jacobs, 2018c, Detailed Site Investigation - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-003).

31. Jacobs, 2018d, Tier 2 Human Health Risk Assessment – Offsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0005).
32. Jacobs, 2018e, Tier 3 Human Health Risk Assessment – Onsite Receptors - Gingin Satellite Airfield Comprehensive PFAS Investigations (No. IS219200-0000- NP- RPT-0006).
33. Jacobs, 2019, PFAS Ongoing Groundwater Monitoring Report (No. IS219200-0000-NP-RPT-0008).

APPENDIX

A

FIGURES



now



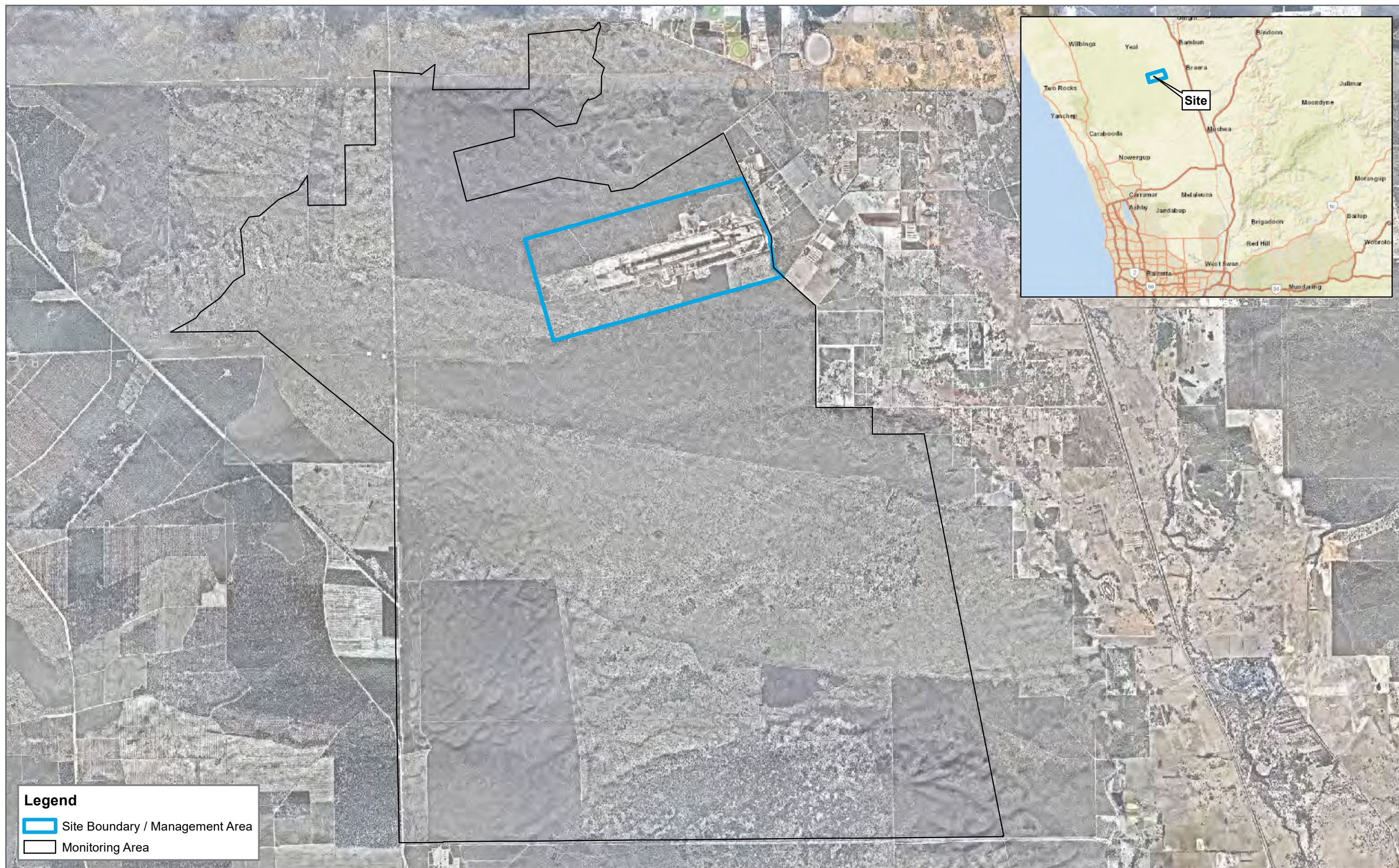


FIGURE 1
1:60,000 Scale at A3

Meters

0 1,000 2,000

Site Location

**QUARTERLY SAMPLING EVENT
 GINGIN SATELLITE AIRFIELD
 DEPARTMENT OF DEFENCE**



Map Produced by Cardno WA
 Date: 2022-08-10 | Project: DEF19009
 Coordinate System: GDA 1994 MGA Zone 50
 Map: DEF19009_WA_0958-GS-001_RegionalLocation 02.mxd
 Aerial Imagery Supplied by Nearmap

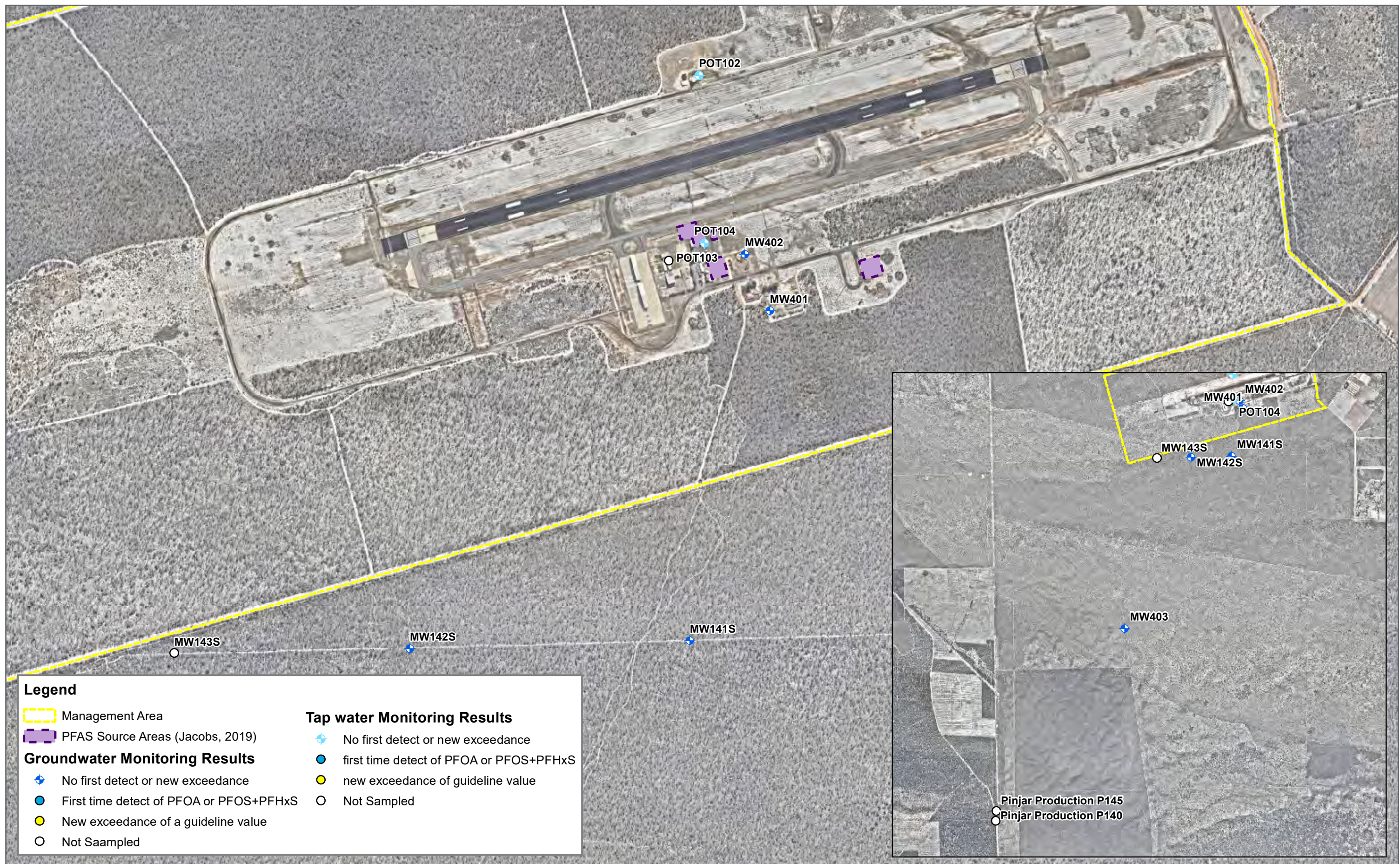


FIGURE 2
1:10,000 Scale at A3

Meters

0 200 400

Monitoring Locations & Results Summary

QUARTERLY SAMPLING EVENT
GINGIN SATELLITE AIRFIELD
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2022-08-10 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0958-GS-002_2022Q3PFASResults 01.mxd
Aerial Imagery Supplied by Nearmap

APPENDIX

B

DATA ASSESSMENT TABLES



now



							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 (PFTrDA)	
	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.																
	15/07/2022	0958_QC302_220715	Rinsate	EP2208860	<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
	15/07/2022	0958_QC402_220715	Field Blank	EP2208860	<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
MW141S	15/07/2022	0958_MW141S_220715	Normal	EP2208860	0.04	0.05	0.40	0.03	0.32	<0.02	<0.1	<0.02	0.09	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	15/07/2022	0958_QC102_220715	Field Duplicate	EP2208860	0.04	0.05	0.43	0.04	0.34	<0.02	<0.1	<0.02	0.11	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	15/07/2022	0958_QC202_220715	Interlab Duplicate	906764	0.04	0.04	0.35	0.04	0.28	<0.01	<0.05	0.02	0.07	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
MW142S	15/07/2022	0958_MW142S_220715	Normal	EP2208860	<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
MW401	15/07/2022	0958_MW401_220715	Normal	EP2208860	<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
MW402	15/07/2022	0958_MW402_220715	Normal	EP2208860	0.17	0.21	1.50	0.11	0.77	<0.02	<0.1	0.06	0.32	0.05	0.10	<0.02	<0.02	<0.02	<0.02	<0.02
MW403	15/07/2022	0958_MW403_220715	Normal	EP2208860	<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
POT102	15/07/2022	0958_POT102_220715	Normal	EP2208860	0.02	0.02	0.19	<0.02	0.12	<0.02	<0.1	<0.02	0.10	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	15/07/2022	0958_QC103_220715	Field Duplicate	EP2208860	0.02	0.03	0.19	<0.02	0.12	<0.02	<0.1	<0.02	0.10	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	15/07/2022	0958_QC203_220715	Interlab Duplicate	906764	0.02	0.02	0.14	0.02	0.09	<0.01	<0.05	0.02	0.07	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
POT104	15/07/2022	0958_POT104_220715	Normal	EP2208860	<0.02	<0.02	0.16	<0.02	0.11	<0.02	<0.1	<0.02	0.09	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02

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

	Perfluorotetradecanoic acid (PFTeDA)	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	0.01	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.															
	15/07/2022	0958_QC302_220715	Rinsate	EP2208860	<0.05	<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
	15/07/2022	0958_QC402_220715	Field Blank	EP2208860	<0.05	<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	15/07/2022	0958_MW141S_220715	Normal	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.72	0.88	0.96
MW141S	15/07/2022	0958_QC102_220715	Field Duplicate	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.77	0.95	1.04
MW141S	15/07/2022	0958_QC202_220715	Interlab Duplicate	906764	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.63	0.79	0.88
MW142S	15/07/2022	0958_MW142S_220715	Normal	EP2208860	<0.05	<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	15/07/2022	0958_MW401_220715	Normal	EP2208860	<0.05	<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
MW402	15/07/2022	0958_MW402_220715	Normal	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2.27	2.97	3.29
MW403	15/07/2022	0958_MW403_220715	Normal	EP2208860	<0.05	<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	15/07/2022	0958_POT102_220715	Normal	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.31	0.45	0.47
POT102	15/07/2022	0958_QC103_220715	Field Duplicate	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.31	0.45	0.48
POT102	15/07/2022	0958_QC203_220715	Interlab Duplicate	906764	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.23	0.35	0.39
POT104	15/07/2022	0958_POT104_220715	Normal	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.27	0.38	0.38

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

Date Field ID Matrix Type Lab Report Number			15/07/2022	15/07/2022	RPD	15/07/2022	15/07/2022	RPD	15/07/2022	15/07/2022	RPD	15/07/2022	15/07/2022	RPD
			0958_MW141S_220715	0958_QC102_220715		0958_MW141S_220715	0958_QC202_220715		0958_POT102_220715	0958_QC103_220715		0958_POT102_220715	0958_QC203_220715	
			Water	Water		Water	Water		Water	Water		Water	Water	
			EP2208860	EP2208860		EP2208860	906764		EP2208860	EP2208860		EP2208860	906764	
	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	0.04	0.04	0	0.04	0.04	0	0.02	0.02	0	0.02	0.02	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	0.05	0.05	0	0.05	0.04	22	0.02	0.03	40	0.02	0.02	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.40	0.43	7	0.40	0.35	13	0.19	0.19	0	0.19	0.14	30
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	0.03	0.04	29	0.03	0.04	29	<0.02	<0.02	0	<0.02	0.02	0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.32	0.34	6	0.32	0.28	13	0.12	0.12	0	0.12	0.09	29
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	0.02	0	<0.02	<0.02	0	<0.02	0.02	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	0.09	0.11	20	0.09	0.07	25	0.10	0.10	0	0.10	0.07	35
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	0.03	0.03	0	0.03	0.02	40	0.02	0.02	0	0.02	0.01	67
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 (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
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	0.72	0.77	7	0.72	0.63	13	0.31	0.31	0	0.31	0.23	30
Sum of PFAS (WA DER List)	µg/L	0.01	0.88	0.95	8	0.88	0.79	11	0.45	0.45	0	0.45	0.35	25
Sum of PFAS	µg/L	0.01	0.96	1.04	8	0.96	0.88	9	0.47	0.48	2	0.47	0.39	19
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)	µg/L	0.01					0.65						0.24	
Sum of PFAS (PFOS + PFOA)	µg/L	0.01					0.3						0.1	

*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



**CHAIN OF CUSTODY**

COC#: 40128

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW - Q3 2022

ORDER NO: pfas-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:

CONTACT PH: [REDACTED]

QUOTE NO: SY/139/19 B

SAMPLER MOBILE: [REDACTED]

/ 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_MW403		15/07/2022 09:49 AM	Water	ALS: 2 Non ALS: 0	No	X			
002	0958_MW142S		15/07/2022 10:30 AM	Water	ALS: 2 Non ALS: 0	No	X			
003	0958_MW141S		15/07/2022 10:48 AM	Water	ALS: 2 Non ALS: 0	No	X			
004	0958_QC102		15/07/2022 10:49 AM	Water	ALS: 2 Non ALS: 0	No	X			
005	0958_MW401		15/07/2022 11:08 AM	Water	ALS: 4 Non ALS: 0	No	X			extra PFAS bottles for lab QC
006	0958_MW402		15/07/2022 11:16 AM	Water	ALS: 2 Non ALS: 0	No	X			
007	0958_POT104		15/07/2022 11:22 AM	Water	ALS: 2 Non ALS: 0	No	X			
008	0958_POT102		15/07/2022 11:51 AM	Water	ALS: 2 Non ALS: 0	No	X			
009	0958_QC103		15/07/2022 11:52 AM	Water	ALS: 4 Non ALS: 0	No	X			extra PFAS bottles for lab QC



CHAIN OF CUSTODY

COC#: 40128

ALS Laboratory: EP Perth

CLIENT: MWAHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0958_PFASOMP

SITE: Gingin GW - Q3 2022

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:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ 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
010	0958_QC302		15/07/2022 11:57 AM	Water	ALS: 2 Non ALS: 0	No		X		
011	0958_QC402		15/07/2022 11:57 AM	Water	ALS: 2 Non ALS: 0	No		X		

**CHAIN OF CUSTODY**

COC#: 40128

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 - Q3 2022

ORDER NO: pfas-omp Gingin

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

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:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0958_MW403	HDPE (no PTFE)	20 mL	00350621066941	Grey	No	
001	0958_MW403	HDPE (no PTFE)	20 mL	00350621066940	Grey	No	
002	0958_MW142S	HDPE (no PTFE)	20 mL	00350621066985	Grey	No	
002	0958_MW142S	HDPE (no PTFE)	20 mL	00350621066840	Grey	No	
003	0958_MW141S	HDPE (no PTFE)	20 mL	00350621067067	Grey	No	
003	0958_MW141S	HDPE (no PTFE)	20 mL	00350621066780	Grey	No	
004	0958_QC102	HDPE (no PTFE)	20 mL	00350621067207	Grey	No	
004	0958_QC102	HDPE (no PTFE)	20 mL	00350621066817	Grey	No	
005	0958_MW401	HDPE (no PTFE)	20 mL	00350621067099	Grey	No	
005	0958_MW401	HDPE (no PTFE)	20 mL	00350621066933	Grey	No	
005	0958_MW401	HDPE (no PTFE)	20 mL	00350621067135	Grey	No	
005	0958_MW401	HDPE (no PTFE)	20 mL	00350621066984	Grey	No	
006	0958_MW402	HDPE (no PTFE)	20 mL	00350621066760	Grey	No	
006	0958_MW402	HDPE (no PTFE)	20 mL	00350621067184	Grey	No	
007	0958_POT104	HDPE (no PTFE)	20 mL	00350621066818	Grey	No	
007	0958_POT104	HDPE (no PTFE)	20 mL	00350621067082	Grey	No	
008	0958_POT102	HDPE (no PTFE)	20 mL	00350621067044	Grey	No	
008	0958_POT102	HDPE (no PTFE)	20 mL	00350621066796	Grey	No	
009	0958_QC103	HDPE (no PTFE)	20 mL	00350621067032	Grey	No	
009	0958_QC103	HDPE (no PTFE)	20 mL	00350621067017	Grey	No	
009	0958_QC103	HDPE (no PTFE)	20 mL	00350621066766	Grey	No	
009	0958_QC103	HDPE (no PTFE)	20 mL	00350621066923	Grey	No	
010	0958_QC302	HDPE (no PTFE)	20 mL	00350621066896	Grey	No	
010	0958_QC302	HDPE (no PTFE)	20 mL	00350621067900	Grey	No	
011	0958_QC402	HDPE (no PTFE)	20 mL	00350621067141	Grey	No	
011	0958_QC402	HDPE (no PTFE)	20 mL	00350621067330	Grey	No	



CHAIN OF CUSTODY

COC#: 40128

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 - Q3 2022

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:

Total Bottle Count: ALS: 26, Non ALS: 0

**SAMPLE RECEIPT NOTIFICATION (SRN)****Work Order : EP2208860**

Client : STANTEC AUSTRALIA PTY LTD
Contact : [REDACTED]
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]@alsglobal.com
Telephone : [REDACTED]
Facsimile : [REDACTED]

Project : WA_0958_PFASOMP
Order number : pfas-omp Gingin
C-O-C number : 40128
Site : Gingin GW - Q3 2022
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 : 15-Jul-2022 13:15
Client Requested Due Date : 26-Jul-2022

Issue Date : 18-Jul-2022
Scheduled Reporting Date : **26-Jul-2022**

Delivery Details

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

Security Seal : Not Available
Temperature : 5.6 - Ice present
No. of samples received / analysed : 11 / 11

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)
EP2208860-001	15-Jul-2022 09:49	0958_MW403_220715	✓
EP2208860-002	15-Jul-2022 10:30	0958_MW142S_220715	✓
EP2208860-003	15-Jul-2022 10:48	0958_MW141S_220715	✓
EP2208860-004	15-Jul-2022 10:49	0958_QC102_220715	✓
EP2208860-005	15-Jul-2022 11:08	0958_MW401_220715	✓
EP2208860-006	15-Jul-2022 11:16	0958_MW402_220715	✓
EP2208860-007	15-Jul-2022 11:22	0958_POT104_220715	✓
EP2208860-008	15-Jul-2022 11:51	0958_POT102_220715	✓
EP2208860-009	15-Jul-2022 11:52	0958_QC103_220715	✓
EP2208860-010	15-Jul-2022 11:57	0958_QC302_220715	✓
EP2208860-011	15-Jul-2022 11:57	0958_QC402_220715	✓

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	██████████
██████████	- *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 : EP2208860
Client : STANTEC AUSTRALIA PTY LTD
Contact : [REDACTED]
Address : GROUND FLOOR 226 ADELAIDE TERRACE
 PERTH 6000
Telephone : ----
Project : WA_0958_PFASOMP
Order number : pfas-omp Gingin
C-O-C number : 40128
Sampler : [REDACTED]
Site : Gingin GW - Q3 2022
Quote number : SY/139/19 B
No. of samples received : 11
No. of samples analysed : 11

Page : 1 of 11
Laboratory : Environmental Division Perth
Contact : [REDACTED]
Address : 26 Rigali Way Wangara Western Australia Australia 6065
Telephone : [REDACTED]
Date Samples Received : 15-Jul-2022 13:15
Date Analysis Commenced : 20-Jul-2022
Issue Date : 26-Jul-2022 12:07



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_MW403_220715	0958_MW142S_22071 5	0958_MW141S_22071 5	0958_QC102_220715	0958_MW401_220715
Sampling date / time					15-Jul-2022 09:49	15-Jul-2022 10:30	15-Jul-2022 10:48	15-Jul-2022 10:49	15-Jul-2022 11:08
Compound	CAS Number	LOR	Unit	EP2208860-001	EP2208860-002	EP2208860-003	EP2208860-004	EP2208860-005	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.04	0.04	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.05	0.05	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.40	0.43	<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.03	0.04	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.32	0.34	<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	0.09	0.11	<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	0.03	0.03	<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_MW403_220715	0958_MW142S_220715 5	0958_MW141S_220715 5	0958_QC102_220715	0958_MW401_220715
Sampling date / time					15-Jul-2022 09:49	15-Jul-2022 10:30	15-Jul-2022 10:48	15-Jul-2022 10:49	15-Jul-2022 11:08
Compound	CAS Number	LOR	Unit	EP2208860-001	EP2208860-002	EP2208860-003	EP2208860-004	EP2208860-005	
				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	0.96	1.04	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.72	0.77	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.88	0.95	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	109	94.4	96.9	99.5	98.7	
13C8-PFOA	----	0.02	%	87.7	90.6	94.2	98.5	91.0	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0958_MW402_220715	0958_POT102_220715 5	0958_QC103_220715	----	----
Sampling date / time				15-Jul-2022 11:16	15-Jul-2022 11:51	15-Jul-2022 11:52	----	----
Compound	CAS Number	LOR	Unit	EP2208860-006	EP2208860-008	EP2208860-009	-----	-----
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.17	0.02	0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.21	0.02	0.03	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	1.50	0.19	0.19	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.11	<0.02	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.77	0.12	0.12	----	----
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	0.06	<0.02	<0.02	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.32	0.10	0.10	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.05	<0.02	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.10	0.02	0.02	----	----
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_MW402_220715	0958_POT102_220715 5	0958_QC103_220715	----	----
Sampling date / time				15-Jul-2022 11:16	15-Jul-2022 11:51	15-Jul-2022 11:52	----	----
Compound	CAS Number	LOR	Unit	EP2208860-006	EP2208860-008	EP2208860-009	-----	-----
				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	3.29	0.47	0.48	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	2.27	0.31	0.31	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	2.97	0.45	0.45	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	99.4	104	107	----	----
13C8-PFOA	----	0.02	%	93.1	83.5	82.4	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0958_QC302_220715	0958_QC402_220715	----	----	----
Sampling date / time					15-Jul-2022 11:57	15-Jul-2022 11:57	----	----	----
Compound	CAS Number	LOR	Unit	EP2208860-010	EP2208860-011	-----	-----	-----	
				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_QC302_220715	0958_QC402_220715	----	----	----
Sampling date / time				15-Jul-2022 11:57	15-Jul-2022 11:57	----	----	----
Compound	CAS Number	LOR	Unit	EP2208860-010	EP2208860-011	-----	-----	-----
Result				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	102	----	----	----
13C8-PFOA	----	0.02	%	83.1	86.0	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

0958_POT104_22071
5

Sampling date / time

15-Jul-2022 11:22

Compound

CAS Number

LOR

Unit

EP2208860-007

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	0.16	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.11	----	----	----	----
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	0.09	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

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



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0958_POT104_22071 5	----	----	----	----
Sampling date / time				15-Jul-2022 11:22	----	----	----	----
Compound	CAS Number	LOR	Unit	EP2208860-007	-----	-----	-----	-----
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	0.38	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.27	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.38	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	110	----	----	----	----
13C8-PFOA	----	0.02	%	82.8	----	----	----	----



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	: EP2208860	Page	: 1 of 6
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 Western Australia Australia 6065
Telephone	: ----	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 15-Jul-2022
Order number	: pfas-omp Gingin	Date Analysis Commenced	: 20-Jul-2022
C-O-C number	: 40128	Issue Date	: 26-Jul-2022
Sampler	: [REDACTED]		
Site	: Gingin GW - Q3 2022		
Quote number	: SY/139/19 B		
No. of samples received	: 11		
No. of samples analysed	: 11		



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: 4474300)									
EP2208860-005	0958_MW401_220715	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: 4474300)									
EP2208860-005	0958_MW401_220715	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: 4474300)									
EP2208860-005	0958_MW401_220715	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 : EP2208860
 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: 4474300) - continued									
EP2208860-005	0958_MW401_220715	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: 4474300)									
EP2208860-005	0958_MW401_220715	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: 4474300)									
EP2208860-005	0958_MW401_220715	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			
Method: Compound	CAS Number	LOR	Unit		Result	Spike	Spike Recovery (%)	Acceptable Limits (%)
				Concentration		LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4474300)								
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	102	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	96.6	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	92.6	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	93.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4474300)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	90.2	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	114	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.0	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	108	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	90.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	90.4	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	79.2	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	95.8	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	89.0	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4474300)								
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	87.8	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	80.6	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	92.8	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	71.6	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	100	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	83.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4474300)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	94.8	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	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	108	67.0	138



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: 4474300) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	89.0	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: 4474300)							
EP2208860-009	0958_QC103_220715	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	91.2	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.25 µg/L	100	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	89.6	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	98.8	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	89.6	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	103	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4474300)							
EP2208860-009	0958_QC103_220715	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	95.0	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	105	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	114	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	103	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	109	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	94.4	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	98.4	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	82.8	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	96.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4474300)							
EP2208860-009	0958_QC103_220715	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	113	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	95.9	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	85.1	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	103	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	80.7	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	107	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: 4474300) - continued							
EP2208860-009	0958_QC103_220715	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	96.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4474300)							
EP2208860-009	0958_QC103_220715	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	100	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	104	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	91.0	71.4	144

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2208860	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: [REDACTED]
Project	: WA_0958_PFASOMP	Date Samples Received	: 15-Jul-2022
Site	: Gingin GW - Q3 2022	Issue Date	: 26-Jul-2022
Sampler	: [REDACTED]	No. of samples received	: 11
Order number	: pfas-omp Gingin	No. of samples analysed	: 11

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	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	15	6.67	10.00	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_MW403_220715, 0958_MW141S_220715, 0958_MW401_220715, 0958_POT104_220715, 0958_QC103_220715, 0958_QC402_220715	0958_MW142S_220715, 0958_QC102_220715, 0958_MW402_220715, 0958_POT102_220715, 0958_QC302_220715,	15-Jul-2022	22-Jul-2022	11-Jan-2023	✔	25-Jul-2022	11-Jan-2023	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0958_MW403_220715, 0958_MW141S_220715, 0958_MW401_220715, 0958_POT104_220715, 0958_QC103_220715, 0958_QC402_220715	0958_MW142S_220715, 0958_QC102_220715, 0958_MW402_220715, 0958_POT102_220715, 0958_QC302_220715,	15-Jul-2022	22-Jul-2022	11-Jan-2023	✔	25-Jul-2022	11-Jan-2023	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0958_MW403_220715, 0958_MW141S_220715, 0958_MW401_220715, 0958_POT104_220715, 0958_QC103_220715, 0958_QC402_220715	0958_MW142S_220715, 0958_QC102_220715, 0958_MW402_220715, 0958_POT102_220715, 0958_QC302_220715,	15-Jul-2022	22-Jul-2022	11-Jan-2023	✔	25-Jul-2022	11-Jan-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_MW403_220715, 0958_MW141S_220715, 0958_MW401_220715, 0958_POT104_220715, 0958_QC103_220715, 0958_QC402_220715	0958_MW142S_220715, 0958_QC102_220715, 0958_MW402_220715, 0958_POT102_220715, 0958_QC302_220715,	15-Jul-2022	22-Jul-2022	11-Jan-2023	✔	25-Jul-2022	11-Jan-2023	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0958_MW403_220715, 0958_MW141S_220715, 0958_MW401_220715, 0958_POT104_220715, 0958_QC103_220715, 0958_QC402_220715	0958_MW142S_220715, 0958_QC102_220715, 0958_MW402_220715, 0958_POT102_220715, 0958_QC302_220715,	15-Jul-2022	22-Jul-2022	11-Jan-2023	✔	25-Jul-2022	11-Jan-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	1	15	6.67	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
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.

1

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2 Kingston Town Close, Oakleigh, VIC 3166
Phone: +613 8564 5000 Fax: +613 8564 5090
Email: enquiries.melb@mqtlabmark.com.au

Page 1 of 1

CLIENT DETAILS

Company Name : Cardno (WA) Pty Ltd

Contact Name : Maelle Bourdais

Purchase Order :	DEF19009
------------------	----------

COC Number :	DEF19009 -01
--------------	--------------

Office Address : 11 Harvest Terrace, West perth, WA, 6005

PROJECT Number :	WA 0958 PFASOMP
------------------	-----------------

Eurofins | mgt quote ID :

Email for COC/SRN/Results :

PROJECT Name ;	WA_0958_PFASOMP
----------------	-----------------

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

PFAS (28 analytes) - standard LOR

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	
-----	------	------	-----	-----------	---------	-----	--

Relinquished By:

Received

Date & Time :

Signature: _____

Date & Time :

15/07/2022

Signature: _____

Laboratory Staff

Turn around time

Method Of Shipment

Temperature on arrival:

1 DAY ☐ 2 DAY ☐ 3 DAY ☐

STANDARD ☒ Other:

☒ Courier
☐ Hand Delivered
☐ Postal

Courier Consignment #

Report number:

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ABN: 91 05 0159 898

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IANZ# 1327

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Rolleston,
Christchurch 7675
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IANZ# 1290

Sample Receipt Advice

Company name: Stantec Australia Pty Ltd (WA)
Contact name: [REDACTED]
Project name: WA_0958_PFASOMP
Project ID: WA_0958_PFASOMP
Turnaround time: 5 Day
Date/Time received: Jul 18, 2022 3:10 PM
Eurofins reference: 906764

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]@stantec.com.

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

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Christchurch
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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
Project ID: WA_0958_PFASOMP

Order No.: DEF19009
Report #: 906764
Phone: 0458 839 200
Fax:

Received: Jul 18, 2022 3:10 PM
Due: Jul 25, 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_QC202_220715	Jul 15, 2022		Water	L22-JI0036057	X
2	0958_QC203_220715	Jul 15, 2022		Water	L22-JI0036058	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 **906764-W**
Project name **WA_0958_PFASOMP**
Project ID **WA_0958_PFASOMP**
Received Date **Jul 18, 2022**

Client Sample ID			0958_QC202_2 20715	0958_QC203_2 20715
Sample Matrix			Water	Water
Eurofins Sample No.			L22-JI0036057	L22-JI0036058
Date Sampled			Jul 15, 2022	Jul 15, 2022
Test/Reference	LOR	Unit		
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.02	0.02
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.07	0.07
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	0.01	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 0.02	^{N09} 0.01
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	%	91	87
13C5-PFPeA (surr.)	1	%	103	113
13C5-PFHxA (surr.)	1	%	103	110
13C4-PFHpA (surr.)	1	%	106	97
13C8-PFOA (surr.)	1	%	99	71
13C5-PFNA (surr.)	1	%	87	52
13C6-PFDA (surr.)	1	%	69	33
13C2-PFUnDA (surr.)	1	%	51	24
13C2-PFDoDA (surr.)	1	%	40	23
13C2-PFTeDA (surr.)	1	%	33	31
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	%	56	29
D3-N-MeFOSA (surr.)	1	%	56	45

Client Sample ID			0958_QC202_2 20715	0958_QC203_2 20715
Sample Matrix			Water	Water
Eurofins Sample No.			L22-JI0036057	L22-JI0036058
Date Sampled			Jul 15, 2022	Jul 15, 2022
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonamido substances				
D5-N-EtFOSA (surr.)	1	%	54	47
D7-N-MeFOSE (surr.)	1	%	43	34
D9-N-EtFOSE (surr.)	1	%	46	32
D5-N-EtFOSAA (surr.)	1	%	42	25
D3-N-MeFOSAA (surr.)	1	%	45	23
Perfluoroalkyl sulfonic acids (PFASs)				
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	0.04	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	^{N09} 0.04	^{N09} 0.02
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.35	^{N09} 0.14
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.04	^{N09} 0.02
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.28	^{N09} 0.09
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	127	104
18O2-PFHxS (surr.)	1	%	118	95
13C8-PFOS (surr.)	1	%	82	53
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	%	122	63
13C2-6:2 FTSA (surr.)	1	%	120	46
13C2-8:2 FTSA (surr.)	1	%	57	26
13C2-10:2 FTSA (surr.)	1	%	44	18
PFASs Summations				
Sum (PFHxS + PFOS)*	0.01	ug/L	0.63	0.23
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.3	0.1
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.65	0.24
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.79	0.35
Sum of PFASs (n=30)*	0.1	ug/L	0.88	0.39

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 20, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Jul 20, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAAs)	Melbourne	Jul 20, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Jul 20, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Jul 19, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			



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NATA# 1261 Site# 18217

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Address: 6F 226, Adelaide Terrace
Perth
WA 6000

Project Name: WA_0958_PFASOMP
Project ID: WA_0958_PFASOMP

Order No.: DEF19009
Report #: 906764
Phone: 0458 839 200
Fax:

Received: Jul 18, 2022 3:10 PM
Due: Jul 25, 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_QC202_220715	Jul 15, 2022		Water	L22-JI0036057	X
2	0958_QC203_220715	Jul 15, 2022		Water	L22-JI0036058	X
Test Counts						2

Internal Quality Control Review and Glossary

General

1. 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.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. 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

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/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)	%	80			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	91			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	86			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	84			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	87			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	85			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	92			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	94			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	84			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	70			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	83			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	74			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	71			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	67			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	76			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	75			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	88			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	84			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)									
Perfluorobutanesulfonic acid (PFBS)			%	81			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	83			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	84			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	83			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	81			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	90			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	89			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	81			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	86			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	101			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	83			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	87			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-JI0036057	CP	%	89			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	L22-JI0036057	CP	%	98			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	L22-JI0036057	CP	%	97			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	L22-JI0036057	CP	%	98			50-150	Pass	
Perfluorooctanoic acid (PFOA)	L22-JI0036057	CP	%	90			50-150	Pass	
Perfluorononanoic acid (PFNA)	L22-JI0036057	CP	%	102			50-150	Pass	
Perfluorodecanoic acid (PFDA)	L22-JI0036057	CP	%	109			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	L22-JI0036057	CP	%	120			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	L22-JI0036057	CP	%	116			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	L22-JI0036057	CP	%	87			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L22-JI0036057	CP	%	112			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	M22-JI0044043	NCP	%	91			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-JI0044043	NCP	%	120			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-JI0044043	NCP	%	101			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-JI0044043	NCP	%	114			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-JI0044043	NCP	%	117			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-JI0044043	NCP	%	104			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-JI0044043	NCP	%	104			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M22-JI0044043	NCP	%	125			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-JI0044043	NCP	%	86			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-JI0044043	NCP	%	95			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-JI0044043	NCP	%	65			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-JI0044043	NCP	%	103			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-JI0044043	NCP	%	97			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-JI0044043	NCP	%	99			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-JI0044043	NCP	%	81			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)	M22-JI0044043	NCP	%	76			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-JI0044043	NCP	%	98			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-JI0044043	NCP	%	100			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-JI0044043	NCP	%	111			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)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTriDA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	L22-JI0036049	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)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L22-JI0036049	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L22-JI0036049	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Sample Integrity

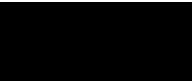
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	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



Monitoring Date	Monitoring Location	Sample_ID	Screen Interval	TOC (mAHD)	Well Depth (m)	SWL (mbTOC)	RWL (mAHD)	Observations	Sampling Method	Temp (°C)	DO (mg/L)	EC (us/Cm)	TDS (mg/L)	pH	Eh (mV)	QC Sample #	Odour	Colour
15/07/2022	MW403	0958_MW403_220715	14-26	73.84	26	21.412	52.43		HydraSleeve	18.5	1.34	363	269.2	6.18	-118.6		no	Clear
15/07/2022	MW143S		14-18.5	75.81	18.5			Dry										
15/07/2022	MW142S	0958_MW142S_220715	12.4-15.4	76.34	15.4	13.572	62.77		HydraSleeve	18.8	3.76	2980	219.7	4.42	141.9		no	Yellow
15/07/2022	MW141S	0958_MW141S_220715	13.5-16.5	74.36	16.5	10.98	63.38	QC102/202	HydraSleeve	18.5	2.53	220	163.1	4.13	-48.6	102/202	no	Cloudy
15/07/2022	MW401	0958_MW401_220715	NA	NA	NA				Tap	21.1	4.8	238.3	167.5	5.75	-9.8		no	Clear
15/07/2022	MW402	0958_MW402_220715	NA	NA	NA				Tap	18.5	2.34	908	674	5.38	-112.7		no	Clear
15/07/2022	POT104	0958_POT104_220715							Tap	19.1	7.82	891	652	5.98	43		no	Clear
15/07/2022	POT103	0958_POT103_220715						No access to building. locked, no keys available on Base.										
15/07/2022	POT102	0958_POT102_220715						QC103/203	Tap	18.9	4.74	849	624	6.03	131.6	103/203	no	Clear



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	✓	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	Operational	✓	
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		✓	174.70 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.56
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 8 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	Calibration Point	Units	Instrument Readings				Units
				Before		After		
Temperature	Check Temp NATA		°C	NA				°C
pH 21G	pH 7.00	7.01	mV	7.04		7.00		pH
pH 21G	pH 4.00	4.00	mV	4.09		4.00		pH
Conductivity (21H100008) 1413	2364 µS/cm at 25°C	2364 / 413	5.03	1443		1413		µS/cm
ORP (Reference check only) 210	Zobell A & B	235	mV	250		231.5		mV
Zero DO (21G100131)	NaSO3 in distilled water	0.0	NA	0		0		%
100% DO (21G100131)	100% Air Saturation	100.0	uA	100		100		%

Calibrated by:

Calibration Date: 03/06/22

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)
15/7/22	0958	YSI #21610 5325	100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N	/	pH 4.00: 4.03 pH 7.00: 7.00 EC: 1524	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 N	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: 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 N	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: 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 N	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 N	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 N	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 N	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 N	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



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Data Quality Review PFAS Ongoing Monitoring Plan July 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 on the 15th July 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 “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 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 report: EP2208860. ▪ Eurofins ARL report: 906764.

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 2 tap water samples (50%)
Interlab duplicate	1 in 10 primary samples (10%)	1 for 5 groundwater samples (20%) 1 in 2 tap water samples (50%)
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: 2
 - 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: 2
 - Interlab Duplicate Samples Analysed: 1
- All RPDs were within acceptance criteria with the following exception:
- QC203 Sum of PFOS and PFHxS – 30%, Sum of PFAS – 25%.
- These exceedances are likely due the difference of methodologies between the primary and secondary laboratories and the low concentrations of analytes under review. Individual analytes didn't report RPD exceedance. 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%. The following quality control samples frequency outliers was reported:</p> <ul style="list-style-type: none"> ▪ EP2208860: <ul style="list-style-type: none"> - Laboratory Duplicates: PFAS by LCMSMS, expected frequency of 10% not achieved. <p>The above exception 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.

APPENDIX

D

DATA ASSESSMENT



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		Field Parameters				
		Temperature (Field)	pH (Field)	DO (Field)	Electrical Conductivity (field)	Redox Potential (Field)
		°C	pH Units	mg/L	µS/cm	mV

Location Code	Date					
MW101I	23/10/2019	22.8	5.72	2.7	125.1	52.3
MW101I	4/05/2020	21.3	8	1.38	247.6	-200.5
MW101I	28/04/2021	21	6.39	0.89	119.1	-62
MW101I	11/04/2022	20.2	5.5	0.56	91.8	-55.6
MW102D	4/05/2020	22.6	5.76	0.8	136.7	-199.8
MW102D	21/10/2020	20.8	6.28	14.02	141.9	-61.1
MW102D	28/04/2021	21	7.96	1.05	523.3	107
MW102D	11/04/2022	20.1	6.27	1.65	230.8	-144.6
MW104I	25/10/2019	24.1	12.1		2,923	-51.2
MW104I	7/05/2020	22.5	6.35	1.95	133.4	2.8
MW104I	21/10/2020	21	5.43	2.19	221.5	78.7
MW104I	28/04/2021	24.8	8.02	1.17	125.7	5.8
MW104I	11/04/2022	21.4	5.66	0.82	106.3	38.4
MW105D	25/10/2019	24.1	8.02	1.77	219.8	121.4
MW105D	7/05/2020	20.8	5.04	2.19	341.9	14.9
MW105D	21/10/2020	22.1	4.82	4.47	121.2	14.9
MW105D	28/04/2021	23.2	9.62	1.72	240.5	-1.2
MW105D	11/04/2022	20.6	5.82	1.32	185.4	-16.8
MW106S	25/10/2019	21	2.86	0.99	222.8	294.1
MW106S	7/05/2020	20.1	3.77	1.55	328.9	43.2
MW106S	23/10/2020	20.6	2.79	4.51	256.8	211.8
MW106S	27/04/2021	21.6	3.41	1.81	272	329.7
MW106S	13/04/2022	21.8	3.98	1.38	200.5	164.3
MW108S	27/10/2021	19.6	4.25	0.91	283.2	-9.7
MW109S	25/10/2019	22.9	3.7	2.43	163.8	367.7
MW109S	5/05/2020	20.4	5.21	1.29	114.4	27.8
MW109S	21/10/2020	20.4	3.51	1.01	143.6	277.2
MW109S	28/04/2021	22.9	4.68	1.3	127.6	163.9
MW109S	27/10/2021	19.3	5.63	5.2	177.6	9
MW109S	11/04/2022	20.8	4.34	1.4	113.3	195.8
MW110S	25/10/2019	23.1	3.79	3.8	112.3	234.4
MW110S	5/05/2020	20.1	4.79	1.63	108.1	8.2
MW110S	21/10/2020	20.5	3.68	2.07	126.5	248
MW110S	28/04/2021	22	4.66	2.3	109.2	219.2
MW110S	11/04/2022	20.2	4.88	1.73	159.2	157.6
MW112S	24/10/2019	23.7	3.65	3.19	113.2	324.5
MW112S	4/05/2020	20.6	6.94	2.89	125.1	-125
MW112S	21/10/2020	20.5	3.24	6.22	137.4	267.2
MW112S	28/04/2021	22.9	3.83	9.39	177.5	319.3
MW112S	11/04/2022	20.6	3.91	3.77	130.5	143.6
MW113S	24/10/2019	26.5	3.62	1.98	165.8	343.6
MW113S	4/05/2020	20.4	4.44	2.98	147.3	-141.1
MW113S	21/10/2020	20.1	3.22	2.55	161.7	276.1
MW113S	28/04/2021	22.1	4.03	1.35	133.5	303.9
MW113S	11/04/2022	20.3	4.26	3.34	136.5	119
MW114S	14/10/2020	22.9	6.15	5.11	180	2,325
MW114S	11/04/2022	22	5.56	4.45	203.2	112.9
MW115S	25/10/2019	25.1	3.12	1.35	187.7	237.2
MW115S	5/05/2020	22.5	4.11	1.58	142.1	21.1
MW115S	21/10/2020	21.3	3.36	2.19	196.5	255.1
MW115S	28/04/2021	23.7	4.03	1.11	136.2	272.7
MW115S	27/10/2021	19.3	5.79	1.34	222.2	-124.7
MW115S	13/04/2022	22.3	3.88	1.36	156.5	177.3
MW116S	25/10/2019	21.3	3.34	2.78	130.2	187.8
MW116S	6/05/2020	18.7	4.2	3.25	147.6	-29.2
MW116S	21/10/2020	19.7	3.35	2.08	146.3	175.9
MW116S	28/04/2021	21	3.99	2.26	150.4	273.3
MW116S	13/04/2022	20.9	4	3.45	167.6	134.2
MW117I	6/05/2020	18.6	4.85	1.5	110.1	-7
MW117I	21/10/2020	20.4	4.87	1.17	124.1	50.6
MW117I	28/04/2021	21	5.18	1.83	129.1	33.7
MW117I	13/04/2022	20.9	5.73	1.12	118	102.4
MW118D	25/10/2019	21.7	5.01	0.6	190.6	85.7
MW118D	6/05/2020	18.7	5.03	1.24	200.6	13.3
MW118D	21/10/2020	20.8	4.97	1.99	200.1	51
MW118D	28/04/2021	21.3	5.01	1.3	212.5	4.8
MW118D	13/04/2022	22	5.62	2.38	199	-134.8
MW119S	24/10/2019	21	3.51	2.8	94.5	157.6
MW119S	6/05/2020	18	3.9	2.18	141.9	-3.6
MW119S	28/04/2021	22.2	4.1	2.55	126.2	320.2
MW119S	13/04/2022	20.4	3.99	3.61	132.5	141
MW120I	24/10/2019	22.8	4.02	0.78	93.9	139.1
MW120I	6/05/2020	15.8	4.29	0.97	76.2	-54
MW120I	21/10/2020	21	4.36	2.68	92.2	94.1
MW120I	28/04/2021	23	5.22	2.86	100	108.4
MW120I	13/04/2022	20.3	5.06	1.3	90.7	-71
MW121D	24/10/2019	23.1	6.06	0.77	321	-43.9
MW121D	6/05/2020	17.5	5.03	1.94	255.9	-21.8
MW121D	21/10/2020	21.3	5.52	0.83	295.6	-9.9
MW121D	28/04/2021	22.9	5.94	3.1	162	-44.8
MW121D	13/04/2022	20.6	5.63	0.92	165	156
MW122S	25/10/2019	21.4	3.56	3.13	124.4	209.5
MW122S	5/05/2020	20.1	4.3	1.76	155.7	50.1
MW122S	21/10/2020	22.5	3.45	7.01	143.8	247.7
MW122S	28/04/2021	4.44	4.42	4.78	158.9	293.5
MW122S	13/04/2022	20.4	3.8	5.16	273.9	143.7
MW123I	25/10/2019	20.3	4.44	0.86	132.3	63.7
MW123I	5/05/2020	20.4	5.15	0.72	150.2	16.7
MW123I	14/10/2020	21.1	5.75	4.08	199.8	-134
MW123I	28/04/2021	22	5.47	1.7	188.2	-41.5
MW123I	13/04/2022	20.7	5.33	0.86	130.7	-12.2
MW124D	25/10/2019	20.1	5.25	0.53	180	91.3

		Field Parameters				
		Temperature (Field)	pH (Field)	DO (Field)	Electrical Conductivity (field)	Redox Potential (Field)
		°C	pH Units	mg/L	µS/cm	mV
MW124D	21/10/2020	21.4	4.67	0.86	190.8	167.5
MW124D	28/04/2021	20.9	6.02	0.52	413.1	47.3
MW124D	13/04/2022	20.5	5.92	1.36	231.5	91.6
MW125S	24/10/2019	21.4	5.08	1.23	93.2	46.1
MW125S	7/05/2020	19	5.21	1.59	92.3	2.9
MW125S	23/10/2020	19.9	4.54	0.79	111.6	55.2
MW125S	27/04/2021	21	4.99	1.38	126.2	37.2
MW125S	12/04/2022	20.1	5.66	1.19	140.7	-134.5
MW126I	24/10/2019	20.2	5.65	1.3	166.3	26.3
MW126I	7/05/2020	19.2	5.28	1.15	174.7	-4.2
MW126I	23/10/2020	20.2	4.82	0.83	180.3	46.3
MW126I	27/04/2021	22.4	5.3	1.41	203.7	-2.5
MW126I	12/04/2022	20.4	5.53	0.7	176.4	-232.6
MW128D	24/10/2019	21.2	5.13	0.52	158.9	-55.3
MW128D	7/05/2020	19.1	5.18	2.53	169.3	-8.8
MW128D	23/10/2020	19.6	4.51	1.01	198.7	109.6
MW128D	27/04/2021	21.4	4.82	0.56	214.5	129.5
MW128D	12/04/2022	21	5.6	0.61	205.4	122.1
MW129S	24/10/2019	24	5.14	0.46	177.8	-36.5
MW129S	7/05/2020	18.9	5.19	1.11	166.6	-3.9
MW129S	23/10/2020	19.8	4.53	2.73	189.1	35.3
MW129S	27/04/2021	24.1	5.44	1.96	115	-23.7
MW129S	12/04/2022	20.1	5.35	0.42	171.1	-132.9
MW130D	24/10/2019	19.8	7.77	1.65	191.4	-51.2
MW130D	7/05/2020	18.4	5.61	1	198.8	-4.6
MW130D	23/10/2020	19.8	5.28	0.92	198.3	18.2
MW130D	27/04/2021	21.8	5.73	1.21	229.3	-48.9
MW130D	12/04/2022	21.4	6.11	0.99	201.9	-182.1
MW131D	24/10/2019	19.4	5.02	1.26	140.4	59.1
MW131D	6/05/2020	18.5	5.46	1.28	176.3	-86.4
MW131D	23/10/2020	20.1	4.93	1.61	156.3	40.2
MW131D	27/04/2021	23.3	5.48	1.19	203.5	-26.9
MW131D	27/10/2021	17.5	6.76	4.74	351.8	25.2
MW131D	12/04/2022	20.1	5.68	1.35	141.3	-74.4
MW132I	24/10/2019	19.9	4.61	1.45	95.1	5.8
MW132I	6/05/2020	17.5	5.31	2.52	177.1	-106.2
MW132I	23/10/2020	20	4.95	0.91	205.5	9.7
MW132I	27/04/2021	21.5	5.05	0.73	164.6	27.7
MW132I	12/04/2022	21.2	5.82	2.9	115.6	-124.7
MW133D	24/10/2019	19.2	4.92	1.12	166.3	-3.8
MW133D	6/05/2020	18.4	5.34	2.63	102.1	-60.4
MW133D	23/10/2020	19.7	4.79	2.42	107.3	19.5
MW133D	27/04/2021	25.3	5.54	1.51	160.8	-5
MW133D	12/04/2022	20.1	5.53	0.83	175.1	-104
MW134D	24/10/2019	19.1	5.13	1	167.9	-24.6
MW134D	7/05/2020	18	5.13	2.89	168.6	3.1
MW134D	23/10/2020	19.6	4.96	1.49	171.8	24.8
MW135I	24/10/2019	19.8	4.64	1.83	165.2	158.9
MW135I	7/05/2020	18	4.99	2	177.2	-25.9
MW135I	23/10/2020	18.9	4.93	2.53	193.4	52.7
MW135I	27/04/2021	20.2	4.98	1.71	226.7	35.8
MW135I	27/10/2021	19.6	5.58	3.71	103.8	63
MW135I	12/04/2022	19	6.54	1.39	205.2	-127.9
MW137S	8/05/2020	20.5	4.5	8.15	190.5	64.7
MW137S	23/10/2020	22.2	3.43	10.88	233.9	236.5
MW137S	28/04/2021	24.1	4.59	3.25	216.6	172.7
MW137S	12/04/2022	22.4	3.57	2.65	296	-46.1
MW138S	24/10/2019	23	3.44	0.78	244.7	183.9
MW138S	7/05/2020	18.6	4.33	1.35	271.2	-23.8
MW138S	23/10/2020	18.9	3.74	0.99	322	170.2
MW138S	27/04/2021	22.6	4.47	1.44	323.5	231.9
MW138S	27/10/2021	19.2	6.33	6	50.7	32.6
MW138S	12/04/2022	19	4.75	1.61	230.7	102.3
MW139I	24/10/2019	22.8	4.91	0.59	180.5	72.5
MW139I	7/05/2020	18.4	5.41	1.14	183.4	-45.4
MW139I	23/10/2020	18.6	5.73	2.04	206.6	-42
MW139I	27/04/2021	22.5	6.33	0.92	226.9	36
MW139I	12/04/2022	18.9	5.51	0.83	174.6	-151.5
MW140D	24/10/2019	21.4	6.47	2.66	391.5	-43.1
MW140D	7/05/2020	17.5	5.88	1.89	376.9	-31.1
MW140D	23/10/2020	19.1	5.42	6.14	410	-13.7
MW140D	27/04/2021	20.4	6.99	0.79	676	-46.4
MW140D	12/04/2022	20.1	6.89	0.65	409.7	-57.5
MW141S	25/10/2019	20.7	3.76	1.01	186.4	96.8
MW141S	10/03/2020	32.2	5.04	3.49	237.4	170.6
MW141S	7/05/2020	18.9	5	1.34	195.4	24.7
MW141S	19/08/2020	18.6	5.17	2.13	193.5	130.2
MW141S	23/10/2020	20.1	4.03	1.55	177.2	19.3
MW141S	28/01/2021	21.5	5.53	2.61	147.6	245.6
MW141S	28/04/2021	22.2	4.01	1.69	188.4	67.4
MW141S	15/07/2021	18.3	4.45	2.76	263.4	20.5
MW141S	20/01/2022	23.6	4.28	1.03	270.4	-103.2
MW141S	12/04/2022	20.1	4.04	1.05	240	-36
MW141S	15/07/2022	18.5	4.13	2.53	220	-48.6
MW142S	25/10/2019	21.8	3.68	3.21	221.4	259.1
MW142S	10/03/2020	30.9	4.21	4.26	291.3	168.2
MW142S	7/05/2020	18.7	4.39	2.61	238.3	33
MW142S	19/08/2020	18.2	4.65	4.58	279.3	324
MW142S	29/10/2020	20.4	4.73	21.11	285	84.5
MW142S	28/01/2021	20.7	3.91	2.2	274.7	302.1
MW142S	28/04/2021	26.5	3.64	4.02	289	337
MW142S	15/07/2021	18.2	4.12	3.5	232.4	262.6
MW142S	20/01/2022	24.8	4.32	2.6	323.7	128.1
MW142S	12/04/2022	22	4.25	4.04	302.9	106.1

		Field Parameters				
		Temperature (Field)	pH (Field)	DO (Field)	Electrical Conductivity (field)	Redox Potential (Field)
		°C	pH Units	mg/L	µS/cm	mV
MW142S	15/07/2022	18.8	4.42	3.76	298	141.9
MW143S	10/03/2020	29.8	4.58	2.65	294.9	211.9
MW301	24/10/2019	24.5	3.68	3.66	137.1	295.1
MW301	4/05/2020	22.5	4.12	2.62	183.7	-47.4
MW301	21/10/2020	20.6	3.04	2.65	208.1	265.1
MW301	28/04/2021	22.2	3.61	4.46	227.7	302.6
MW301	11/04/2022	21.2	3.73	5.42	192.8	163.2
MW302	24/10/2019	23.4	3.46	5.36	174.4	365.7
MW302	4/05/2020	25.3	4.86	5.14	251.1	-25.6
MW302	21/10/2020	20.8	3.55	4.36	141.3	193.8
MW302	28/04/2021	22.3	4.02	4.76	141	194.4
MW302	11/04/2022	21.7	3.63	5.57	159.6	200.6
MW303	24/10/2019	21.4	4.02	6.26	146.7	284.8
MW303	4/05/2020	24	4.38	3.48	142.4	-34.6
MW303	21/10/2020	20.9	3.29	4.47	148.8	250.6
MW303	28/04/2021	22.3	3.94	4.06	149.5	268.5
MW303	11/04/2022	21.5	3.69	5.41	152.9	172
MW304	25/10/2019	24.2	4.76	1.88	255.3	238.6
MW304	5/05/2020	22.3	5.51	2.12	286.5	41.9
MW304	15/10/2020	20.9	4.98	4.17	217.6	201.7
MW304	11/04/2022	22.5	5.7	1.39	324.3	129.8
MW305	25/10/2019	22.3	4.44	2.41	157.9	244.9
MW305	15/10/2020	21.5	4.69	2.43	164	188.1
MW305	11/04/2022	22.5	4.46	1.57	179.7	-92.2
MW306	25/10/2019	22.6	3.87	0.51	215.1	278.1
MW306	15/10/2020	20.9	4.98	3.8	160.9	183.6
MW306	11/04/2022	23.1	4.07	2.25	291.7	155
MW307	25/10/2019	28	4.28		131.8	329.8
MW307	15/10/2020	20.5	5.92	4.79	123.3	104.2
MW307	28/04/2021	24.4	5.13	2.5	158.4	179.5
MW308	25/10/2019	25.6	4.08	3.23	134.5	335.5
MW308	15/10/2020	20.6	6.89	4.3	391.3	161.5
MW308	27/10/2021	19.5	3.85	2.73	169.1	129
MW308	11/04/2022	23.2	5.21	3.64	125.4	146.2
MW309	25/10/2019	27	5.13	4.22	143.4	379.5
MW309	15/10/2020	21.8	4.95	1.94	144.7	196.6
MW309	27/10/2021	22.1	5.78	1.16	168.5	-123.1
MW309	11/04/2022	22.3	5.37	2.31	141.7	183.3
MW310	25/10/2019	28.1	4.68	1	241.7	308.9
MW310	5/05/2020	25.3	6.92	2.72	396.4	-41.6
MW310	15/10/2020	21.7	6.85	4.36	258.4	71
MW310	28/04/2021	25.9	6.85	2.11	154.2	113
MW310	27/10/2021	19.4	4.02	2.09	145.1	187.6
MW312	24/10/2019	26.6	5.36		173.8	192.6
MW312	5/05/2020	22.2	5.29	1.61	193.5	-53.4
MW312	21/10/2020	20.9	4.52	1.94	162.1	258.1
MW312	28/04/2021	24.4	5.76	1.07	165.4	116.8
MW312	27/10/2021	18.2	4.27	6.71	177.1	112.9
MW312	11/04/2022	21.3	5.69	2.72	193.7	65.2
MW313	24/10/2019	27.8	5.93	2.53	163.8	188.4
MW313	5/05/2020	22.1	5.73	1.81	181.5	-62.9
MW313	15/10/2020	21	6.37	5.23	190.9	140.4
MW313	28/04/2021	24.3	5.52	1.42	162.2	139.4
MW313	27/10/2021	17.4	6.01	4.3	152.9	45.3
MW313	11/04/2022	21.3	4.26	6.01	180.8	110
MW401	24/10/2019	26.7	6.49	0.87	380.4	17.8
MW401	18/03/2020	26.2	6.45	2.94	125.9	171.6
MW401	4/05/2020	20	5.89	1.8	399	-178.1
MW401	19/08/2020	20.6	7.43	2.75	493.3	-186
MW401	15/10/2020	23.8	6.43	2.78	251.2	-46.6
MW401	28/01/2021	25.1	6.32	2.9	256.6	-12
MW401	15/07/2021	19.2	5.65	5.21	155	43.3
MW401	19/01/2022	36.1	6.21	2.04	266.4	0.2
MW401	11/04/2022	20.3	6.66	2.96	415.5	-73.3
MW401	15/07/2022	21.1	5.75	4.8	238.3	-9.8
MW402	7/11/2019	28.5	5.57	0.85	409.7	-78.7
MW402	18/03/2020	23.2	6.5	2.19	200.6	-104
MW402	6/05/2020	18.6	5.17	2.16	651	-7.8
MW402	19/08/2020	23.6	7.7	1.43	533	-71
MW402	29/10/2020	29.7	5.99	1.22	611	148
MW402	19/01/2022	27.5	5.87	1.81	597	-82
MW402	11/04/2022	20.6	4.06	4.29	688	225.8
MW402	15/07/2022	18.5	5.38	2.34	908	-112.7
MW403	18/11/2019	24.9	5.88	1.15	361.2	92.8
MW403	10/03/2020	36.9	5.02	8.12	451.7	173.5
MW403	8/05/2020	19.7	5.03	8.91	341.9	57.3
MW403	19/08/2020	18.3	5.74	2.17	302.1	-157
MW403	29/10/2020	19.7	4.36	1.25	366.2	127.2
MW403	28/01/2021	20.6	5.13	2	373.8	225.7
MW403	5/05/2021	18	7.2	1.63	422.7	83.8
MW403	15/07/2021	18.1	5.05	1.66	346.1	218.3
MW403	20/01/2022	23.5	5.72	1.78	410.5	121.3
MW403	12/04/2022	21	5.65	3.1	323.7	-59.5
MW403	15/07/2022	18.5	6.18	1.34	363	-118.6
MW504	21/10/2020	22.3	5	1.5	125.1	133.1
MW504	28/04/2021	23.8	5.8	1.27	61	130.1
MW504	27/10/2021	22.2	3.61	4.42	258.2	161.4
MW504	11/04/2022	22.5	5.15	1.51	123.5	48.1
MW505	21/10/2020	21.3	4.53	1.24	118.6	205.4
MW505	28/04/2021	24.5	5.65	0.81	158.4	218.2
MW505	11/04/2022	21.7	5.93	0.71	160.5	-54.3
POT102	19/01/2022	31.7	6.16	3	787	367.5
POT102	13/04/2022	21.1	6.09	4.88	1,026	159.1
POT102	15/07/2022	18.9	6.03	4.74	849	131.6

		Field Parameters				
		Temperature (Field)	pH (Field)	DO (Field)	Electrical Conductivity (field)	Redox Potential (Field)
		°C	pH Units	mg/L	µS/cm	mV
POT103	19/01/2022	31.2	6.4	3.89	734	125.8
POT103	11/04/2022	20.9	6.23	6.01	873	567.3
POT104	19/01/2022	30.5	5.73	2.6	679	138.6
POT104	11/04/2022	24	6.97	5.19	1,074	767.2
POT104	15/07/2022	19.1	5.98	7.82	891	43

Location ID	Date	Water Depth bTOC (m)	Elevation (mAHD)	Comments
MW101I	23/10/2019	11.839	61.661	
MW101I	4/05/2020	12.264	61.236	
MW101I	21/10/2020			Dry
MW101I	28/04/2021	12.401	61.099	
MW101I	11/04/2022	12.18	61.32	
MW101I	28/09/2022	11.964	61.536	
MW102D	4/05/2020	12.148	61.262	
MW102D	21/10/2020	12.183	61.227	
MW102D	28/04/2021	12.47	60.94	
MW102D	11/04/2022	12.25	61.16	
MW102D	28/09/2022	11.987	61.423	
MW104I	25/10/2019	11.86	61.88	
MW104I	7/05/2020	12.238	61.502	
MW104I	21/10/2020	12.322	61.418	
MW104I	28/04/2021	12.45	61.29	
MW104I	11/04/2022	12.26	61.48	
MW104I	28/09/2022	12.073	61.667	
MW105D	25/10/2019	11.98	61.81	
MW105D	7/05/2020	12.392	61.398	
MW105D	21/10/2020	12.205	61.585	
MW105D	28/04/2021	12.543	61.247	
MW105D	11/04/2022	12.45	61.34	
MW105D	28/09/2022	12.195	61.595	
MW106S	25/10/2019	6.52	65.02	
MW106S	7/05/2020	6.87	64.67	
MW106S	23/10/2020	6.948	64.592	
MW106S	27/04/2021	7.18	64.36	
MW106S	13/04/2022	6.78	64.76	
MW106S	28/09/2022	6.417	65.123	
MW106S	27/10/2021	6.452	65.088	
MW108S	23/10/2019			Dry
MW108S	6/05/2020			Dry
MW108S	23/10/2020			Dry
MW108S	28/04/2021	5.05	65.85	
MW108S	13/04/2022			Dry
MW108S	28/09/2022			Dry
MW108S	27/10/2021			Dry, blocked with roots
MW109S	25/10/2019	7.625	65.825	
MW109S	5/05/2020	8.206	65.244	
MW109S	21/10/2020	7.966	65.484	
MW109S	28/04/2021	9.15	64.3	
MW109S	11/04/2022	7.97	65.48	
MW109S	28/09/2022	7.314	66.136	
MW109S	27/10/2021	7.432	66.018	Hydrasleeve intake at 9m
MW110S	25/10/2019	8.07	65.67	
MW110S	5/05/2020	8.592	65.148	
MW110S	21/10/2020	8.411	65.329	
MW110S	28/04/2021	9.15	64.59	
MW110S	11/04/2022	8.37	65.37	
MW110S	28/09/2022	7.757	65.983	
MW111S	24/10/2019			Dry
MW111S	5/05/2020			Dry
MW111S	15/10/2020			Dry
MW111S	28/04/2021			Dry
MW111S	11/04/2022			Dry
MW111S	28/09/2022	7.881	65.989	
MW112S	24/10/2019	8.28	65.41	
MW112S	4/05/2020	8.809	64.881	
MW112S	21/10/2020	11.006	62.684	
MW112S	28/04/2021	8.79	64.9	
MW112S	11/04/2022	8.6	65.09	
MW112S	28/09/2022	8.083	65.607	
MW113S	24/10/2019	8.464	65.326	
MW113S	4/05/2020	8.942	64.848	
MW113S	21/10/2020	8.884	64.906	
MW113S	28/04/2021	9.185	64.605	
MW113S	11/04/2022	8.75	65.04	
MW113S	28/09/2022	8.288	65.502	
MW114S	25/10/2019			Dry
MW114S	5/05/2020			Dry
MW114S	14/10/2020	7.45	66.23	
MW114S	28/04/2021			Dry
MW114S	11/04/2022	7.4	66.28	
MW114S	28/09/2022	6.664	67.016	
MW115S	25/10/2019	5.17	65.62	

Location ID	Date	Water Depth bTOC (m)	Elevation (mAHD)	Comments
MW115S	5/05/2020	5.776	65.014	
MW115S	21/10/2020	5.668	65.122	
MW115S	28/04/2021	6.17	64.62	
MW115S	13/04/2022	5.62	65.17	
MW115S	28/09/2022	4.942	65.848	
MW115S	27/10/2021	5.152	65.638	
MW116S	25/10/2019	9.46	64.97	
MW116S	6/05/2020	9.998	64.432	
MW116S	21/10/2020	9.826	64.604	
MW116S	28/04/2021	10.18	64.25	
MW116S	13/04/2022	9.65	64.78	
MW116S	28/09/2022	9.17	65.26	
MW117I	25/10/2019	13.68	60.51	
MW117I	6/05/2020	13.886	60.304	
MW117I	21/10/2020	13.926	60.264	
MW117I	28/04/2021	14.1	60.09	
MW117I	13/04/2022			Dry
MW117I	28/09/2022	13.84	60.35	
MW118D	25/10/2019	13.76	60.43	
MW118D	6/05/2020	13.962	60.228	
MW118D	21/10/2020	13.988	60.202	
MW118D	28/04/2021	14.17	60.02	
MW118D	13/04/2022	14.07	60.12	
MW118D	28/09/2022	13.905	60.285	
MW119S	24/10/2019			Dry
MW119S	6/05/2020	12.732	61.328	
MW119S	21/10/2020			Dry
MW119S	28/04/2021	12.49	61.57	
MW119S	13/04/2022	12.14	61.92	
MW119S	29/09/2022	11.745	62.315	
MW120I	24/10/2019	14.82	59.02	
MW120I	6/05/2020	15.014	58.826	
MW120I	21/10/2020	15.051	58.789	
MW120I	28/04/2021	15.19	58.65	
MW120I	13/04/2022	15.16	58.68	
MW120I	29/09/2022	15.16	58.68	
MW121D	24/10/2019	14.965	58.995	
MW121D	6/05/2020	15.033	58.927	
MW121D	21/10/2020	15.185	58.775	
MW121D	28/04/2021	15.34	58.62	
MW121D	13/04/2022	15.3	58.66	
MW121D	29/09/2022	15.295	58.665	
MW122S	25/10/2019	13.53	62.31	
MW122S	5/05/2020	13.722	62.118	
MW122S	21/10/2020	13.568	62.272	
MW122S	28/04/2021	13.72	62.12	
MW122S	13/04/2022	12.57	63.27	
MW122S	28/09/2022	12.434	63.406	
MW123I	25/10/2019	19.13	56.9	
MW123I	5/05/2020	15.808	60.222	
MW123I	14/10/2020	16.1	59.93	
MW123I	28/04/2021	16.36	59.67	
MW123I	13/04/2022	15.23	60.8	
MW123I	28/09/2022	15.505	60.525	
MW124D	25/10/2019	16.59	59.28	
MW124D	5/05/2020	42.5	33.37	Damaged
MW124D	21/10/2020	16.721	59.149	
MW124D	28/04/2021	16.83	59.04	
MW124D	13/04/2022	16.8	59.07	
MW124D	28/09/2022	16.739	59.131	
MW125S	24/10/2019	14.567	60.313	
MW125S	7/05/2020	14.771	60.109	
MW125S	23/10/2020	14.425	60.455	
MW125S	27/04/2021	15.03	59.85	
MW125S	12/04/2022	14.91	59.97	
MW125S	29/09/2022	14.8	60.08	
MW126I	24/10/2019	13	60.5	
MW126I	7/05/2020	13.213	60.287	
MW126I	23/10/2020	13.284	60.216	
MW126I	27/04/2021	13.45	60.05	
MW126I	12/04/2022	13.36	60.14	
MW126I	29/09/2022	13.245	60.255	
MW128D	24/10/2019	16.688	57.712	
MW128D	7/05/2020	16.793	57.607	
MW128D	23/10/2020	16.897	57.503	
MW128D	27/04/2021	17.02	57.38	

Location ID	Date	Water Depth bTOC (m)	Elevation (mAHD)	Comments
MW128D	12/04/2022	17.06	57.34	
MW128D	29/09/2022	17.08	57.32	
MW129S	24/10/2019	15.65	57.86	
MW129S	7/05/2020	15.892	57.618	
MW129S	23/10/2020	15.99	57.52	
MW129S	27/04/2021	16.1	57.41	
MW129S	12/04/2022	16.17	57.34	
MW129S	29/09/2022	16.18	57.33	
MW130D	24/10/2019	15.335	57.435	
MW130D	7/05/2020	15.442	57.328	
MW130D	23/10/2020	16.534	56.236	
MW130D	27/04/2021	15.65	57.12	
MW130D	12/04/2022	15.71	57.06	
MW130D	29/09/2022	15.742	57.028	
MW131D	24/10/2019	19.52	57.07	
MW131D	6/05/2020	19.068	57.522	
MW131D	23/10/2020	19.658	56.932	
MW131D	27/04/2021	19.56	57.03	
MW131D	12/04/2022	19.83	56.76	
MW131D	29/09/2022	19.67	56.92	
MW131D	27/10/2021	19.852	56.738	
MW132I	24/10/2019	19.4	57.03	
MW132I	6/05/2020	19.39	57.04	
MW132I	23/10/2020	19.278	57.152	
MW132I	27/04/2021	19.25	57.18	
MW132I	12/04/2022	19.73	56.7	
MW132I	29/09/2022	18.755	57.675	
MW133D	24/10/2019	19.3	57.19	
MW133D	6/05/2020	19.543	56.947	
MW133D	23/10/2020	19.54	56.95	
MW133D	27/04/2021	19.65	56.84	
MW133D	12/04/2022	19.6	56.89	
MW133D	29/09/2022	19.65	56.84	
MW134D	24/10/2019	21.56	56.92	
MW134D	7/05/2020	21.585	56.895	
MW134D	23/10/2020	21.681	56.799	
MW134D	27/04/2021			Blocked
MW134D	12/04/2022			Blocked
MW134D	29/09/2022			Blocked
MW135I	24/10/2019	20.85	56.82	
MW135I	7/05/2020	20.953	56.717	
MW135I	23/10/2020	20.96	56.71	
MW135I	27/04/2021	21.05	56.62	
MW135I	12/04/2022	21.16	56.51	
MW135I	29/09/2022	21.175	56.495	
MW135I	27/10/2021	21.145	56.525	
MW137S	25/10/2019	8.7	64.42	
MW137S	8/05/2020	8.649	64.471	
MW137S	23/10/2020	8.489	64.631	
MW137S	28/04/2021	8.82	64.3	
MW137S	12/04/2022	8.35	64.77	
MW137S	28/09/2022	7.826	65.294	
MW138S	24/10/2019	7.89	66.28	
MW138S	7/05/2020	9.039	65.131	
MW138S	23/10/2020	9.069	65.101	
MW138S	27/04/2021	9.2	64.97	
MW138S	12/04/2022	9	65.17	
MW138S	28/09/2022	8.683	65.487	
MW138S	27/10/2021	8.685	65.485	
MW139I	24/10/2019	13.77	60.22	
MW139I	7/05/2020	30	43.99	
MW139I	23/10/2020	13.986	60.004	
MW139I	27/04/2021	14.1	59.89	
MW139I	12/04/2022	14.05	59.94	
MW139I	28/09/2022	13.942	60.048	
MW140D	24/10/2019	13.58	60.32	
MW140D	7/05/2020	16.02	57.88	
MW140D	23/10/2020	13.816	60.084	
MW140D	27/04/2021	13.95	59.95	
MW140D	12/04/2022	13.89	60.01	
MW140D	28/09/2022	13.765	60.135	
MW141S	25/10/2019	10.9	63.46	
MW141S	10/03/2020	10.92	63.44	
MW141S	7/05/2020	10.97	63.39	
MW141S	23/10/2020	11.09	63.27	
MW141S	28/01/2021	11.15	63.21	

Location ID	Date	Water Depth bTOC (m)	Elevation (mAHD)	Comments
MW141S	28/04/2021	11.2	63.16	
MW141S	15/07/2021	11.32	63.04	
MW141S	20/01/2022	10.78	63.58	
MW141S	12/04/2022	10.87	63.49	
MW141S	15/07/2022	10.98	63.38	
MW141S	29/09/2022	10.879	63.481	
MW142S	25/10/2019	13.62	62.72	
MW142S	10/03/2020	13.67	62.67	
MW142S	7/05/2020	13.721	62.619	
MW142S	29/10/2020	13.804	62.536	
MW142S	28/01/2021	13.82	62.52	
MW142S	28/04/2021	14.35	61.99	
MW142S	15/07/2021	13.86	62.48	
MW142S	20/01/2022	13.1	63.24	
MW142S	12/04/2022	13.48	62.86	
MW142S	15/07/2022	13.572	62.768	
MW142S	29/09/2022	13.6	62.74	
MW143S	25/10/2019	18.5	57.31	
MW143S	10/03/2020	17.89	57.92	
MW143S	7/05/2020			Dry
MW143S	19/08/2020			Dry
MW143S	29/10/2020			Dry
MW143S	28/01/2021			Dry
MW143S	28/04/2021			Dry
MW143S	15/07/2021			Dry
MW143S	20/01/2022			Dry
MW143S	12/04/2022			Dry
MW143S	15/07/2022			Dry
MW143S	29/09/2022	18.139	57.671	
MW301	24/10/2019	8.59	65.957	
MW301	4/05/2020	9.083	65.464	
MW301	21/10/2020	9.003	65.544	
MW301	28/04/2021	9.31	65.237	
MW301	11/04/2022	8.9	65.647	
MW301	28/09/2022	8.435	66.112	
MW301	3/10/2012	8.486	66.061	
MW301	18/09/2015	8.868	65.679	
MW301	11/11/2016	8.543	66.004	
MW302	24/10/2019	8.762	65.95	
MW302	4/05/2020	9.252	65.46	
MW302	21/10/2020	9.173	65.538	
MW302	28/04/2021	9.48	65.231	
MW302	11/04/2022	9.07	65.642	
MW302	28/09/2022	8.585	66.126	
MW302	3/10/2012	8.656	66.056	
MW302	18/09/2015	8.475	66.237	
MW302	11/11/2016	8.71	66.001	
MW303	24/10/2019	8.625	65.949	
MW303	4/05/2020	10.505	64.069	
MW303	21/10/2020	9.046	65.528	
MW303	28/04/2021	9.34	65.234	
MW303	11/04/2022	8.92	65.654	
MW303	28/09/2022	8.441	66.133	
MW303	3/10/2012	8.518	66.056	
MW303	18/09/2015	8.175	66.399	
MW303	11/11/2016	8.57	66.004	
MW304	25/10/2019	7.76	66.334	
MW304	5/05/2020	8.385	65.709	
MW304	15/10/2020	8.08	66.014	
MW304	28/04/2021	9.5	64.594	
MW304	11/04/2022	8.13	65.964	
MW304	28/09/2022	7.402	66.692	
MW304	3/10/2012	7.645	66.449	
MW304	16/09/2015	7.785	66.309	
MW304	15/11/2016	7.717	66.377	
MW305	25/10/2019	7.525	66.36	
MW305	5/05/2020			Dry
MW305	15/10/2020	7.94	65.945	
MW305	28/04/2021			Dry
MW305	11/04/2022	7.83	66.055	
MW305	28/09/2022	7.16	66.725	
MW305	3/10/2012	7.425	66.46	
MW305	10/09/2015	7.56	66.325	
MW305	15/11/2016	7.48	66.405	
MW306	25/10/2019	7.613	66.352	
MW306	5/05/2020			Dry

Location ID	Date	Water Depth bTOC (m)	Elevation (mAHD)	Comments
MW306	15/10/2020	7.93	66.035	
MW306	28/04/2021	9	64.965	
MW306	11/04/2022	7.98	65.984	
MW306	28/09/2022	7.265	66.7	
MW306	3/10/2012	7.508	66.457	
MW306	17/09/2015	7.66	66.305	
MW306	15/11/2016	7.57	66.394	
MW307	25/10/2019	7.365	66.27	
MW307	5/05/2020			Dry
MW307	15/10/2020	6.67	66.965	
MW307	28/04/2021	8.125	65.51	
MW307	11/04/2022			Well destroyed
MW307	28/09/2022			Bore was driven over. destroyed.
MW307	3/10/2012	7.209	66.426	
MW307	17/09/2015	7.375	66.26	
MW307	15/11/2016	7.328	66.306	
MW308	25/10/2019	7.39	66.301	
MW308	15/10/2020	7.64	66.051	
MW308	11/04/2022	7.8	65.891	
MW308	28/09/2022	6.98	66.711	
MW308	3/10/2012	7.255	66.436	
MW308	21/09/2015	7.4	66.291	
MW308	15/11/2016	7.35	66.341	
MW308	27/10/2021	7.115	66.576	
MW309	25/10/2019	7.6	66.299	
MW309	5/05/2020			Dry
MW309	15/10/2020	7.94	65.959	
MW309	28/04/2021			Dry
MW309	11/04/2022	7.97	65.929	
MW309	28/09/2022	7.265	66.634	
MW309	3/10/2012	7.469	66.43	
MW309	21/09/2015	7.63	66.269	
MW309	15/11/2016	7.581	66.318	
MW309	27/10/2021	7.391	66.508	
MW310	25/10/2019	7.505	66.301	
MW310	5/05/2020	8.087	65.719	
MW310	15/10/2020	7.77	66.036	
MW310	28/04/2021	8.25	65.556	
MW310	11/04/2022	7.82	65.986	
MW310	28/09/2022	7.113	66.693	
MW310	3/10/2012	7.366	66.44	
MW310	21/09/2015	7.62	66.186	
MW310	15/11/2016	7.458	66.348	
MW310	27/10/2021	7.242	66.564	
MW312	24/10/2019	8.303	66.238	
MW312	5/05/2020	8.837	65.704	
MW312	21/10/2020	8.627	65.914	
MW312	28/04/2021	9.035	65.506	
MW312	11/04/2022	8.63	65.911	
MW312	28/09/2022	7.995	66.546	
MW312	3/10/2012	8.134	66.407	
MW312	18/09/2015	8.34	66.201	
MW312	11/11/2016	8.24	66.301	
MW312	27/10/2021	8.115	66.426	
MW313	24/10/2019	8.455	66.233	
MW313	5/05/2020	8.984	65.704	
MW313	15/10/2020	8.73	65.958	
MW313	28/04/2021	9.18	65.508	
MW313	11/04/2022	8.8	65.888	
MW313	28/09/2022	8.15	66.538	
MW313	3/10/2012	8.294	66.394	
MW313	19/09/2015	9.49	65.198	
MW313	11/11/2016	8.396	66.292	
MW313	27/10/2021	8.279	66.409	
MW403	18/11/2019	21.8	52.04	
MW403	10/03/2020	21.07	52.77	
MW403	29/10/2020	21.144	52.696	
MW403	28/01/2021	21.16	52.68	
MW403	15/07/2021	21.26	52.58	
MW403	20/01/2022	21.37	52.47	
MW403	12/04/2022	21.42	52.42	
MW403	15/07/2022	21.412	52.428	
MW504	21/10/2020	8.159	64.661	
MW504	28/04/2021	7.908	64.912	
MW504	11/04/2022	7.47	65.35	
MW504	28/09/2022	6.697	66.123	

Location ID	Date	Water Depth bTOC (m)	Elevation (mAHD)	Comments
MW504	27/10/2021	6.862	65.958	
MW505	21/10/2020	8.497	65.333	
MW505	28/04/2021	8.915	64.915	
MW505	11/04/2022	8.51	65.32	
MW505	28/09/2022	7.84	65.99	

							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)				
	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	0.01	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 Number																
MW101I	20/03/2018	0958_MW101_I_180320	Normal	208378	0.05	0.08	0.40	0.03	0.11	<0.02	<0.02	<0.02	0.03	<0.01	0.02	<0.01	<0.02	<0.02	<0.05	<0.1
MW101I	25/02/2019	0958_MW101_I_190225	Normal	222957	0.05	0.05	0.41	0.02	0.19	<0.02	<0.02	<0.02	0.04	<0.01	0.02	<0.01	<0.02	<0.02	<0.05	<0.1
MW101I	23/10/2019	0958_MW101_191023	Normal	EP1910901	0.05	0.06	0.40	0.03	0.18	<0.02	<0.1	<0.02	0.04	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW101I	4/05/2020	0958_MW101_D_200504	Normal	EP2004453	<0.02	<0.02	0.12	<0.02	0.23	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW101I	28/04/2021	0958_MW101I_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
MW101I	7/09/2021	0958_MW101I_210907	Normal	EP2110442	0.04	0.06	0.35	<0.02	0.18	<0.02	<0.1	<0.02	0.03	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW101I	11/04/2022	0958_MW101I_220411	Normal	EP2204288	0.07	0.06	0.38	<0.02	0.20	<0.02	<0.1	<0.02	0.05	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW102D	19/03/2018	0958_MW102_D_180319	Normal	208244	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW102D	6/03/2019	0958_MW102_D_190306	Normal	223277	<0.01	<0.01	0.02	<0.01	0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW102D	4/05/2020	0958_MW102_D_200504	Normal	EP2004453	0.03	0.04	0.31	<0.02	0.16	<0.02	0.2	<0.02	0.03	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW102D	21/10/2020	0958_MW102_201021	Normal	EP2011490	0.04	0.05	0.34	0.02	0.15	<0.02	<0.1	<0.02	0.03	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW102D	28/04/2021	0958_MW102D_210428	Normal	EP2104666	0.13	<0.02	0.20	0.03	0.28	<0.02	<0.1	<0.02	0.02	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW102D	28/04/2021	0958_QC104_210428	Field Duplicate	EP2104666	0.14	<0.02	0.23	0.04	0.31	<0.02	<0.1	<0.02	0.02	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW102D	28/04/2021	0958_QC204_210428	Interlab Duplicate	791819	0.01	0.02	0.20	0.02	0.33	<0.01	<0.05	0.01	0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW102D	8/09/2021	0958_MW102D_210908	Normal	EP2110531	0.10	<0.02	0.12	<0.02	0.14	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW102D	11/04/2022	0958_MW102D_220411	Normal	EP2204288	<0.02	<0.02	0.04	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	27/03/2018	0958_MW104_I_180327	Normal	208696	<0.01	0.01	0.10	<0.01	0.07	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW104I	5/03/2019	0958_MW104_I_190305	Normal	223277	<0.01	0.01	0.09	<0.01	0.07	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW104I	25/10/2019	0958_MW104_191025	Normal	EP1911008	0.08	0.12	1.46	0.06	1.19	<0.02	<0.1	<0.02	0.23	0.03	0.06	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	7/05/2020	0958_MW104_I_20200507	Normal	EP2004672	<0.02	<0.02	0.04	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	21/10/2020	0958_MW104_201021	Normal	EP2011490	<0.02	<0.02	0.20	<0.02	0.18	<0.02	<0.1	<0.02	0.03	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	28/04/2021	0958_MW104I_210428	Normal	EP2104665	0.04	0.03	0.26	<0.02	0.13	<0.02	<0.1	<0.02	0.05	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	28/04/2021	0958_QC105_210428	Field Duplicate	EP2104665	0.04	0.03	0.25	<0.02	0.11	<0.02	<0.1	<0.02	0.04	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	28/04/2021	0958_QC205_210428	Interlab Duplicate	791819	0.02	0.02	0.17	<0.01	0.12	<0.01	<0.05	0.01	0.04	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW104I	7/09/2021	0958_MW104I_210907	Normal	EP2110442	0.08	0.10	0.60	0.04	0.27	<0.02	<0.1	0.03	0.14	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	11/04/2022	0958_MW104I_220411	Normal	EP2204288	0.10	0.10	0.60	0.04	0.28	<0.02	<0.1	0.04	0.19	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	11/04/2022	0958_QC102_220411	Field Duplicate	EP2204288	0.10	0.10	0.61	0.04	0.26	<0.02	<0.1	0.05	0.19	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW104I	11/04/2022	0958_QC202_220411	Interlab Duplicate	881198	0.07	0.06	0.41	0.02	0.26	<0.01	0.09	0.03	0.11	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
MW105D	27/03/2018	0958_MW105_D_180327	Normal	208696	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW105D	6/03/2019	0958_MW105_D_190306	Normal	223277	0.02	0.04	0.40	0.01	0.31	<0.02	<0.02	<0.02	0.06	<0.01	0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW105D	25/10/2019	0958_MW105_191025	Normal	EP1911008	<0.02	<0.02	0.10	<0.02	0.11	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW105D	7/05/2020	0958_MW105_D_20200507	Normal	EP2004672	<0.02	0.03	0.37	<0.02	0.50	<0.02	<0.1	<0.02	0.05	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW105D	21/10/2020	0958_MW105_201021	Normal	EP2011490	<0.02	<0.02	0.05	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW105D	28/04/2021	0958_MW105D_210428	Normal	EP2104665	0.07	0.13	1.33	0.07	1.13	<0.02	<0.1	0.03	0.19	0.03	0.08	<0.02	<0.02	<0.02	<0.02	<0.02
MW105D	7/09/2021	0958_MW105D_210907	Normal	EP2110442	0.03	0.04	0.46	0.02	0.41	<0.02	<0.1	<0.02	0.07	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW105D	11/04/2022	0958_MW105D_220411	Normal	EP2204288	<0.02	0.02	0.20	<0.02	0.19	<0.02	<0.1	<0.02	0.04	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW106S	20/03/2018	0958_MW106_S_180320	Normal	208378	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW106S	4/03/2019	0958_MW106_S_190304	Normal	223132	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW106S	25/10/2019	0958_MW106_191025	Normal	EP1911007	<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
MW106S	7/05/2020	0958_MW106_S_20200507	Normal	EP2004672	<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
MW106S	23/10/2020	0958_MW106_201023	Normal	EP2011633	<0.02	<0.02	<0.02	<0.02	&lt											

							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)
LOR - Limit of Reporting	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	0.01	0.01	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											0.56					
PFAS NEMP 2020 Recreational Water											10					

Location Code	Date	Field ID	Sample Type	Lab Report Number																
MW110S	4/03/2019	0958_MW110_S_190304	Normal	223132	<0.01	<0.01	0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW110S	25/10/2019	0958_MW110_191025	Normal	EP1911007	<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
MW110S	5/05/2020	0958_MW110_S_200505	Normal	EP2004509	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW110S	21/10/2020	0958_MW110_201021	Normal	EP2011490	<0.02	<0.02	0.03	<0.02	0.11	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW110S	28/04/2021	0958_MW110S_210428	Normal	EP2104666	<0.02	<0.02	0.02	<0.02	0.07	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW110S	7/09/2021	0958_MW110S_210907	Normal	EP2110442	<0.02	<0.02	<0.02	<0.02	0.07	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW110S	7/09/2021	0958_QC104_210907	Field Duplicate	EP2110442	<0.02	<0.02	<0.02	<0.02	0.07	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW110S	7/09/2021	0958_QC204_210907	Interlab Duplicate	823596	<0.01	<0.01	0.02	<0.01	0.09	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW110S	11/04/2022	0958_MW110S_220411	Normal	EP2204288	<0.02	<0.02	0.03	<0.02	0.06	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW111S	20/03/2018	0958_MW111_S_180320	Normal	208378	0.05	0.10	1.6	0.07	0.79	<0.02	0.02	0.03	0.13	0.03	0.06	<0.01	<0.02	<0.02	<0.05	<0.1
MW112S	19/03/2018	0958_MW112_S_180319	Normal	208244	<0.01	<0.01	0.03	<0.01	0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW112S	4/03/2019	0958_MW112_S_190304	Normal	223132	<0.01	<0.01	0.05	<0.01	0.07	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW112S	24/10/2019	0958_MW112_191024	Normal	EP1910968	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW112S	4/05/2020	0958_MW112_S_200504	Normal	EP2004453	<0.02	<0.02	0.03	<0.02	0.03	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW112S	21/10/2020	0958_MW112_201021	Normal	EP2011490	<0.02	<0.02	0.02	<0.02	0.05	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW112S	28/04/2021	0958_MW112_210428	Normal	EP2104666	<0.02	<0.02	0.05	<0.02	0.09	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW112S	7/09/2021	0958_MW112S_210907	Normal	EP2110442	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW112S	11/04/2022	0958_MW112S_220411	Normal	EP2204288	<0.02	<0.02	0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW113S	20/03/2018	0958_MW113_S_180320	Normal	208378	<0.01	<0.01	0.03	<0.01	0.03	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW113S	4/03/2019	0958_MW113_S_190304	Normal	223132	<0.01	<0.01	0.02	<0.01	0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW113S	24/10/2019	0958_MW113_191024	Normal	EP1910968	<0.02	<0.02	<0.02	<0.02	0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW113S	24/10/2019	0958_QC101_191024	Field Duplicate	EP1910968	<0.02	<0.02	<0.02	<0.02	0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW113S	24/10/2019	0958_QC201_191024	Interlab Duplicate	684804	<0.01	<0.01	0.02	<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
MW113S	4/05/2020	0958_MW113_S_200504	Normal	EP2004453	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW113S	21/10/2020	0958_MW113_201021	Normal	EP2011490	<0.02	<0.02	<0.02	<0.02	0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW113S	28/04/2021	0958_MW113S_210428	Normal	EP2104666	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW113S	7/09/2021	0958_MW113S_210907	Normal	EP2110442	<0.02	<0.02	0.02	<0.02	0.03	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW113S	11/04/2022	0958_MW113S_220411	Normal	EP2204288	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW114S	20/03/2018	0958_MW114_S_180320	Normal	208378	0.07	0.14	0.80	0.03	0.94	<0.02	<0.02	<0.02	0.14	0.01	0.02	<0.01	<0.02	<0.02	<0.05	<0.1
MW114S	1/03/2019	0958_MW114_S_190301	Normal	223132	0.02	0.06	0.76	0.04	1.0	<0.02	<0.02	<0.02	0.06	<0.01	0.03	<0.01	<0.02	<0.02	<0.05	<0.1
MW114S	14/10/2020	0958_MW114_201014	Normal	EP2011160	<0.05	<0.05	0.25	<0.05	0.53	<0.05	<0.2	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW114S	7/09/2021	0958_MW114S_210907	Normal	EP2110442	0.06	0.07	0.51	<0.02	0.27	<0.02	<0.1	0.02	0.08	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW114S	11/04/2022	0958_MW114S_220411	Normal	EP2204288	0.08	0.09	0.57	<0.02	0.69	<0.02	<0.1	0.03	0.12	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW115S	28/03/2018	0958_MW115_S_180328	Normal	208793	<0.01	<0.01	0.11	<0.01	0.05	<0.02	<0.02	<0.02	0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW115S	4/03/2019	0958_MW115_S_190304	Normal	223132	<0.01	<0.01	0.03	<0.01	0.08	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW115S	25/10/2019	0958_MW115_191025	Normal	EP1911007	<0.02	<0.02	0.25	<0.02	0.10	<0.02	<0.1	<0.02	0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW115S	25/10/2019	0958_QC104_191025	Field Duplicate	EP1911007	<0.02	0.02	0.26	<0.02	0.10	<0.02	<0.1	<0.02	0.03	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW115S	25/10/2019	0958_QC204_191025	Interlab Duplicate	685043	<0.01	0.02	0.22	<0.01	0.10	<0.01	<0.05	<0.01	0.02	<0.01	<0.01	<0.01	<0.0			

							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)
LOR - Limit of Reporting	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	0.01	0.01	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											0.56					
PFAS NEMP 2020 Recreational Water											10					

Location Code	Date	Field ID	Sample Type	Lab Report Number																
MW117I	21/10/2020	0958_MW117_201021	Normal	EP2011490	<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
MW117I	28/04/2021	0958_MW117I_210428	Normal	EP2104679	<0.02	<0.02	0.03	<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
MW117I	6/09/2021	0958_MW117I_210906	Normal	EP2110395	<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
MW117I	13/04/2022	0958_MW117I_220413	Normal	EP2204360	<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
MW118D	28/03/2018	0958_MW118_D_180328	Normal	208793	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW118D	6/03/2019	0958_MW118_D_190306	Normal	223277	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW118D	25/10/2019	0958_MW118_191025	Normal	EP1911007	<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
MW118D	6/05/2020	0958_MW118_D_200506	Normal	EP2004592	<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
MW118D	21/10/2020	0958_MW118_201021	Normal	EP2011490	<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
MW118D	28/04/2021	0958_MW118D_210428	Normal	EP2104679	<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
MW118D	6/09/2021	0958_MW118D_210906	Normal	EP2110395	<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
MW118D	13/04/2022	0958_MW118D_220413	Normal	EP2204360	<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
MW118D	13/04/2022	0958_QC107_220413	Field Duplicate	EP2204360	<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
MW118D	13/04/2022	0958_QC207_220413	Interlab Duplicate	881198	<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
MW119S	27/03/2018	0958_MW119_S_180327	Normal	208696	<0.01	<0.01	0.03	<0.01	0.04	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW119S	4/03/2019	0958_MW119_S_190304	Normal	223132	<0.01	<0.01	0.02	<0.01	0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW119S	24/10/2019	0958_MW119_191024	Normal	EP1910969	<0.02	<0.02	0.03	<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
MW119S	6/05/2020	0958_MW119_S_200506	Normal	EP2004592	<0.02	<0.02	0.02	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW119S	28/04/2021	0958_MW119S_210428	Normal	EP2104679	<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
MW119S	6/09/2021	0958_MW119S_210906	Normal	EP2110395	<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
MW119S	13/04/2022	0958_MW119S_220413	Normal	EP2204360	<0.02	<0.02	0.04	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW120I	27/03/2018	0958_MW120_I_180327	Normal	208696	<0.01	<0.01	<0.01	<0.01	0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW120I	6/03/2019	0958_MW120_I_190306	Normal	223277	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW120I	24/10/2019	0958_MW120_191024	Normal	EP1910968	<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
MW120I	6/05/2020	0958_MW120_I_200506	Normal	EP2004592	<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
MW120I	6/05/2020	0958_QC103_200506	Field Duplicate	EP2004592	<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
MW120I	6/05/2020	0958_QC203_200506	Interlab Duplicate	718240	<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
MW120I	21/10/2020	0958_MW120_201021	Normal	EP2011490	<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
MW120I	28/04/2021	0958_MW120I_210428	Normal	EP2104679	<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
MW120I	28/04/2021	0958_QC106_210428	Field Duplicate	EP2104679	<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
MW120I	28/04/2021	0958_QC206_210428	Interlab Duplicate	791819	<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
MW120I	6/09/2021	0958_MW120I_210906	Normal	EP2110395	<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
MW120I	13/04/2022	0958_MW120I_220413	Normal	EP2204360	<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
MW121D	27/03/2018	0958_MW121_D_180327	Normal	208696	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW121D	6/03/2019	0958_MW121_D_190306	Normal	223277	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW121D	24/10/2019	0958_MW121_191024	Normal	EP1910968	<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
MW121D	6/05/2020	0958_MW121_D_200506	Normal	EP2004592	<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
MW121D	21/10/2020	0958_MW121_20_																		

LOR - 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
PFAS NEMP 2020 Drinking Water											0.56					
PFAS NEMP 2020 Recreational Water											10					

MW124D	6/03/2019	0958_MW124_D_190306	Normal	223277	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW124D	25/10/2019	0958_MW124_191025	Normal	EP1911007	<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
MW124D	21/10/2020	0958_MW124_201021	Normal	EP2011490	<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
MW124D	28/04/2021	0958_MW124D_210428	Normal	EP2104679	<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
MW124D	6/09/2021	0958_MW124D_210906	Normal	EP2110395	<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
MW124D	13/04/2022	0958_MW124D_220413	Normal	EP2204360	<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
MW124D	13/04/2022	0958_QC106_220413	Field Duplicate	EP2204360	<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
MW124D	13/04/2022	0958_QC206_220413	Interlab Duplicate	881198	<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
MW125S	29/03/2018	0958_MW125_S_180329	Normal	208806	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW125S	26/02/2019	0958_MW125_S_190226	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW125S	24/10/2019	0958_MW125_191024	Normal	EP1910968	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW125S	7/05/2020	0958_MW125_S_20200507	Normal	EP2004672	<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
MW125S	23/10/2020	0958_MW125_201023	Normal	EP2011633	<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
MW125S	27/04/2021	0958_MW125S_210427	Normal	EP2104577	<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
MW125S	6/09/2021	0958_MW125S_210906	Normal	EP2110395	<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
MW125S	6/09/2021	0958_QC101_210906	Field Duplicate	EP2110395	<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
MW125S	6/09/2021	0958_QC201_210906	Interlab Duplicate	822876	<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
MW125S	12/04/2022	0958_MW125S_220412	Normal	EP2204301	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW126I	29/03/2018	0958_MW126_I_180329	Normal	208806	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW126I	26/02/2019	0958_MW126_I_190226	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW126I	24/10/2019	0958_MW126_191024	Normal	EP1910968	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW126I	7/05/2020	0958_MW126_I_20200507	Normal	EP2004672	<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
MW126I	23/10/2020	0958_MW126_201023	Normal	EP2011633	<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
MW126I	27/04/2021	0958_MW126I_210427	Normal	EP2104577	<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
MW126I	6/09/2021	0958_MW126I_210906	Normal	EP2110395	<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
MW126I	12/04/2022	0958_MW126I_220412	Normal	EP2204301	<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
MW128D	29/03/2018	0958_MW128_S_180329	Normal	208806	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW128D	26/02/2019	0958_MW128_S_190226	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW128D	24/10/2019	0958_MW128_191024	Normal	EP1910968	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW128D	7/05/2020	0958_MW128_S_20200507	Normal	EP2004672	<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
MW128D	23/10/2020	0958_MW128_201023	Normal	EP2011633	<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
MW128D	27/04/2021	0958_MW128S_210427	Normal	EP2104577	<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
MW128D	6/09/2021	0958_MW128D_210906	Normal	EP2110395	<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
MW128D	12/04/2022	0958_MW128D_220412	Normal	EP2204301	<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
MW129S	29/03/2018	0958_MW129_I_180329	Normal	208793	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW129S	26/02/2019	0958_MW129_I_190226	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW129S	24/10/2019	0958_MW129_191024	Normal	EP1910968	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW129S	7/05/2020	0958_MW129_I_20200507	Normal	EP2004672	<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
MW129S	23/10/2020	0958_MW129_201023	Normal	EP2011633	<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
MW129S	27/04/2021	0958_MW129I_210427	Normal	EP2104577	<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
MW129S	27/04/2021	0958_QC103_210427	Field Duplicate	EP2104577	<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
MW129S	27/04/2021	0958_QC203_210427	Interlab Duplicate	791818	<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
MW129S	6/09/2021	0958_MW129I_210906	Normal	EP2110395	<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
MW129S	12/04/2022	0958_MW129I_220412	Normal	EP2204301	<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
MW130D	26/02/2019	0958_MW130_D_190226	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW130D	24/10/2019	0958_MW130_191024	Normal	EP1910968	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW130D	7/05/2020	0958_MW130_D_20200507	Normal	EP2004672	<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
MW130D	23/10/2020	0958_MW130_201023	Normal	EP2011633	<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
MW130D	27/04/2021	0958_MW130D_210427	Normal	EP2104577	0.04	<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
MW130D	6/09/2021	0958_MW130D_210906	Normal	EP2110395	<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
MW130D	12/04/2022	0958_MW130D_220412	Normal	EP2204301	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.						

							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)
LOR - Limit of Reporting	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	0.01	0.01	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											0.56					
PFAS NEMP 2020 Recreational Water											10					

Location Code	Date	Field ID	Sample Type	Lab Report Number																
MW132I	5/03/2019	0958_MW132_I_190305	Normal	223277	<0.01	<0.01	0.04	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW132I	24/10/2019	0958_MW132_191024	Normal	EP1910969	<0.02	<0.02	0.06	<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
MW132I	6/05/2020	0958_MW132_I_200506	Normal	EP2004592	<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
MW132I	23/10/2020	0958_MW132_201023	Normal	EP2011633	<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
MW132I	27/04/2021	0958_MW132I_210427	Normal	EP2104577	<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
MW132I	6/09/2021	0958_MW132I_210906	Normal	EP2110395	<0.02	<0.02	0.03	<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
MW132I	12/04/2022	0958_MW132I_220412	Normal	EP2204301	<0.02	<0.02	0.03	<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
MW132I	12/04/2022	0958_QC104_220412	Field Duplicate	EP2204301	<0.02	<0.02	0.03	<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
MW132I	12/04/2022	0958_QC204_220412	Interlab Duplicate	881198	<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
MW133D	27/02/2019	0958_MW133_D_190227	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW133D	24/10/2019	0958_MW133_191024	Normal	EP1910969	<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
MW133D	6/05/2020	0958_MW133_D_200506	Normal	EP2004592	<0.02	<0.02	0.04	<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
MW133D	23/10/2020	0958_MW133_201023	Normal	EP2011633	<0.02	<0.02	0.03	<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
MW133D	27/04/2021	0958_MW133D_210427	Normal	EP2104577	<0.02	<0.02	0.04	<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
MW133D	6/09/2021	0958_MW133D_210906	Normal	EP2110395	<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
MW133D	12/04/2022	0958_MW133D_220412	Normal	EP2204301	<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
MW134D	27/02/2019	0958_MW134_D_190227	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW134D	24/10/2019	0958_MW134_191024	Normal	EP1910969	<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
MW134D	7/05/2020	0958_MW134_D_20200507	Normal	EP2004672	<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
MW134D	23/10/2020	0958_MW134_201023	Normal	EP2011633	<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
MW135I	16/03/2018	0958_MW135_S_180316	Normal	208244	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW135I	16/03/2018	0958_QC110_180316	Field Duplicate	208244	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW135I	27/04/2021	0958_MW135I_210427	Normal	EP2104577	<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
MW135I	6/09/2021	0958_MW135I_210906	Normal	EP2110395	<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
MW135I	12/04/2022	0958_MW135I_220412	Normal	EP2204301	<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
MW136D	27/02/2019	0958_MW136_I_190227	Normal	223071	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW136D	24/10/2019	0958_MW136_191024	Normal	EP1910969	<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
MW136D	7/05/2020	0958_MW136_I_20200507	Normal	EP2004672	<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
MW136D	23/10/2020	0958_MW136_201023	Normal	EP2011633	<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
MW136D	27/04/2021	0958_MW136D_210427	Normal	EP2104577	<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
MW136D	6/09/2021	0958_MW136D_210906	Normal	EP2110395	<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
MW136D	12/04/2022	0958_MW136D_220412	Normal	EP2204301	<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
MW137S	4/03/2019	0958_MW137_S_190304	Normal	223132	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW137S	8/05/2020	0958_MW137_200508	Normal	EP2004700	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW137S	23/10/2020	0958_MW137_201023	Normal	EP2011633	<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
MW137S	28/04/2021	0958_MW137S_210428	Normal	EP2104665	<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
MW137S	8/09/2021	0958_MW137S_210908	Normal	EP2110531	<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
MW137S	12/04/20220																			

							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)
	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	0.01	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 Number																
MW140D	6/09/2021	0958_MW140D_210906	Normal	EP2110395	<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
MW140D	12/04/2022	0958_MW140D_220412	Normal	EP2204301	<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
MW141S	12/03/2019	0958_MW141_S_190312	Normal	223597	0.05	0.06	0.54	0.03	0.25	<0.02	<0.02	<0.02	0.11	0.01	0.02	<0.01	<0.02	<0.02	<0.05	<0.1
MW141S	25/10/2019	0958_MW141_191025	Normal	EP1911007	0.06	0.06	0.52	0.04	0.21	<0.02	<0.1	<0.02	0.12	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	28/01/2020	0958_QC202_210128	Interlab Duplicate	770820	0.06	0.08	0.61	0.05	0.31	<0.01	<0.05	0.04	0.14	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01
MW141S	10/03/2020	0958_MW141_S_200310	Normal	EP2002549	0.07	0.10	0.64	0.06	0.21	<0.02	<0.1	0.05	0.16	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	10/03/2020	0958_QC101_200310	Field Duplicate	EP2002549	0.06	0.09	0.60	0.05	0.22	<0.02	<0.1	0.04	0.15	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	10/03/2020	0958_QC201_200310	Interlab Duplicate	707212	0.05	0.06	0.41	0.03	0.20	<0.01	<0.05	0.01	0.10	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
MW141S	7/05/2020	0958_MW141_S_20200507	Normal	EP2004672	0.07	0.08	0.69	0.05	0.33	<0.02	<0.1	0.03	0.16	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	19/08/2020	0958_MW141_200819	Normal	EP2008767	0.10	0.11	0.87	0.07	0.45	<0.02	<0.1	0.04	0.20	0.03	0.05	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	23/10/2020	0958_MW141_201023	Normal	EP2011633	0.04	0.03	0.34	<0.02	0.08	<0.02	<0.1	<0.02	0.08	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	28/01/2021	0958_MW141_210128	Normal	EP2100912	0.06	0.07	0.62	0.04	0.21	<0.02	<0.1	0.02	0.15	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	28/01/2021	0958_QC102_210128	Field Duplicate	EP2100912	0.06	0.07	0.61	0.04	0.21	<0.02	<0.1	0.02	0.15	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	28/04/2021	0958_MW141S_210428	Normal	EP2104679	0.07	0.09	0.66	0.04	0.27	<0.02	<0.1	0.02	0.16	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	15/07/2021	0958_MW141S_210715	Normal	EP2108063	0.10	0.10	0.80	0.05	0.41	<0.02	<0.1	0.03	0.19	0.03	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	15/07/2021	0958_QC101_210715	Field Duplicate	EP2108063	0.09	0.09	0.74	0.06	0.44	<0.02	<0.1	0.03	0.19	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	15/07/2021	0958_QC201_210715	Interlab Duplicate	812060	0.07	0.10	0.78	0.06	0.39	<0.01	<0.05	0.03	0.15	0.02	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
MW141S	8/09/2021	0958_MW141S_210908	Normal	EP2110531	0.07	0.09	0.65	0.06	0.41	<0.02	<0.1	0.03	0.15	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	20/01/2022	0958_MW141S_220120	Normal	EP2200662	0.11	0.10	0.94	0.07	0.58	<0.02	<0.1	0.04	0.25	0.03	0.05	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	12/04/2022	0958_MW141_220412	Normal	EP2204301	0.06	0.08	0.52	0.05	0.40	<0.02	<0.1	0.02	0.12	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	15/07/2022	0958_MW141S_220715	Normal	EP2208860	0.04	0.05	0.40	0.03	0.32	<0.02	<0.1	<0.02	0.09	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	15/07/2022	0958_QC102_220715	Field Duplicate	EP2208860	0.04	0.05	0.43	0.04	0.34	<0.02	<0.1	<0.02	0.11	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW141S	15/07/2022	0958_QC202_220715	Interlab Duplicate	906764	0.04	0.04	0.35	0.04	0.28	<0.01	<0.05	0.02	0.07	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
MW142S	12/03/2019	0958_MW142_S_190312	Normal	223597	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW142S	25/10/2019	0958_MW142_191025	Normal	EP1911007	<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
MW142S	10/03/2020	0958_MW142_S_200310	Normal	EP2002549	<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
MW142S	7/05/2020	0958_MW142_S_20200507	Normal	EP2004672	<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
MW142S	19/08/2020	0958_MW142_200819	Normal	EP2008767	<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
MW142S	29/10/2020	0958_MW142_201029	Normal	EP2011863	<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
MW142S	28/01/2021	0958_MW142_210128	Normal	EP2100912	<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
MW142S	28/04/2021	0958_MW142S_210428	Normal	EP2104679	<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
MW142S	15/07/2021	0958_MW142S_210715	Normal	EP2108063	<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
MW142S	8/09/2021	0958_MW142S_210908	Normal	EP2110531	<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
MW142S	20/01/2022	0958_MW142S_220120	Normal	EP2200662	<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
MW142S	12/04/2022	0958_MW142_220412	Normal	EP2204301	<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
MW142S	15/07/2022	0958_MW142S_220715	Normal	EP2208860	<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
MW143S	12/03/2019	0958_MW143_S_190312	Normal	223597	<0.01	<0.01	0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW143S	12/03/2019	0958_QC101_190312	Field Duplicate	223597	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW143S	10/03/2020	0958_MW143_S_200310	Normal	EP2002549	<0.02	<0.02	0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02						

							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)				
	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	0.01	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 Number																
MW302	8/09/2021	0958_MW302_210908	Normal	EP2110531	0.07	0.10	1.52	0.15	0.64	<0.02	<0.1	0.03	0.12	<0.02	0.1	<0.02	<0.02	<0.02	<0.02	<0.02
MW302	11/04/2022	0958_MW302_220411	Normal	EP2204288	0.09	0.12	1.43	0.13	1.21	<0.02	<0.1	0.04	0.18	0.02	0.14	<0.02	<0.02	<0.02	<0.02	<0.02
MW303	18/09/2015	WA0072-MW003	Normal	EP1514030					6.29						1.54					
MW303	11/11/2016	WA0072_MW003	Normal	523711					14						0.68					
MW303	26/03/2018	0958_MW303_180326	Normal	208619	0.41	0.88	17	3.7	71	<0.1	<0.1	0.20	1.6	0.53	1.9	<0.05	<0.1	<0.1	<0.2	<0.5
MW303	26/03/2018	0958_QC112_180326	Field Duplicate	208619	0.29	0.76	13	5.8	58	<0.02	0.09	0.21	1.4	0.54	1.9	<0.01	<0.02	<0.02	<0.05	<0.1
MW303	28/02/2019	0958_MW303_190228	Normal	223071	0.31	0.83	6.8	4.0	56	<0.02	0.1	0.29	2.0	0.38	3	<0.01	<0.02	<0.02	<0.05	<0.1
MW303	24/10/2019	0958_MW303_191024	Normal	EP1910968	0.34	0.66	10.5	1.26	36.4	<0.05	<0.2	0.30	1.70	0.25	1.78	<0.05	<0.05	<0.05	<0.05	<0.05
MW303	4/05/2020	0958_MW303_200504	Normal	EP2004453	0.30	0.78	13.0	0.96	51.2	<0.02	<0.1	0.30	1.78	0.41	1.43	<0.02	<0.02	<0.02	<0.02	<0.02
MW303	21/10/2020	0958_MW303_201021	Normal	EP2011490	0.23	0.61	5.35	0.83	16.2	<0.02	<0.1	0.17	1.04	0.18	0.8	<0.02	<0.02	<0.02	<0.02	<0.02
MW303	28/04/2021	0958_MW303_210428	Normal	EP2104666	0.45	1.26	5.07	2.15	77.7	<0.02	0.1	0.34	1.97	0.28	1.16	<0.02	<0.02	<0.02	<0.02	<0.02
MW303	8/09/2021	0958_MW303_210908	Normal	EP2110531	0.22	0.45	3.45	0.54	57.1	<0.02	<0.1	0.09	0.51	0.07	0.41	<0.02	<0.02	<0.02	<0.02	<0.02
MW303	11/04/2022	0958_MW303_220411	Normal	EP2204288	0.42	0.99	5.96	0.44	39.9	<0.02	<0.1	0.32	2.21	0.31	0.6	<0.02	<0.02	<0.02	<0.02	<0.02
MW304	3/10/2012	DUP01	Field Duplicate	EP1208227					4.21						0.14					
MW304	3/10/2012	WA0073-MW004	Normal	EP1208227					3.84						0.14					
MW304	18/09/2013	WA0073-MW004	Normal	EP1307135					3.96						0.22					
MW304	17/09/2015	WA0073-MW04	Normal	EP1514001					2.15						0.16					
MW304	15/11/2016	QC108	Field Duplicate	524161					5.9						0.26					
MW304	15/11/2016	WA0073-MW004	Normal	524161					5.2						0.26					
MW304	26/03/2018	0958_MW304_180326	Normal	208619	1.3	1.5	8.7	0.79	13	<0.02	0.29	0.39	1.9	0.20	0.36	<0.01	<0.02	<0.02	<0.05	<0.1
MW304	1/03/2019	0958_MW304_190301	Normal	223132	1.7	2.3	17	0.68	24	<0.02	0.35	0.44	2.3	0.36	0.45	<0.01	<0.02	<0.02	<0.05	<0.1
MW304	1/03/2019	0958_QC101_190301	Field Duplicate	223132	1.7	2.3	16	0.74	28	<0.02	0.34	0.44	2.3	0.38	0.41	<0.01	<0.02	<0.02	<0.05	<0.1
MW304	25/10/2019	0958_MW304_191025	Normal	EP1911008	0.63	0.55	4.25	0.24	2.71	<0.02	<0.1	0.15	0.89	0.10	0.21	<0.02	<0.02	<0.02	<0.02	<0.02
MW304	5/05/2020	0958_MW304_200505	Normal	EP2004509	1.54	3.01	8.46	0.51	2.92	<0.02	<0.1	0.42	2.64	0.44	0.45	<0.02	<0.02	<0.02	<0.02	<0.02
MW304	15/10/2020	0958_MW304_201015	Normal	EP2011227	0.61	0.45	2.79	0.21	1.81	<0.02	0.2	0.21	0.79	0.07	0.18	<0.02	<0.02	<0.02	<0.02	<0.02
MW304	7/09/2021	0958_MW304_210907	Normal	EP2110442	0.57	0.62	4.42	0.22	1.90	<0.02	0.1	0.20	0.88	0.10	0.2	<0.02	<0.02	<0.02	<0.02	<0.02
MW304	11/04/2022	0958_MW304_220411	Normal	EP2204288	0.34	0.38	3.54	0.22	2.83	<0.02	0.1	0.19	0.70	0.10	0.18	<0.02	<0.02	<0.02	<0.02	<0.02
MW305	17/09/2013	WA0073_MW005	Normal	EP1307095					3.57						0.21					
MW305	17/09/2015	WA0073-MW05	Normal	EP1514001					1.86						0.99					
MW305	15/11/2016	WA0073-MW005	Normal	524161					3.2						0.19					
MW305	26/03/2018	0958_MW305_180326	Normal	208619	0.13	0.22	1.8	0.18	2.4	<0.02	0.05	0.06	0.24	0.04	0.15	<0.01	<0.02	<0.02	<0.05	<0.1
MW305	28/02/2019	0958_MW305_190228	Normal	223071	0.14	0.18	2.1	0.23	2.0	<0.02	0.05	0.07	0.26	0.03	0.21	<0.01	<0.02	<0.02	<0.05	<0.1
MW305	25/10/2019	0958_MW305_191025	Normal	EP1911008	0.16	0.25	3.54	0.41	3.32	<0.02	<0.1	0.05	0.35	0.05	0.41	<0.02	<0.02	<0.02	<0.02	<0.02
MW305	15/10/2020	0958_MW305_201015	Normal	EP2011227	0.10	0.08	1.75	0.18	2.79	<0.05	<0.2	<0.05	0.18	<0.05	0.16	<0.05	<0.05	<0.05	<0.05	<0.05
MW305	7/09/2021	0958_MW305_210907	Normal	EP2110442	0.22	0.26	1.68	0.16	3.26	<0.02	<0.1	0.11	0.36	0.05	0.15	<0.02	<0.02	<0.02	<0.02	<0.02
MW305	11/04/2022	0958_MW305_220411	Normal	EP2204288	0.10	0.10	0.82	0.10	3.16	<0.02	<0.1	0.07	0.20	0.03	0.08	<0.02	<0.02	<0.02	<0.02	<0.02
MW306	4/10/2012	WA0073-MW006	Normal	EP1208340					3.01						0.15					
MW306	17/09/2013	WA0073_MW006	Normal	EP1307095					4.4						0.16					
MW306	17/09/2015	QC01	Field Duplicate	EP1514001					1.98						0.22					
MW306	17/09/2015	QC02	Interlab Duplicate	473137					2.2						0.33					
MW306	17/09/2015	WA0073-MW06	Normal	EP1514001					1.58						0.27					
MW306	15/11/2016	WA0073-MW006	Normal	524161					2.9						0.22					
MW306	28/03/2018	0958_MW306_180328	Normal	208793	0.28	0.41	4.1	0.28	1.7	<0.02	0.08	0.1	0.53	0.06	0.24	<0.01	<0.02	<0.02	<0.05	<0.1
MW306	28/02/2019	0958_MW306_190228	Normal	223071	0.25	0.36	4.6	0.34	2.4	<0.02	0.07	0.1	0.51	0.06	0.34	<0.01	<0.02	<0.02	<0.05	<0.1
MW306	25/10/2019	0958_MW306_191025	Normal	EP1911008	0.24	0.27	3.30	0.36	2.80	<0.02	<0.1	0.09	0.55	0.05	0.33	<0.02	<0.02	<0.02	<0.02	<0.02
MW306	15/10/2020	0958_MW306_201015	Normal	EP2011227	0.16	0.21	3.19	0.34	2.78	<0.02	<0.1	0.06	0.35	0.04	0.29	<0.02	<0.02	<0.02	<0.02	<0.02
MW306	15/10/2020	0958_QC103_201015	Field Duplicate	EP2011227	0.14	0.20	2.98	0.34	2.86	<0.02	<0.1	0.06	0.31	0.04	0.26	<0.02	<0.02	<0.02	<0.02	<0.02
MW306	15/10/2020	0958_QC203_201015	Interlab Duplicate	751054	0.14	0.20	3.4	0.32	3.2	<0.01	<0.05	0.07	0.27	0.04	0.26	<0.01	<0.01	<0.01	<0.01	<0.01
MW306	7/09/2021	0958_MW306_210907	Normal	EP2110442	0.56	1.28	3.71	0.20	2.89	<0.02</										

							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)		
	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	0.01	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											0.56							
PFAS NEMP 2020 Recreational Water											10							

Location Code	Date	Field ID	Sample Type	Lab Report Number																
MW308	16/08/2013	QC26	Interlab Duplicate	140697					13						0.04					
MW308	16/09/2013	QC25	Field Duplicate	EP1307065					13.2						0.61					
MW308	16/09/2013	WA0075-MW011	Normal	EP1307065					11.8						0.54					
MW308	21/09/2015	WA0075-MW011	Normal	EP1514064					3.38						0.15					
MW308	15/11/2016	WA0075-MW011	Normal	524161					71						0.9					
MW308	21/03/2018	0958_MW308_180321	Normal	208619	0.98	0.71	9.2	1.5	37	<0.1	0.23	0.43	2.2	0.29	0.93	<0.05	<0.1	<0.1	<0.2	<0.5
MW308	28/02/2019	0958_MW308_190228	Normal	223071	2.5	1.7	18	2.1	29	<0.02	0.40	0.77	4.8	0.53	1.6	<0.01	<0.02	<0.02	<0.05	<0.1
MW308	25/10/2019	0958_MW308_191025	Normal	EP1911008	0.78	0.74	3.78	0.40	42.5	<0.02	0.2	0.45	1.79	0.13	0.38	<0.02	<0.02	<0.02	<0.02	<0.02
MW308	15/10/2020	0958_MW308_201015	Normal	EP2011227	1.06	1.70	14.4	0.45	8.52	<0.02	0.3	0.47	2.46	0.50	0.51	<0.02	<0.02	<0.02	<0.02	<0.02
MW308	7/09/2021	0958_MW308_210907	Normal	EP2110442	0.42	0.81	3.58	0.33	27.5	<0.02	0.1	0.21	1.56	0.15	0.3	<0.02	<0.02	<0.02	<0.02	<0.02
MW308	11/04/2022	0958_MW308_220411	Normal	EP2204288	0.51	1.16	10.4	2.12	37.7	0.11	0.1	0.43	3.28	0.36	1.26	0.02	<0.02	<0.02	<0.02	<0.02
MW308	11/04/2022	0958_QC101_220411	Field Duplicate	EP2204288	0.50	0.94	10.7	2.12	36.8	0.10	0.1	0.43	3.28	0.36	1.34	0.02	<0.02	<0.02	<0.02	<0.02
MW308	11/04/2022	0958_QC201_220411	Interlab Duplicate	881198	0.43	0.93	13	1.1	50	<0.01	0.22	0.33	3.0	0.31	1.3	0.02	<0.01	<0.01	<0.01	<0.01
MW309	16/09/2013	WA0075-MW012	Normal	EP1307065					22						0.56					
MW309	21/09/2015	WA0075-MW012	Normal	EP1514064					4.03						0.22					
MW309	15/11/2016	WA0075-MW012	Normal	524161					14						0.34					
MW309	21/03/2018	0958_MW309_180321	Normal	208619	1.2	2.1	41	19	230	<0.1	0.36	0.72	4.2	0.91	5	<0.05	<0.1	<0.1	<0.2	<0.5
MW309	28/02/2019	0958_MW309_190228	Normal	223071	0.98	1.7	23	1.4	20	<0.02	0.31	0.50	3.0	0.66	1.3	<0.01	<0.02	<0.02	<0.05	<0.1
MW309	25/10/2019	0958_MW309_191025	Normal	EP1911008	1.44	1.21	8.21	0.97	34.0	<0.02	0.4	0.66	2.19	0.21	0.74	<0.02	<0.02	<0.02	<0.02	<0.02
MW309	15/10/2020	0958_MW309_201015	Normal	EP2011227	0.51	0.95	7.43	0.62	16.2	<0.02	0.1	0.31	2.15	0.22	0.44	<0.02	<0.02	<0.02	<0.02	<0.02
MW309	7/09/2021	0958_MW309_210907	Normal	EP2110442	1.32	2.03	10.9	1.28	202	<0.02	0.3	0.50	3.07	0.81	0.39	<0.02	<0.02	<0.02	<0.02	<0.02
MW309	7/09/2021	0958_QC103_210907	Field Duplicate	EP2110442	1.30	2.04	8.73	1.57	202	<0.02	0.3	0.46	3.07	0.75	0.37	<0.02	<0.02	<0.02	<0.02	<0.02
MW309	7/09/2021	0958_QC203_210907	Interlab Duplicate	823596	1.4	1.9	9.4	0.22	140	<0.01	0.30	0.77	3.1	0.84	0.46	0.02	<0.01	<0.01	<0.01	<0.01
MW309	11/04/2022	0958_MW309_220411	Normal	EP2204288	1.42	3.45	29.4	3.48	122	0.04	0.3	0.76	4.60	1.11	2.76	0.06	<0.02	<0.02	<0.02	<0.02
MW310	3/10/2012	WA0075-MW013	Normal	EP1208227					19.2						0.8					
MW310	16/09/2013	WA0075-MW013	Normal	EP1307065					16.4						0.62					
MW310	21/09/2015	WA0075-MW013	Normal	EP1514064					8.12						0.29					
MW310	15/11/2016	WA0075-MW013	Normal	524161					150						2.5					
MW310	21/03/2018	0958_MW310_180321	Normal	208619	0.84	2.3	21	1.6	24	<0.1	0.20	0.42	3.1	0.83	0.97	<0.05	<0.1	<0.1	<0.2	<0.5
MW310	28/02/2019	0958_MW310_190228	Normal	223071	8.4	11	34	2.0	34	<0.02	1.5	2.3	18	1.6	1.9	<0.01	<0.02	<0.02	<0.05	<0.1
MW310	25/10/2019	0958_MW310_191025	Normal	EP1911008	3.88	3.25	27.6	2.50	50.5	0.02	0.6	1.72	5.43	0.70	2.27	<0.02	<0.02	<0.02	<0.02	<0.02
MW310	5/05/2020	0958_MW310_200505	Normal	EP2004509	0.89	0.96	3.52	0.30	10.9	0.06	<0.1	<0.02	2.28	0.66	0.61	0.39	0.15	<0.02	<0.02	<0.02
MW310	15/10/2020	0958_MW310_201015	Normal	EP2011227	0.57	0.55	1.55	0.04	4.43	<0.02	0.1	0.24	1.44	0.12	0.05	0.02	0.04	<0.02	<0.02	<0.02
MW310	28/04/2021	0958_MW310_210428	Normal	EP2104665	0.05	0.10	0.92	0.09	3.06	<0.02	<0.1	0.05	0.15	0.11	0.12	0.1	0.1	0.08	0.06	<0.02
MW310	7/09/2021	0958_MW310_210907	Normal	EP2110442	2.55	7.53	53.2	3.30	93.6	<0.02	0.6	1.04	8.52	2.09	2.92	<0.02	<0.02	<0.02	<0.02	<0.02
MW312	18/09/2015	WA0171-MW017	Normal	EP1514030					17.2						1.06					
MW312	11/11/2016	QC204	Interlab Duplicate	ME301144							<0.01	0.02	0.13	0.02	0.07	<0.01	<0.01	<0.01	<0.01	<0.01
MW312	11/11/2016	WA0171_MW017	Normal	523711					3.3						0.08					
MW312	26/03/2018	0958_MW312_180326	Normal	208619	0.02	0.03	0.39	0.02	1.0	<0.02	<0.02	<0.02	0.05	<0.01	0.02	<0.01	<0.02	<0.02	<0.05	<0.1
MW312	28/02/2019	0958_MW312_190228	Normal	223071	0.07	0.10	0.57	0.02	0.96	<0.02	<0.02	<0.02	0.13	0.01	0.02	<0.01	<0.02	<0.02	<0.05	<0.1
MW312	24/10/2019	0958_MW312_191024	Normal	EP1910968	0.07	0.07	0.89	<0.02	0.58	<0.02	<0.1	0.02	0.12	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW312	5/05/2020	0958_MW312_200505	Normal	EP2004509	0.02	0.02	0.36	<0.02	0.62	<0.02	<0.1	<0.02	0.05	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW312	21/10/2020	0958_MW312_201021	Normal	EP2011490	0.04	0.05	0.87	0.03	0.36	<0.02	<0.1	<0.02	0.11	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW312	28/04/2021	0958_MW312_210428	Normal	EP2104665	0.08	0.10	0.87	0.06	2.38	<0.02	<0.1	0.04	0.19	0.03	0.05	<0.02	<0.02	<0.02	<0.02	<0.02
MW312	7/09/2021	0958_MW312_210907	Normal	EP2110442	<0.02	<0.02	0.09	<0.02	0.20	<0.02	<0.1	<0.02	0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW312	11/04/2022	0958_MW312_220411	Normal	EP2204288	0.07	0.06	0.49	<0.02	0.75	<0.02	<0.1	0.03	0.11	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW313	18/09/2015	WA0171-MW018	Normal	EP1514030					20.9						1.64					
MW313	11/11/2016	WA0171_MW018	Normal	523711					4.8						0.07					
MW313	29/03/2018																			

							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)
	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	0.01	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 Number																
MW313	11/04/2022	0958_MW313_220411	Normal	EP2204288	<0.02	<0.02	0.14	<0.02	0.08	<0.02	<0.1	<0.02	0.03	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02
MW401	14/02/2018	0958_BORE_1_180214	Normal	206770-A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW401	27/03/2018	0958_Bore_1_180327	Normal	208696	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW401	25/02/2019	0958_Bore_1_190225	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW401	24/10/2019	0958_MW401_191024	Normal	EP1910968	<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
MW401	28/01/2020	0958_QC201_210128	Interlab Duplicate	770820	<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
MW401	18/03/2020	0958_MW401_200318	Normal	EP2002870	<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
MW401	4/05/2020	0958_MW401_200504	Normal	EP2004453	<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
MW401	19/08/2020	0958_MW401_200819	Normal	EP2008767	<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
MW401	15/10/2020	0958_MW401_201015	Normal	EP2011227	<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
MW401	28/01/2021	0958_MW401_210128	Normal	EP2100912	<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
MW401	28/01/2021	0958_QC101_210128	Field Duplicate	EP2100912	<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
MW401	27/04/2021	0958_MW401_210427	Normal	EP2104578	<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
MW401	15/07/2021	0958_MW401_210715	Normal	EP2108063	<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
MW401	10/09/2021	0958_MW401_210910	Normal	EP2110622	<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
MW401	19/01/2022	0958_MW401_220119	Normal	EP2200662	<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
MW401	11/04/2022	0958_MW401_220411	Normal	EP2204288	<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
MW401	15/07/2022	0958_MW401_220715	Normal	EP2208860	<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
MW402	27/03/2018	0958_Bore_2_180327	Normal	208696	0.08	0.11	0.65	0.07	0.26	<0.02	<0.02	0.02	0.12	0.02	0.04	<0.01	<0.02	<0.02	<0.05	<0.1
MW402	25/02/2019	0958_Bore_2_190225	Normal	222957	0.07	0.07	0.52	0.03	0.30	<0.02	<0.02	<0.02	0.09	<0.01	0.02	<0.01	<0.02	<0.02	<0.05	<0.1
MW402	7/11/2019	0958_MW402_191107	Normal	EP1911620	0.07	0.08	0.70	0.04	0.24	<0.02	<0.1	<0.02	0.10	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	18/03/2020	0958_MW402_200318	Normal	EP2002870	0.09	0.10	0.69	0.04	0.46	<0.02	<0.1	0.02	0.13	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	6/05/2020	0958_MW402_200506	Normal	EP2004592	0.26	0.27	1.60	0.11	0.66	<0.02	<0.1	0.08	0.39	0.05	0.07	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	6/05/2020	0958_QC104_200506	Field Duplicate	EP2004592	0.27	0.28	1.63	0.12	0.74	<0.02	<0.1	0.08	0.41	0.05	0.08	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	6/05/2020	0958_QC204_200506	Interlab Duplicate	718240	0.21	0.20	1.4	0.07	0.61	<0.01	<0.05	0.07	0.35	0.04	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
MW402	19/08/2020	0958_MW402_200819	Normal	EP2008767	0.08	0.08	0.52	0.04	0.33	<0.02	<0.1	0.02	0.12	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	19/08/2020	0958_QC101_200819	Field Duplicate	EP2008767	0.10	0.09	0.62	0.04	0.41	<0.02	<0.1	0.03	0.15	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	19/08/2020	0958_QC201_200819	Interlab Duplicate	739083	0.07	0.07	0.54	0.04	0.24	<0.01	<0.05	0.02	0.11	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
MW402	29/10/2020	0958_MW402_201029	Normal	EP2011863	0.07	0.07	0.50	0.03	0.27	<0.02	<0.1	0.03	0.13	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	27/04/2021	0958_MW402_210427	Normal	EP2104578	0.06	0.07	0.54	0.04	0.26	<0.02	<0.1	<0.02	0.11	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	27/04/2021	0958_QC101_210427	Field Duplicate	EP2104578	0.06	0.07	0.54	0.04	0.27	<0.02	<0.1	<0.02	0.12	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	27/04/2021	0958_QC201_210427	Interlab Duplicate	791818	0.06	0.06	0.46	0.02	0.36	<0.01	<0.05	0.03	0.09	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
MW402	7/09/2021	0958_MW402_210907	Normal	EP2110442	0.09	0.12	0.76	0.05	0.37	<0.02	<0.1	0.02	0.14	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	19/01/2022	0958_MW402_220119	Normal	EP2200662	0.09	0.08	0.67	0.05	0.40	<0.02	<0.1	0.02	0.16	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	11/04/2022	0958_MW402_220411	Normal	EP2204288	0.18	0.16	1.21	0.09	0.55	<0.02	<0.1	0.06	0.28	0.05	0.06	<0.02	<0.02	<0.02	<0.02	<0.02
MW402	15/07/2022	0958_MW402_220715	Normal	EP2208860	0.17	0.21	1.50	0.11	0.77	<0.02	<0.1	0.06	0.32	0.05	0.1	<0.02	<0.02	<0.02	<0.02	<0.02
MW403	26/02/2019	0958_GC19_190226	Normal	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW403	26/02/2019	0958_QC101_190226	Field Duplicate	222957	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
MW403	18/11/2019	0958_GC19_191118	Normal	EP1912058	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.0				

							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 (PFTrDA)
	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	0.01	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 Number															
MW505	7/09/2021	0958_MW505_210907	Normal	EP2110442	<0.02	<0.02	0.06	<0.02	0.03	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
MW505	11/04/2022	0958_MW505_220411	Normal	EP2204288	0.04	0.04	0.35	<0.02	0.24	<0.02	<0.1	0.03	0.09	<0.02	0.01	<0.02	<0.02	<0.02	<0.02

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 PFHxS+PFOS

New exceedance of guideline value

	Perfluorotetra- carboxylic acid (PF ₄ DA)	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)	Perfluorooctan- e sulfonamide (FOSA)	N-Methyl perfluorooctan- e sulfonamide (MeFOSA)	N-Methyl perfluorooctan- e sulfonamidoac- etate	N-methyl perfluorooctan- e sulfonamidoac- etate	N-Ethyl perfluorooctan- e sulfonamide (EtFOSA)	N-Ethyl perfluorooctan- e sulfonamidoac- etate	N-Ethyl perfluorooctan- e sulfonamidoac- etate	Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	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	μg/L	μg/L	μg/L	μg/L	μg/L	μg/L	
	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	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	20/03/2018	0958_MW101_I_180320	Normal	208378	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5			
MW101I	25/02/2019	0958_MW101_I_190225	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.60	0.78
MW101I	23/10/2019	0958_MW101_191023	Normal	EP1910901	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.69	0.58	0.78
MW101I	4/05/2020	0958_MW101_D_200504	Normal	EP2004453	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.35	0.35	0.35
MW101I	28/04/2021	0958_MW101I_210428	Normal	EP2104666	<0.10	<0.05	<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
MW101I	7/09/2021	0958_MW101I_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.61	0.53	0.67
MW101I	11/04/2022	0958_MW101I_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.72	0.58	0.78
MW102D	19/03/2018	0958_MW102_D_180319	Normal	208244	<0.5	<0.01	0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW102D	6/03/2019	0958_MW102_D_190306	Normal	223277	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.04	0.04
MW102D	4/05/2020	0958_MW102_D_200504	Normal	EP2004453	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.74	0.47	0.78
MW102D	21/10/2020	0958_MW102_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.57	0.49	0.64
MW102D	28/04/2021	0958_MW102D_210428	Normal	EP2104666	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.64	0.48	0.67
MW102D	28/04/2021	0958_QC104_210428	Field Duplicate	EP2104666	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.71	0.54	0.75
MW102D	28/04/2021	0958_QC204_210428	Interlab Duplicate	791819	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.58	0.53	0.62
MW102D	8/09/2021	0958_MW102D_210908	Normal	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.36	0.26	0.36
MW102D	11/04/2022	0958_MW102D_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.08	0.08	0.08
MW104I	27/03/2018	0958_MW104_I_180327	Normal	208696	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW104I	5/03/2019	0958_MW104_I_190305	Normal	223277	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.16	0.17
MW104I	25/10/2019	0958_MW104_191025	Normal	EP1911008	<0.05	<0.05	0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	3.1	2.65	3.28
MW104I	7/05/2020	0958_MW104_I_20200507	Normal	EP2004672	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.08	0.08	0.08
MW104I	21/10/2020	0958_MW104_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.41	0.38	0.41
MW104I	28/04/2021	0958_MW104I_210428	Normal	EP2104665	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.49	0.39	0.52
MW104I	28/04/2021	0958_QC105_210428	Field Duplicate	EP2104665	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.45	0.36	0.48
MW104I	28/04/2021	0958_QC205_210428	Interlab Duplicate	791819	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.37	0.29	0.39
MW104I	7/09/2021	0958_MW104I_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.15	0.87	1.29
MW104I	11/04/2022	0958_MW104I_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.26	0.88	1.40
MW104I	11/04/2022	0958_QC102_220411	Field Duplicate	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.27	0.87	1.41
MW104I	11/04/2022	0958_QC202_220411	Interlab Duplicate	881198	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1	0.67	1.1
MW105D	27/03/2018	0958_MW105_D_180327	Normal	208696	<0.5	<0.01	0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW105D	6/03/2019	0958_MW105_D_190306	Normal	223277	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.71	0.85
MW105D	25/10/2019	0958_MW105_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.21	0.21	0.21
MW105D	7/05/2020	0958_MW105_D_20200507	Normal	EP2004672	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.94	0.87	0.97
MW105D	21/10/2020	0958_MW105_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09	0.09
MW105D	28/04/2021	0958_MW105D_210428	Normal	EP2104665	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2.86	2.46	3.06
MW105D	7/09/2021	0958_MW105D_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.99	0.87	1.05
MW105D	11/04/2022	0958_MW105D_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.45	0.39	0.47
MW106S	20/03/2018	0958_MW106_S_180320	Normal	208378	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5			
MW106S	4/03/2019	0958_MW106_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW106S	25/10/2019	0958_MW106_191025	Normal	EP1911007	<0.05	<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
MW106S	7/05/2020	0958_MW106_S_20200507	Normal	EP2004672	<0.05	<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
MW106S	23/10/2020	0958_MW106_201023	Normal	EP2011633	<0.05	<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
MW106S	27/04/2021	0958_MW106S_210427	Normal	EP2104577	<0.05	<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
MW10																			

	Perfluorotetradecanoic acid (PFTeDA)	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 sulfonamide	N-methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide	Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	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	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	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															
MW110S	4/03/2019	0958_MW110_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.01	0.01
MW110S	25/10/2019	0958_MW110_191025	Normal	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.04	0.04	0.04
MW110S	5/05/2020	0958_MW110_S_200505	Normal	EP2004509	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.05	0.05	0.05
MW110S	21/10/2020	0958_MW110_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.14	0.14	0.14
MW110S	28/04/2021	0958_MW110S_210428	Normal	EP2104666	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09	0.09
MW110S	7/09/2021	0958_MW110S_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.07	0.07	0.07
MW110S	7/09/2021	0958_QC104_210907	Field Duplicate	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.07	0.07	0.07
MW110S	7/09/2021	0958_QC204_210907	Interlab Duplicate	823596	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	0.11	0.11
MW110S	11/04/2022	0958_MW110S_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09	0.09
MW111S	20/03/2018	0958_MW111_S_180320	Normal	208378	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5			
MW112S	19/03/2018	0958_MW112_S_180319	Normal	208244	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW112S	4/03/2019	0958_MW112_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.12	0.12
MW112S	24/10/2019	0958_MW112_191024	Normal	EP1910968	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.04	0.04	0.04
MW112S	4/05/2020	0958_MW112_S_200504	Normal	EP2004453	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.06	0.06	0.06
MW112S	21/10/2020	0958_MW112_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.07	0.07	0.07
MW112S	28/04/2021	0958_MW112_210428	Normal	EP2104666	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.14	0.14	0.14
MW112S	7/09/2021	0958_MW112S_210907	Normal	EP2110442	<0.05	<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
MW112S	11/04/2022	0958_MW112S_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW113S	20/03/2018	0958_MW113_S_180320	Normal	208378	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5			
MW113S	4/03/2019	0958_MW113_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.03	0.03
MW113S	24/10/2019	0958_MW113_191024	Normal	EP1910968	<0.05	<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
MW113S	24/10/2019	0958_QC101_191024	Field Duplicate	EP1910968	<0.05	<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
MW113S	24/10/2019	0958_QC201_191024	Interlab Duplicate	684804	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.03	<0.1
MW113S	4/05/2020	0958_MW113_S_200504	Normal	EP2004453	<0.05	<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
MW113S	21/10/2020	0958_MW113_201021	Normal	EP2011490	<0.05	<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
MW113S	28/04/2021	0958_MW113S_210428	Normal	EP2104666	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW113S	7/09/2021	0958_MW113S_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.05	0.05	0.05
MW113S	11/04/2022	0958_MW113S_220411	Normal	EP2204288	<0.05	<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
MW114S	20/03/2018	0958_MW114_S_180320	Normal	208378	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5			
MW114S	1/03/2019	0958_MW114_S_190301	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		1.8	2.0
MW114S	14/10/2020	0958_MW114_201014	Normal	EP2011160	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.12	<0.05	<0.12	<0.12	<0.05	<0.12	0.83	0.78	0.83
MW114S	7/09/2021	0958_MW114S_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.98	0.78	1.05
MW114S	11/04/2022	0958_MW114S_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.51	1.26	1.60
MW115S	28/03/2018	0958_MW115_S_180328	Normal	208793	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW115S	4/03/2019	0958_MW115_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.11	0.11
MW115S	25/10/2019	0958_MW115_191025	Normal	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.37	0.35	0.37
MW115S	25/10/2019	0958_QC104_191025	Field Duplicate	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.4	0.36	0.42
MW115S	25/10/2019	0958_QC204_191025	Interlab Duplicate	685043	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.34	0.32	0.36
MW115S	5/05/2020	0958_MW115_S_200505	Normal	EP2004509	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.14	0.14	0.14
MW115S	21/10/2020	0958_MW115_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.08	0.08	0.08
MW115S	28/04/2021	0958_MW115S_210428	Normal	EP2104666	<0.05	<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
MW115S	8/09/2021	0958_MW115S_210908	Normal	EP2110531	<0.05	<0.05	<0.05	<0.05</											

[illegible]

MW117I	21/10/2020	0958_MW117_201021	Normal	EP2011490	<0.05	<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
MW117I	28/04/2021	0958_MW117I_210428	Normal	EP2104679	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.03	0.03	0.03
MW117I	6/09/2021	0958_MW117I_210906	Normal	EP2110395	<0.05	<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
MW117I	13/04/2022	0958_MW117I_220413	Normal	EP2204360	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW118D	28/03/2018	0958_MW118_D_180328	Normal	208793	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW118D	6/03/2019	0958_MW118_D_190306	Normal	223277	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW118D	25/10/2019	0958_MW118_191025	Normal	EP1911007	<0.05	<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
MW118D	6/05/2020	0958_MW118_D_200506	Normal	EP2004592	<0.05	<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
MW118D	21/10/2020	0958_MW118_201021	Normal	EP2011490	<0.05	<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
MW118D	28/04/2021	0958_MW118D_210428	Normal	EP2104679	<0.05	<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
MW118D	6/09/2021	0958_MW118D_210906	Normal	EP2110395	<0.05	<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
MW118D	13/04/2022	0958_MW118D_220413	Normal	EP2204360	<0.05	<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
MW118D	13/04/2022	0958_QC107_220413	Field Duplicate	EP2204360	<0.05	<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
MW118D	13/04/2022	0958_QC207_220413	Interlab Duplicate	881198	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.1
MW119S	27/03/2018	0958_MW119_S_180327	Normal	208696	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW119S	4/03/2019	0958_MW119_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.04	0.04
MW119S	24/10/2019	0958_MW119_191024	Normal	EP1910969	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.06	0.06	0.06
MW119S	6/05/2020	0958_MW119_S_200506	Normal	EP2004592	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.06	0.06	0.06
MW119S	28/04/2021	0958_MW119S_210428	Normal	EP2104679	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW119S	6/09/2021	0958_MW119S_210906	Normal	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW119S	13/04/2022	0958_MW119S_220413	Normal	EP2204360	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.08	0.08	0.08
MW120I	27/03/2018	0958_MW120_I_180327	Normal	208696	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW120I	6/03/2019	0958_MW120_I_190306	Normal	223277	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW120I	24/10/2019	0958_MW120_191024	Normal	EP1910968	<0.05	<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
MW120I	6/05/2020	0958_MW120_I_200506	Normal	EP2004592	<0.05	<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
MW120I	6/05/2020	0958_QC103_200506	Field Duplicate	EP2004592	<0.05	<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
MW120I	6/05/2020	0958_QC203_200506	Interlab Duplicate	718240	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.1
MW120I	21/10/2020	0958_MW120_201021	Normal	EP2011490	<0.05	<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
MW120I	28/04/2021	0958_MW120I_210428	Normal	EP2104679	<0.05	<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
MW120I	28/04/2021	0958_QC106_210428	Field Duplicate	EP2104679	<0.05	<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
MW120I	28/04/2021	0958_QC206_210428	Interlab Duplicate	791819	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.1
MW120I	6/09/2021	0958_MW120I_210906	Normal	EP2110395	<0.05	<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
MW120I	13/04/2022	0958_MW120I_220413	Normal	EP2204360	<0.05	<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
MW121D	27/03/2018	0958_MW121_D_180327	Normal	208696	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW121D	6/03/2019	0958_MW121_D_190306	Normal	223277	<0.5	<0.01	0.02	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	0.02
MW121D	24/10/2019	0958_MW121_191024	Normal	EP1910968	<0.05	<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
MW121D	6/05/2020	0958_MW121_D_200506	Normal	EP2004592	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW121D	21/10/2020	0958_MW121_201021	Normal	EP2011490	<0.05	<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
MW121D	28/04/2021	0958_MW121D_210428	Normal	EP2104679	<0.05	<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
MW121D	6/09/2021	0958_MW121D_210906	Normal	EP2110395	<0.05	<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
MW121D	13/04/2022	0958_MW121D_220413	Normal	EP2204360	<0.05	<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
MW122S	20/03/2018	0958_MW122_S_180320	Normal	208378	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5			
MW122S	4/03/2019	0958_MW122_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.01	0.01
MW122S	25/10/2019	0958_MW122_191025	Normal	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW122S	5/05/2020	0958_MW122_S_200505	Normal	EP2004509	<0.05	<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
MW122S	21/10/2020	0958_MW122_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW122S	28/04/2021	0958_MW122S_210428	Normal	EP2104679	<0.05	<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
MW122S	6/09/2021	0958_MW122S_210906	Normal	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.11	0.11	0.11
MW122S	13/04/2022	0958_MW122S_220413	Normal	EP2204360	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.06	0.06	0.06
MW123I	20/03/2018	0958_MW123_I_180320	Normal	208378	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5			
MW123I	5/03/2019	0958_MW123_I_190305	Normal	223277	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.12	0.12
MW123I	25/10/2019	0958_MW123_191025	Normal	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.14	0.14	0.14
MW123I	5/05/2020	0958_MW123_I_200505	Normal	EP2004509	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.13	0.13	0.13
MW123I	14/10/2020	0958_MW123_I_201014	Normal	EP2011160	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09	0.09
MW123I	14/10/2020	0958_QC101_201014	Field Duplicate	EP2011160	<0.05	<													

	Perfluorotetradecanoic acid (PFTeDA)	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 sulfonamide	N-methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide	Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	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	µg/L	µg/L
LOR - Limit of Reporting	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	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															
MW124D	6/03/2019	0958_MW124_D_190306	Normal	223277	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW124D	25/10/2019	0958_MW124_191025	Normal	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW124D	21/10/2020	0958_MW124_201021	Normal	EP2011490	<0.05	<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
MW124D	28/04/2021	0958_MW124D_210428	Normal	EP2104679	<0.05	<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
MW124D	6/09/2021	0958_MW124D_210906	Normal	EP2110395	<0.05	<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
MW124D	13/04/2022	0958_MW124D_220413	Normal	EP2204360	<0.05	<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
MW124D	13/04/2022	0958_QC106_220413	Field Duplicate	EP2204360	<0.05	<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
MW124D	13/04/2022	0958_QC206_220413	Interlab Duplicate	881198	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.1
MW125S	29/03/2018	0958_MW125_S_180329	Normal	208806	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW125S	26/02/2019	0958_MW125_S_190226	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW125S	24/10/2019	0958_MW125_191024	Normal	EP1910968	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.12	<0.05	<0.12	<0.12	<0.05	<0.12	<0.05	<0.05	<0.05
MW125S	7/05/2020	0958_MW125_S_20200507	Normal	EP2004672	<0.05	<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
MW125S	23/10/2020	0958_MW125_201023	Normal	EP2011633	<0.05	<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
MW125S	27/04/2021	0958_MW125S_210427	Normal	EP2104577	<0.05	<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
MW125S	6/09/2021	0958_MW125S_210906	Normal	EP2110395	<0.05	<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
MW125S	6/09/2021	0958_QC101_210906	Field Duplicate	EP2110395	<0.05	<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
MW125S	6/09/2021	0958_QC201_210906	Interlab Duplicate	822876	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.1
MW125S	12/04/2022	0958_MW125S_220412	Normal	EP2204301	<0.05	<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
MW126I	29/03/2018	0958_MW126_I_180329	Normal	208806	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW126I	26/02/2019	0958_MW126_I_190226	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW126I	24/10/2019	0958_MW126_191024	Normal	EP1910968	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.12	<0.05	<0.12	<0.12	<0.05	<0.12	<0.05	<0.05	<0.05
MW126I	7/05/2020	0958_MW126_I_20200507	Normal	EP2004672	<0.05	<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
MW126I	23/10/2020	0958_MW126_201023	Normal	EP2011633	<0.05	<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
MW126I	27/04/2021	0958_MW126I_210427	Normal	EP2104577	<0.05	<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
MW126I	6/09/2021	0958_MW126I_210906	Normal	EP2110395	<0.05	<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
MW126I	12/04/2022	0958_MW126I_220412	Normal	EP2204301	<0.05	<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
MW128D	29/03/2018	0958_MW128_S_180329	Normal	208806	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW128D	26/02/2019	0958_MW128_S_190226	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW128D	24/10/2019	0958_MW128_191024	Normal	EP1910968	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.12	<0.05	<0.12	<0.12	<0.05	<0.12	<0.05	<0.05	<0.05
MW128D	7/05/2020	0958_MW128_S_20200507	Normal	EP2004672	<0.05	<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
MW128D	23/10/2020	0958_MW128_201023	Normal	EP2011633	<0.05	<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
MW128D	27/04/2021	0958_MW128S_210427	Normal	EP2104577	<0.05	<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
MW128D	6/09/2021	0958_MW128D_210906	Normal	EP2110395	<0.05	<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
MW128D	12/04/2022	0958_MW128D_220412	Normal	EP2204301	<0.05	<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
MW129S	29/03/2018	0958_MW129_I_180329	Normal	208793	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW129S	26/02/2019	0958_MW129_I_190226	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW129S	24/10/2019	0958_MW129_191024	Normal	EP1910968	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.12	<0.05	<0.12	<0.12	<0.05	<0.12	<0.05	<0.05	<0.05
MW129S	7/05/2020	0958_MW129_I_20200507	Normal	EP2004672	<0.05	<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
MW129S	23/10/2020	0958_MW129_201023	Normal	EP2011633	<0.05	<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
MW129S	27/04/2021	0958_MW129I_210427	Normal	EP2104577	<0.05	<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
MW129S	27/04/2021	0958_QC103_210427	Field Duplicate	EP2104577	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02									

	Perfluorotetradecanoic acid (PFTeDA)	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 sulfonamidoacetate	N-methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetate	N-Ethyl perfluorooctane sulfonamide	Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	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	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	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															
MW132I	5/03/2019	0958_MW132_I_190305	Normal	223277	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.04	0.04
MW132I	24/10/2019	0958_MW132_I_191024	Normal	EP1910969	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.06	0.06	0.06
MW132I	6/05/2020	0958_MW132_I_200506	Normal	EP2004592	<0.05	<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
MW132I	23/10/2020	0958_MW132_I_201023	Normal	EP2011633	<0.05	<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
MW132I	27/04/2021	0958_MW132I_210427	Normal	EP2104577	<0.05	<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
MW132I	6/09/2021	0958_MW132I_210906	Normal	EP2110395	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.03	0.03	0.03
MW132I	12/04/2022	0958_MW132I_220412	Normal	EP2204301	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.03	0.03	0.03
MW132I	12/04/2022	0958_QC104_220412	Field Duplicate	EP2204301	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.03	0.03	0.03
MW132I	12/04/2022	0958_QC204_220412	Interlab Duplicate	881198	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.1
MW133D	27/02/2019	0958_MW133_D_190227	Normal	222957	<0.5	<0.01	0.02	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	0.02
MW133D	24/10/2019	0958_MW133_I_191024	Normal	EP1910969	<0.05	<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
MW133D	6/05/2020	0958_MW133_D_200506	Normal	EP2004592	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.04	0.04	0.04
MW133D	23/10/2020	0958_MW133_I_201023	Normal	EP2011633	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.03	0.03	0.03
MW133D	27/04/2021	0958_MW133D_210427	Normal	EP2104577	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.04	0.04	0.04
MW133D	6/09/2021	0958_MW133D_210906	Normal	EP2110395	<0.05	<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
MW133D	12/04/2022	0958_MW133D_220412	Normal	EP2204301	<0.05	<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
MW134D	27/02/2019	0958_MW134_D_190227	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW134D	24/10/2019	0958_MW134_I_191024	Normal	EP1910969	<0.05	<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
MW134D	7/05/2020	0958_MW134_D_20200507	Normal	EP2004672	<0.05	<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
MW134D	23/10/2020	0958_MW134_I_201023	Normal	EP2011633	<0.05	<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
MW135I	16/03/2018	0958_MW135_S_180316	Normal	208244	<0.5	<0.01	0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW135I	16/03/2018	0958_QC110_180316	Field Duplicate	208244	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW135I	27/04/2021	0958_MW135I_210427	Normal	EP2104577	<0.05	<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
MW135I	6/09/2021	0958_MW135I_210906	Normal	EP2110395	<0.05	<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
MW135I	12/04/2022	0958_MW135I_220412	Normal	EP2204301	<0.05	<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
MW136D	27/02/2019	0958_MW136_I_190227	Normal	223071	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW136D	24/10/2019	0958_MW136_I_191024	Normal	EP1910969	<0.05	<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
MW136D	7/05/2020	0958_MW136_I_20200507	Normal	EP2004672	<0.05	<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
MW136D	23/10/2020	0958_MW136_I_201023	Normal	EP2011633	<0.05	<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
MW136D	27/04/2021	0958_MW136D_210427	Normal	EP2104577	<0.05	<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
MW136D	6/09/2021	0958_MW136D_210906	Normal	EP2110395	<0.05	<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
MW136D	12/04/2022	0958_MW136D_220412	Normal	EP2204301	<0.05	<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
MW137S	4/03/2019	0958_MW137_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW137S	8/05/2020	0958_MW137_I_200508	Normal	EP2004700	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.12	<0.05	<0.12	<0.12	<0.05	<0.12	<0.05	<0.05	<0.05
MW137S	23/10/2020	0958_MW137_I_201023	Normal	EP2011633	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.02	0.02	0.02
MW137S	28/04/2021	0958_MW137S_210428	Normal	EP2104665	<0.05	<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
MW137S	8/09/2021	0958_MW137S_210908	Normal	EP2110531	<0.05	<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
MW137S	12/04/2022	0958_MW137S_220412	Normal	EP2204301	<0.05	<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
MW138S	4/03/2019	0958_MW138_S_190304	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.21	0.24
MW138S	24/10/2019	0958_MW138_S_191024	Normal	EP1910969	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.47	0.44	0.47
MW138S	7/05/2020	0958_MW138_S_																	

	Perfluorotetradecanoic acid (PFTeDA)	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 sulfonamide	N-methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide	Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	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	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	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															
MW140D	6/09/2021	0958_MW140D_210906	Normal	EP2110395	<0.05	<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
MW140D	12/04/2022	0958_MW140D_220412	Normal	EP2204301	<0.05	<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	12/03/2019	0958_MW141_S_190312	Normal	223597	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.79	1.1
MW141S	25/10/2019	0958_MW141_191025	Normal	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.94	0.73	1.04
MW141S	28/01/2020	0958_QC202_210128	Interlab Duplicate	770820	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.22	0.92	1.37
MW141S	10/03/2020	0958_MW141_S_200310	Normal	EP2002549	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.19	0.85	1.35
MW141S	10/03/2020	0958_QC101_200310	Field Duplicate	EP2002549	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.13	0.82	1.27
MW141S	10/03/2020	0958_QC201_200310	Interlab Duplicate	707212	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.81	0.61	0.92
MW141S	7/05/2020	0958_MW141_S_20200507	Normal	EP2004672	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.32	1.02	1.45
MW141S	19/08/2020	0958_MW141_200819	Normal	EP2008767	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.74	1.32	1.92
MW141S	23/10/2020	0958_MW141_201023	Normal	EP2011633	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.56	0.42	0.59
MW141S	28/01/2021	0958_MW141_210128	Normal	EP2100912	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.12	0.83	1.23
MW141S	28/01/2021	0958_QC102_210128	Field Duplicate	EP2100912	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.11	0.82	1.22
MW141S	28/04/2021	0958_MW141S_210428	Normal	EP2104679	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.24	0.93	1.37
MW141S	15/07/2021	0958_MW141S_210715	Normal	EP2108063	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.6	1.21	1.75
MW141S	15/07/2021	0958_QC101_210715	Field Duplicate	EP2108063	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.55	1.18	1.70
MW141S	15/07/2021	0958_QC201_210715	Interlab Duplicate	812060	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.49	1.17	1.68
MW141S	8/09/2021	0958_MW141S_210908	Normal	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.37	1.06	1.52
MW141S	20/01/2022	0958_MW141S_220120	Normal	EP2200662	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2	1.52	2.17
MW141S	12/04/2022	0958_MW141_220412	Normal	EP2204301	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.16	0.92	1.29
MW141S	15/07/2022	0958_MW141S_220715	Normal	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.88	0.72	0.96
MW141S	15/07/2022	0958_QC102_220715	Field Duplicate	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.95	0.77	1.04
MW141S	15/07/2022	0958_QC202_220715	Interlab Duplicate	906764	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.79	0.63	0.88
MW142S	12/03/2019	0958_MW142_S_190312	Normal	223597	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW142S	25/10/2019	0958_MW142_191025	Normal	EP1911007	<0.05	<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
MW142S	10/03/2020	0958_MW142_S_200310	Normal	EP2002549	<0.05	<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
MW142S	7/05/2020	0958_MW142_S_20200507	Normal	EP2004672	<0.05	<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
MW142S	19/08/2020	0958_MW142_200819	Normal	EP2008767	<0.05	<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
MW142S	29/10/2020	0958_MW142_201029	Normal	EP2011863	<0.05	<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
MW142S	28/01/2021	0958_MW142_210128	Normal	EP2100912	<0.05	<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
MW142S	28/04/2021	0958_MW142S_210428	Normal	EP2104679	<0.05	<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
MW142S	15/07/2021	0958_MW142S_210715	Normal	EP2108063	<0.05	<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
MW142S	8/09/2021	0958_MW142S_210908	Normal	EP2110531	<0.05	<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
MW142S	20/01/2022	0958_MW142S_220120	Normal	EP2200662	<0.05	<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
MW142S	12/04/2022	0958_MW142_220412	Normal	EP2204301	<0.05	<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
MW142S	15/07/2022	0958_MW142S_220715	Normal	EP2208860	<0.05	<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
MW143S	12/03/2019	0958_MW143_S_190312	Normal	223597	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.01	0.01
MW143S	12/03/2019	0958_QC101_190312	Field Duplicate	223597	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW143S	10/03/2020	0958_MW143_S_200310	Normal	EP2002549	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.03	0.02	0.03
MW301	18/09/2015	WA0072-MW001	Normal	EP1514030			<0.1	<0.1											
MW301	11/11/2016	WA0072_MW001	Normal	523711			<0.1												
MW301	26/03/2018	0958_MW301_180326	Normal	208619	<2	<0.05	<0.05	<0.05	<0.05	<0.5	<0.2	<0.1	<0.2	<0.5	<0.1	<2			

	Perfluorotetradecanoic acid (PFTeDA)	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 sulfonamidoacetate	N-methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetate	N-Ethyl perfluorooctane sulfonamide		Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	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	µg/L
LOR - Limit of Reporting	0.01	0.01	0.01	0.01	0.01		0.01	0.01	0.02	0.01	0.01	0.01	0.01		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															
MW302	8/09/2021	0958_MW302_210908	Normal	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2.48	2.16	2.73
MW302	11/04/2022	0958_MW302_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	3.11	2.64	3.36
MW303	18/09/2015	WA0072-MW003	Normal	EP1514030			<0.1	<0.1											
MW303	11/11/2016	WA0072_MW003	Normal	523711			<0.05												
MW303	26/03/2018	0958_MW303_180326	Normal	208619	<2	<0.05	<0.05	<0.05	<0.05	<0.5	<0.2	<0.1	<0.2	<0.5	<0.1	<2			
MW303	26/03/2018	0958_QC112_180326	Field Duplicate	208619	<0.5	<0.01	0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW303	28/02/2019	0958_MW303_190228	Normal	223071	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5		63	74
MW303	24/10/2019	0958_MW303_191024	Normal	EP1910968	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.12	<0.05	<0.12	<0.12	<0.05	<0.12	51.3	46.9	53.2
MW303	4/05/2020	0958_MW303_200504	Normal	EP2004453	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	68.4	64.2	70.2
MW303	21/10/2020	0958_MW303_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	24	21.6	25.4
MW303	28/04/2021	0958_MW303_210428	Normal	EP2104666	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	87.1	82.8	90.5
MW303	8/09/2021	0958_MW303_210908	Normal	EP2110531	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	61.8	60.6	62.8
MW303	11/04/2022	0958_MW303_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	49.7	45.9	51.2
MW304	3/10/2012	DUP01	Field Duplicate	EP1208227			<0.1												
MW304	3/10/2012	WA0073-MW004	Normal	EP1208227			<0.1												
MW304	18/09/2013	WA0073-MW004	Normal	EP1307135			<0.1												
MW304	17/09/2015	WA0073-MW004	Normal	EP1514001			<0.1	<0.1											
MW304	15/11/2016	QC108	Field Duplicate	524161			<0.05												
MW304	15/11/2016	WA0073-MW004	Normal	524161			<0.05												
MW304	26/03/2018	0958_MW304_180326	Normal	208619	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW304	1/03/2019	0958_MW304_190301	Normal	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		41	50
MW304	1/03/2019	0958_QC101_190301	Field Duplicate	223132	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		44	53
MW304	25/10/2019	0958_MW304_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	8.94	6.96	9.73
MW304	5/05/2020	0958_MW304_200505	Normal	EP2004509	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	16.9	11.4	20.4
MW304	15/10/2020	0958_MW304_201015	Normal	EP2011227	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	6.66	4.6	7.32
MW304	7/09/2021	0958_MW304_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	8.37	6.32	9.21
MW304	11/04/2022	0958_MW304_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	7.98	6.37	8.58
MW305	17/09/2013	WA0073_MW005	Normal	EP1307095			<0.1												
MW305	17/09/2015	WA0073-MW005	Normal	EP1514001			<0.1	<0.1											
MW305	15/11/2016	WA0073-MW005	Normal	524161			<0.05												
MW305	26/03/2018	0958_MW305_180326	Normal	208619	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW305	28/02/2019	0958_MW305_190228	Normal	223071	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5		4.1	5.3
MW305	25/10/2019	0958_MW305_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	7.88	6.86	8.54
MW305	15/10/2020	0958_MW305_201015	Normal	EP2011227	<0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.12	<0.05	<0.12	<0.12	<0.05	<0.12	4.98	4.54	5.24
MW305	7/09/2021	0958_MW305_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	5.83	4.94	6.25
MW305	11/04/2022	0958_MW305_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	4.46	3.98	4.66
MW306	4/10/2012	WA0073-MW006	Normal	EP1208340			<0.1												
MW306	17/09/2013	WA0073_MW006	Normal	EP1307095			<0.1												
MW306	17/09/2015	QC01	Field Duplicate	EP1514001			<0.1	<0.1											
MW306	17/09/2015	QC02	Interlab Duplicate	473137			0.08												
MW306	17/09/2015	WA0073-MW006	Normal	EP1514001			<0.1	<0.1											
MW306	15/11/2016	WA0073-MW006	Normal	524161			<0.05												
MW306	28/03/2018	0958_MW306_180328	Normal	208793	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW306	28/02/2019	0958_MW306_190228	Normal	223071	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5		7	9.0
MW306	25/10/2019	0958_MW306_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	7.36	6.1	7.99
MW306	15/10/2020	0958_MW306_201015	Normal	EP2011227	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	6.87	5.97	7.42
MW306	15/10/2020	0958_QC103_201015	Field Duplicate	EP2011227	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	6.65	5.84	7.19
MW306	15/10/2020	0958_QC203_201015	Interlab Duplicate	751054	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	7.38	6.6	7.93
MW306	7/09/2021	0958_MW306_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	8.58	6.6	10.1
MW306	11/04/2022	0958_MW306_220411	Normal	EP22042															

	Perfluorotetradecanoic acid (PFTeDA)	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-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Propyl perfluorooctane sulfonamide (nPrFOSA)	N-Butyl perfluorooctane sulfonamide (nBuFOSA)	N-Pentyl perfluorooctane sulfonamide (nPeFOSA)	N-Hexyl perfluorooctane sulfonamide (nHxFOSA)	N-Heptyl perfluorooctane sulfonamide (nHeFOSA)	N-Octyl perfluorooctane sulfonamide (nOxFOSA)	Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	Sum of PFAS
LOR - Limit of Reporting	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	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															
MW308	16/08/2013	QC26	Interlab Duplicate	140697															
MW308	16/09/2013	QC25	Field Duplicate	EP1307065			<0.1												
MW308	16/09/2013	WA0075-MW011	Normal	EP1307065			<0.1												
MW308	21/09/2015	WA0075-MW011	Normal	EP1514064			<0.1	<0.1											
MW308	15/11/2016	WA0075-MW011	Normal	524161			0.32												
MW308	21/03/2018	0958_MW308_180321	Normal	208619	<2	<0.05	<0.05	<0.05	<0.05	<0.5	<0.2	<0.1	<0.2	<0.5	<0.1	<2			
MW308	28/02/2019	0958_MW308_190228	Normal	223071	<0.5	<0.01	0.04	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		47	61
MW308	25/10/2019	0958_MW308_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	50	46.3	51.2
MW308	15/10/2020	0958_MW308_201015	Normal	EP2011227	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	28.2	22.9	30.4
MW308	7/09/2021	0958_MW308_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	33.8	31.1	35.0
MW308	11/04/2022	0958_MW308_220411	Normal	EP2204288	<0.05	<0.05	0.06	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	54.1	48.1	57.5
MW308	11/04/2022	0958_QC101_220411	Field Duplicate	EP2204288	<0.05	<0.05	0.06	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	53.6	47.5	56.8
MW308	11/04/2022	0958_QC201_220411	Interlab Duplicate	881198	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	68.59	63	70.73
MW309	16/09/2013	WA0075-MW012	Normal	EP1307065			0.1												
MW309	21/09/2015	WA0075-MW012	Normal	EP1514064			<0.1	<0.1											
MW309	15/11/2016	WA0075-MW012	Normal	524161			<0.05												
MW309	21/03/2018	0958_MW309_180321	Normal	208619	<2	<0.05	0.08	<0.05	<0.05	<0.5	<0.2	<0.1	<0.2	<0.5	<0.1	<2			
MW309	28/02/2019	0958_MW309_190228	Normal	223071	<0.5	<0.01	0.04	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5		43	53
MW309	25/10/2019	0958_MW309_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	47.8	42.2	50.0
MW309	15/10/2020	0958_MW309_201015	Normal	EP2011227	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	27.4	23.6	28.9
MW309	7/09/2021	0958_MW309_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	219	213	223
MW309	7/09/2021	0958_QC103_210907	Field Duplicate	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	217	211	220
MW309	7/09/2021	0958_QC203_210907	Interlab Duplicate	823596	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	156.27	149.4	158.87
MW309	11/04/2022	0958_MW309_220411	Normal	EP2204288	<0.05	<0.05	0.15	<0.05	<0.05	0.03	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	162	151	170
MW310	3/10/2012	WA0075-MW013	Normal	EP1208227			<0.1												
MW310	16/09/2013	WA0075-MW013	Normal	EP1307065			0.2												
MW310	21/09/2015	WA0075-MW013	Normal	EP1514064			<0.1	<0.1											
MW310	15/11/2016	WA0075-MW013	Normal	524161			1.1												
MW310	21/03/2018	0958_MW310_180321	Normal	208619	<2	<0.05	<0.05	<0.05	<0.05	<0.5	<0.2	<0.1	<0.2	<0.5	<0.1	<2			
MW310	28/02/2019	0958_MW310_190228	Normal	223071	<0.5	<0.01	0.02	<0.01	<0.01	<0.1	<0.1	<0.02	<0.05	<0.1	<0.02	<0.5		68	110
MW310	25/10/2019	0958_MW310_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	92.7	78.1	98.5
MW310	5/05/2020	0958_MW310_200505	Normal	EP2004509	<0.05	<0.05	1.37	0.64	<0.05	0.04	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	20.9	14.4	22.8
MW310	15/10/2020	0958_MW310_201015	Normal	EP2011227	<0.05	<0.05	0.08	0.15	<0.05	0.03	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	8.73	5.98	9.41
MW310	28/04/2021	0958_MW310_210428	Normal	EP2104665	<0.05	<0.05	0.08	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	4.54	3.98	5.07
MW310	7/09/2021	0958_MW310_210907	Normal	EP2110442	<0.05	<0.05	0.12	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	165	147	175
MW312	18/09/2015	WA0171-MW017	Normal	EP1514030			<0.1	<0.1											
MW312	11/11/2016	QC204	Interlab Duplicate	ME301144	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01		<0.01	<0.01	<0.01	<0.01			
MW312	11/11/2016	WA0171_MW017	Normal	523711			<0.05												
MW312	26/03/2018	0958_MW312_180326	Normal	208619	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW312	28/02/2019	0958_MW312_190228	Normal	223071	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		1.5	1.9
MW312	24/10/2019	0958_MW312_191024	Normal	EP1910968	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.7	1.47	1.77
MW312	5/05/2020	0958_MW312_200505	Normal	EP2004509	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.07	0.98	1.09
MW312	21/10/2020	0958_MW312_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.41	1.23	1.49
MW312	28/04/2021	0958_MW312_210428	Normal	EP2104665	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	3.64	3.25	3.80
MW312	7/09/2021	0958_MW312_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.31	0.29	0.31
MW312	11/04/2022	0958_MW312_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.47	1.24	1.53
MW313	18/09/2015	WA0171-MW018	Normal	EP1514030			<0.1	<0.1											
MW313	11/11/2016	WA0171_MW018	Normal	523711			<0.05												
MW313	29/03/2018	0958_MW313_180329_H	Normal	208793	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05						

	Perfluorotetradecanoic acid (PFTeDA)	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 sulfonamide	N-methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamide	Sum of PFAS (WA DER List)	Sum of PFHxS and PFOS	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	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	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															
MW313	11/04/2022	0958_MW313_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.25	0.22	0.25
MW401	14/02/2018	0958_BORE_1_180214	Normal	206770-A	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.1	<0.05	<0.02	<0.5			
MW401	27/03/2018	0958_Bore_1_180327	Normal	208696	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW401	25/02/2019	0958_Bore_1_190225	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	<0.01
MW401	24/10/2019	0958_MW401_191024	Normal	EP1910968	<0.05	<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	28/01/2020	0958_QC201_210128	Interlab Duplicate	770820	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.1
MW401	18/03/2020	0958_MW401_200318	Normal	EP2002870	<0.05	<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	4/05/2020	0958_MW401_200504	Normal	EP2004453	<0.05	<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	19/08/2020	0958_MW401_200819	Normal	EP2008767	<0.05	<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	15/10/2020	0958_MW401_201015	Normal	EP2011227	<0.05	<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	28/01/2021	0958_MW401_210128	Normal	EP2100912	<0.05	<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	28/01/2021	0958_QC101_210128	Field Duplicate	EP2100912	<0.05	<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	27/04/2021	0958_MW401_210427	Normal	EP2104578	<0.05	<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	15/07/2021	0958_MW401_210715	Normal	EP2108063	<0.05	<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	10/09/2021	0958_MW401_210910	Normal	EP2110622	<0.05	<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	19/01/2022	0958_MW401_220119	Normal	EP2200662	<0.05	<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	11/04/2022	0958_MW401_220411	Normal	EP2204288	<0.05	<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	15/07/2022	0958_MW401_220715	Normal	EP2208860	<0.05	<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
MW402	27/03/2018	0958_Bore_2_180327	Normal	208696	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5			
MW402	25/02/2019	0958_Bore_2_190225	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.82	1.1
MW402	7/11/2019	0958_MW402_191107	Normal	EP1911620	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.13	0.94	1.25
MW402	18/03/2020	0958_MW402_200318	Normal	EP2002870	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.42	1.15	1.56
MW402	6/05/2020	0958_MW402_200506	Normal	EP2004592	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	3.11	2.26	3.49
MW402	6/05/2020	0958_QC104_200506	Field Duplicate	EP2004592	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	3.26	2.37	3.66
MW402	6/05/2020	0958_QC204_200506	Interlab Duplicate	718240	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.73	2.01	3.12
MW402	19/08/2020	0958_MW402_200819	Normal	EP2008767	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.1	0.85	1.22
MW402	19/08/2020	0958_QC101_200819	Field Duplicate	EP2008767	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.37	1.03	1.50
MW402	19/08/2020	0958_QC201_200819	Interlab Duplicate	739083	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.01	0.78	1.15
MW402	29/10/2020	0958_MW402_201029	Normal	EP2011863	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.03	0.77	1.13
MW402	27/04/2021	0958_MW402_210427	Normal	EP2104578	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.99	0.8	1.10
MW402	27/04/2021	0958_QC101_210427	Field Duplicate	EP2104578	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.02	0.81	1.13
MW402	27/04/2021	0958_QC201_210427	Interlab Duplicate	791818	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.04	0.82	1.14
MW402	7/09/2021	0958_MW402_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.44	1.13	1.61
MW402	19/01/2022	0958_MW402_220119	Normal	EP2200662	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.4	1.07	1.53
MW402	11/04/2022	0958_MW402_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2.39	1.76	2.64
MW402	15/07/2022	0958_MW402_220715	Normal	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	2.97	2.27	3.29
MW403	26/02/2019	0958_GC19_190226	Normal	222957	<0.5	<0.01	0.04	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	0.04
MW403	26/02/2019	0958_QC101_190226	Field Duplicate	222957	<0.5	<0.01	0.03	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		<0.01	0.03
MW403	18/11/2019	0958_GC19_191118	Normal	EP1912058	<0.05	<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
MW403	10/03/2020	0958_MW403_200310	Normal	EP2002549	<0.05	<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
MW403	8/05/2020	0958_MW403_200508	Normal	EP2004700	<0.05	<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
MW403	19/08/2020	0958_MW403																	

	Perfluorotetradecanoic acid (PFTeDA)	PFAS - (n:2) Fluorotelomer Sulfonic Acids					PFAS - Perfluoroalkyl Sulfonamides										PFAS		
	µg/L	4:2 Fluorotelomer sulfonic acid (4:2 FTS) µg/L	6:2 Fluorotelomer sulfonic acid (6:2 FTS) µg/L	8:2 Fluorotelomer sulfonic acid (8:2 FTS) µg/L	10:2 Fluorotelomer sulfonic acid (10:2 FTS) µg/L		Perfluorooctane sulfonamide (FOSA) µg/L	N-Methyl perfluorooctane sulfonamide (MeFOSA) µg/L	N-Methyl perfluorooctane sulfonamidoacetate µg/L	N-methyl perfluorooctane sulfonamide µg/L	N-Ethyl perfluorooctane sulfonamide (EtFOSA) µg/L	N-Ethyl perfluorooctane sulfonamidoacetate µg/L	N-Ethyl perfluorooctane sulfonamide µg/L				Sum of PFAS (WA DER List) µg/L	Sum of PFHxS and PFOS µg/L	Sum of PFAS µg/L
LOR - Limit of Reporting	0.01	0.01	0.01	0.01	0.01		0.01	0.01	0.02	0.01	0.01	0.01	0.01				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																
MW505	7/09/2021	0958_MW505_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.09	0.09	0.09
MW505	11/04/2022	0958_MW505_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.76	0.59	0.80

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 PFHxS+PFOS
New exceedance of guideline value

							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 (PFTrDA)
LOR - Limit of Reporting	0.01	0.01	0.01	0.01	0.01	0.01	0.02	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 Number																
POT102	14/02/2018	0958_POT102_180214	Normal	206770	0.07	0.07	0.54	0.03	0.15	<0.02	<0.02	<0.02	0.11	0.01	0.03	<0.01	<0.02	<0.02	<0.05	<0.1
POT102	25/02/2019	0958_Pot 102_190225	Normal	222957	0.06	0.06	0.41	0.03	0.27	<0.02	<0.02	<0.02	0.09	<0.01	0.02	<0.01	<0.02	<0.02	<0.05	<0.1
POT102	25/10/2019	0958_POT102_191025	Normal	EP1911007	0.06	0.07	0.45	0.03	0.28	<0.02	<0.1	<0.02	0.11	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	25/10/2019	0958_QC102_191025	Field Duplicate	EP1911007	0.07	0.07	0.49	0.04	0.29	<0.02	<0.1	<0.02	0.11	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	25/10/2019	0958_QC202_191025	Interlab Duplicate	685043	0.06	0.06	0.45	0.03	0.32	<0.01	<0.05	0.02	0.09	0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
POT102	10/03/2020	0958_POT102_200310	Normal	EP2002549	0.09	0.12	0.58	0.05	0.3	<0.02	<0.1	0.04	0.16	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	6/05/2020	0958_POT102_200506	Normal	EP2004592	<0.02	<0.02	0.04	<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
POT102	6/05/2020	0958_QC101_200506	Field Duplicate	EP2004592	<0.02	<0.02	0.04	<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
POT102	6/05/2020	0958_QC201_200506	Interlab Duplicate	718240	<0.01	<0.01	0.04	<0.01	0.02	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
POT102	19/08/2020	0958_POT102_200819	Normal	EP2008767	0.09	0.09	0.6	0.04	0.38	<0.02	<0.1	0.02	0.14	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	21/10/2020	0958_POT102_201021	Normal	EP2011490	0.06	0.06	0.44	0.03	0.2	<0.02	<0.1	<0.02	0.11	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	28/01/2021	0958_POT102_210128	Normal	EP2100912	0.08	0.08	0.53	0.03	0.22	<0.02	<0.1	0.03	0.14	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	27/04/2021	0958_POT102_210427	Normal	EP2104578	0.08	0.08	0.61	0.04	0.27	<0.02	<0.1	0.03	0.16	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	15/07/2021	0958_POT102_210715	Normal	EP2108063	0.12	0.11	0.7	0.06	0.46	<0.02	<0.1	0.04	0.2	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	6/09/2021	0958_POT102_210906	Normal	EP2110395	0.08	0.1	0.68	0.04	0.36	<0.02	<0.1	0.03	0.15	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	19/01/2022	0958_POT102_220119	Normal	EP2200662	0.1	0.09	0.68	0.05	0.38	<0.02	<0.1	0.05	0.25	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	13/04/2022	0958_POT102_220413	Normal	EP2204360	0.06	0.06	0.35	0.03	0.22	<0.02	<0.1	0.03	0.14	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	15/07/2022	0958_POT102_220715	Normal	EP2208860	0.02	0.02	0.19	<0.02	0.12	<0.02	<0.1	<0.02	0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	15/07/2022	0958_QC103_220715	Field Duplicate	EP2208860	0.02	0.03	0.19	<0.02	0.12	<0.02	<0.1	<0.02	0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT102	15/07/2022	0958_QC203_220715	Interlab Duplicate	906764	0.02	0.02	0.14	0.02	0.09	<0.01	<0.05	0.02	0.07	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
POT103	14/02/2018	0958_POT103_180214	Normal	206770	0.08	0.08	0.56	0.04	0.18	<0.02	<0.02	<0.02	0.1	0.01	0.03	<0.01	<0.02	<0.02	<0.05	<0.1
POT103	25/02/2019	0958_Pot 103_190225	Normal	222957	0.06	0.05	0.38	0.03	0.24	<0.02	<0.02	<0.02	0.08	<0.01	0.01	<0.01	<0.02	<0.02	<0.05	<0.1
POT103	25/10/2019	0958_POT103_191025	Normal	EP1911008	0.07	0.07	0.41	0.03	0.27	<0.02	<0.1	<0.02	0.11	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	25/10/2019	0958_QC101_191025	Field Duplicate	EP1911008	0.07	0.07	0.46	0.03	0.27	<0.02	<0.1	<0.02	0.11	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	25/10/2019	0958_QC201_191025	Interlab Duplicate	685043	0.06	0.06	0.42	0.03	0.28	<0.01	<0.05	0.02	0.09	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
POT103	10/03/2020	0958_POT103_200310	Normal	EP2002549	0.09	0.11	0.54	0.04	0.26	<0.02	<0.1	0.05	0.17	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	5/05/2020	0958_POT103_200505	Normal	EP2004509	0.06	0.05	0.32	0.03	0.18	<0.02	<0.1	<0.02	0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	5/05/2020	0958_QC103_200505	Field Duplicate	EP2004509	0.05	0.05	0.34	0.04	0.2	<0.02	<0.1	<0.02	0.09	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	5/05/2020	0958_QC203_200505	Interlab Duplicate	717776	0.02	0.03	0.16	<0.01	0.11	<0.01	<0.05	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
POT103	19/08/2020	0958_POT103_200819	Normal	EP2008767	0.1	0.09	0.58	0.04	0.36	<0.02	<0.1	0.02	0.15	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	14/10/2020	0958_POT103_201014	Normal	EP2011160	0.05	0.04	0.36	0.02	0.14	<0.02	<0.1	<0.02	0.09	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	28/01/2021	0958_POT103_210128	Normal	EP2100912	0.03	0.03	0.18	<0.02	0.07	<0.02	<0.1	<0.02	0.06	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	27/04/2021	0958_POT103_210427	Normal	EP2104578	0.06	0.06	0.43	0.03	0.18	<0.02	<0.1	0.02	0.11	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	15/07/2021	0958_POT103_210715	Normal	EP2108063	0.1	0.09	0.62	0.05	0.41	<0.02	<0.1	0.03	0.17	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	7/09/2021	0958_POT103_210907	Normal	EP2110442	0.08	0.1	0.63	0.04	0.35	<0.02	<0.1	0.03	0.14	0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	19/01/2022	0958_POT103_220119	Normal	EP2200662	0.12	0.09	0.67	0.04	0.39	<0.02	<0.1	0.04	0.21	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	11/04/2022	0958_POT103_220411	Normal	EP2204288	0.09	0.09	0.66	0.05	0.37	<0.02	<0.1	0.06	0.29	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	11/04/2022	0958_QC103_220411	Field Duplicate	EP2204288	0.11	0.08	0.61	0.04	0.34	<0.02	<0.1	0.06	0.3	0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
POT103	11/04/2022	0958_QC203_220411	Interlab Duplicate	881198	0.07	0.06	0.54	0.04	0.44	<0.01	0.12	0.05	0.21	0.02	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
POT104	14/02/2018	0958_POT104_180214	Normal	206770	0.08	0.07	0.53	0.04	0.17	<0.02	<0.02	<0.02	0.1	0.01	0.03	<0.01	<0.02	<0.02	<0.05	<0.1
POT104	25/02/2019	0958_Pot 104_190225	Normal	222957	0.06	0.05	0.38	0.03	0.23	<0.02	<0.02	<0.02								

							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)
	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	0.02	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 Number																
POT104	19/01/2022	0958_POT104_220119	Normal	EP2200662	0.11	0.09	0.77	0.06	0.45	<0.02	<0.1	0.03	0.21	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02
POT104	19/01/2022	0958_QC101_220119	Field Duplicate	EP2200662	0.11	0.09	0.78	0.06	0.46	<0.02	<0.1	0.03	0.21	0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02
POT104	19/01/2022	0958_QC201_220119	Interlab Duplicate	857293	<0.01	0.07	0.61	0.06	0.45	<0.01	<0.05	0.02	0.14	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
POT104	11/04/2022	0958_POT104_220411	Normal	EP2204288	0.07	0.07	0.44	0.04	0.25	<0.02	<0.1	0.04	0.2	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
POT104	15/07/2022	0958_POT104_220715	Normal	EP2208860	<0.02	<0.02	0.16	<0.02	0.11	<0.02	<0.1	<0.02	0.09	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02

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 PFHxS+PFOS
- New exceedance of guideline value

	Perfluorotetradecanoic acid (PFTeDA)	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 PFAS (WA DER List)	Sum of PFHxS and PFOS	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	µg/L	µg/L	µg/L	µg/L	µg/L	
PFAS NEMP 2020 Drinking Water	0.01	0.01	0.01	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 Recreational Water														0.07		
														2		

Location Code	Date	Field ID	Sample Type	Lab Report Number															
POT102	14/02/2018	0958_POT102_180214	Normal	206770	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.1	<0.05	<0.02	<0.5			
POT102	25/02/2019	0958_Pot 102_190225	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.68	0.94
POT102	25/10/2019	0958_POT102_191025	Normal	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.93	0.73	1.03
POT102	25/10/2019	0958_QC102_191025	Field Duplicate	EP1911007	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.98	0.78	1.09
POT102	25/10/2019	0958_QC202_191025	Interlab Duplicate	685043	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.98	0.77	1.09
POT102	10/03/2020	0958_POT102_200310	Normal	EP2002549	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.22	0.88	1.39
POT102	6/05/2020	0958_POT102_200506	Normal	EP2004592	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.06	0.06	0.06
POT102	6/05/2020	0958_QC101_200506	Field Duplicate	EP2004592	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.06	0.06	0.06
POT102	6/05/2020	0958_QC201_200506	Interlab Duplicate	718240	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.06	<0.1
POT102	19/08/2020	0958_POT102_200819	Normal	EP2008767	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.28	0.98	1.41
POT102	21/10/2020	0958_POT102_201021	Normal	EP2011490	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.83	0.64	0.92
POT102	28/01/2021	0958_POT102_210128	Normal	EP2100912	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.03	0.75	1.14
POT102	27/04/2021	0958_POT102_210427	Normal	EP2104578	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.18	0.88	1.30
POT102	15/07/2021	0958_POT102_210715	Normal	EP2108063	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.58	1.16	1.75
POT102	6/09/2021	0958_POT102_210906	Normal	EP2110395	<0.05	<0.05	HxS+PFOS wa	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.35	1.04	1.49
POT102	19/01/2022	0958_POT102_220119	Normal	EP2200662	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.52	1.06	1.66
POT102	13/04/2022	0958_POT102_220413	Normal	EP2204360	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.82	0.57	0.91
POT102	15/07/2022	0958_POT102_220715	Normal	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.45	0.31	0.47
POT102	15/07/2022	0958_QC103_220715	Field Duplicate	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.45	0.31	0.48
POT102	15/07/2022	0958_QC203_220715	Interlab Duplicate	906764	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.35	0.23	0.39
POT103	14/02/2018	0958_POT103_180214	Normal	206770	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.1	<0.05	<0.02	<0.5			
POT103	25/02/2019	0958_Pot 103_190225	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.62	0.85
POT103	25/10/2019	0958_POT103_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.89	0.68	0.99
POT103	25/10/2019	0958_QC101_191025	Field Duplicate	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	0.03	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.94	0.73	1.07
POT103	25/10/2019	0958_QC201_191025	Interlab Duplicate	685043	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.89	0.7	1
POT103	10/03/2020	0958_POT103_200310	Normal	EP2002549	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.14	0.80	1.29
POT103	5/05/2020	0958_POT103_200505	Normal	EP2004509	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.68	0.50	0.76
POT103	5/05/2020	0958_QC103_200505	Field Duplicate	EP2004509	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.70	0.54	0.79
POT103	5/05/2020	0958_QC203_200505	Interlab Duplicate	717776	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.33	0.27	0.36
POT103	19/08/2020	0958_POT103_200819	Normal	EP2008767	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.26	0.94	1.39
POT103	14/10/2020	0958_POT103_201014	Normal	EP2011160	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.66	0.50	0.72
POT103	28/01/2021	0958_POT103_210128	Normal	EP2100912	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.35	0.25	0.38
POT103	27/04/2021	0958_POT103_210427	Normal	EP2104578	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.82	0.61	0.91
POT103	15/07/2021	0958_POT103_210715	Normal	EP2108063	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.39	1.03	1.53
POT103	7/09/2021	0958_POT103_210907	Normal	EP2110442	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.28	0.98	1.42
POT103	19/01/2022	0958_POT103_220119	Normal	EP2200662	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.49	1.06	1.62
POT103	11/04/2022	0958_POT103_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.53	1.03	1.67
POT103	11/04/2022	0958_QC103_220411	Field Duplicate	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.48	0.95	1.60
POT103	11/04/2022	0958_QC203_220411	Interlab Duplicate	881198	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.48	0.98	1.61
POT104	14/02/2018	0958_POT104_180214	Normal	206770	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.1	<0.05	<0.02	<0.5			
POT104	25/02/2019	0958_Pot 104_190225	Normal	222957	<0.5	<0.01	<0.01	<0.01	<0.01	<0.1	<0.05	<0.02	<0.05	<0.1	<0.02	<0.5		0.61	0.86
POT104	25/10/2019	0958_POT104_191025	Normal	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.71	0.54	0.78
POT104	25/10/2019	0958_QC103_191025	Field Duplicate	EP1911008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05								

	Perfluorotetradecanoic acid (PFTeDA)	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 PFAS (WA DER List)	Sum of PFHxS and PFOS	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	µg/L
LOR - Limit of Reporting	0.01	0.01	0.01	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 Number															
POT104	19/01/2022	0958_POT104_220119	Normal	EP2200662	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.64	1.22	1.79
POT104	19/01/2022	0958_QC101_220119	Field Duplicate	EP2200662	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.66	1.24	1.81
POT104	19/01/2022	0958_QC201_220119	Interlab Duplicate	857293	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1.24	1.06	1.39
POT104	11/04/2022	0958_POT104_220411	Normal	EP2204288	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	1.03	0.69	1.14
POT104	15/07/2022	0958_POT104_220715	Normal	EP2208860	<0.05	<0.05	<0.05	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	0.38	0.27	0.38

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 PFHxS+PFOS
- New exceedance of guideline value

Trend Report

Report Date & Time: 2023-03-01 05:39:37

Data File Name: inputSUMPFOS&PFHxS.csv

Report Title: Groundwater GINGIN sumPFOS&PFHXS

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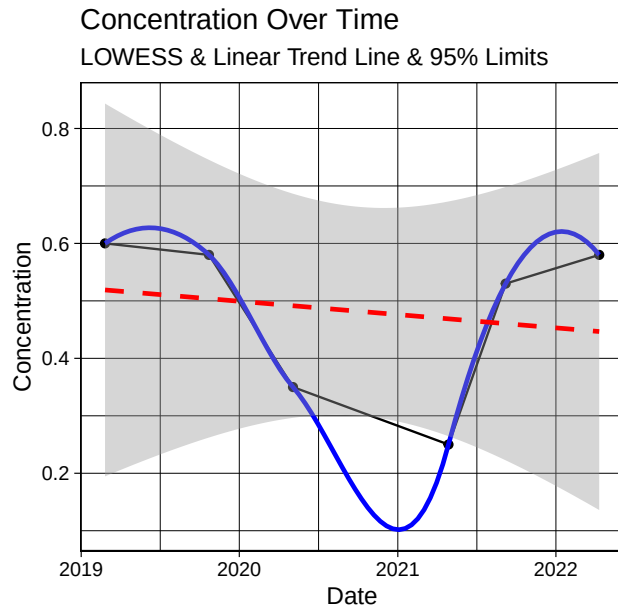
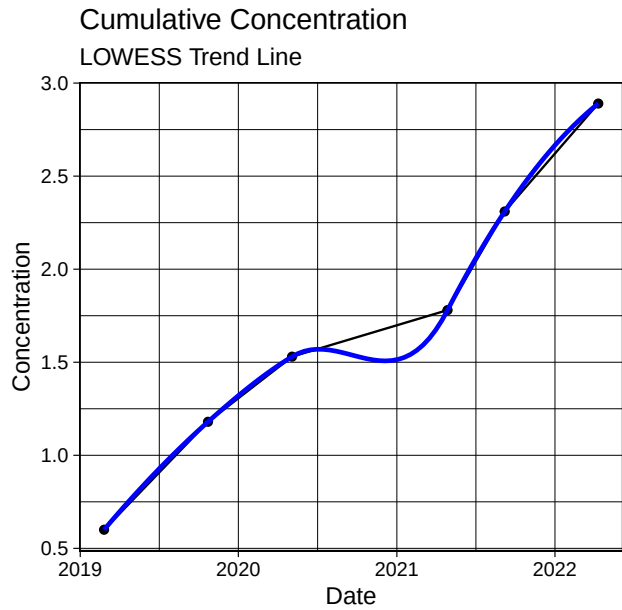
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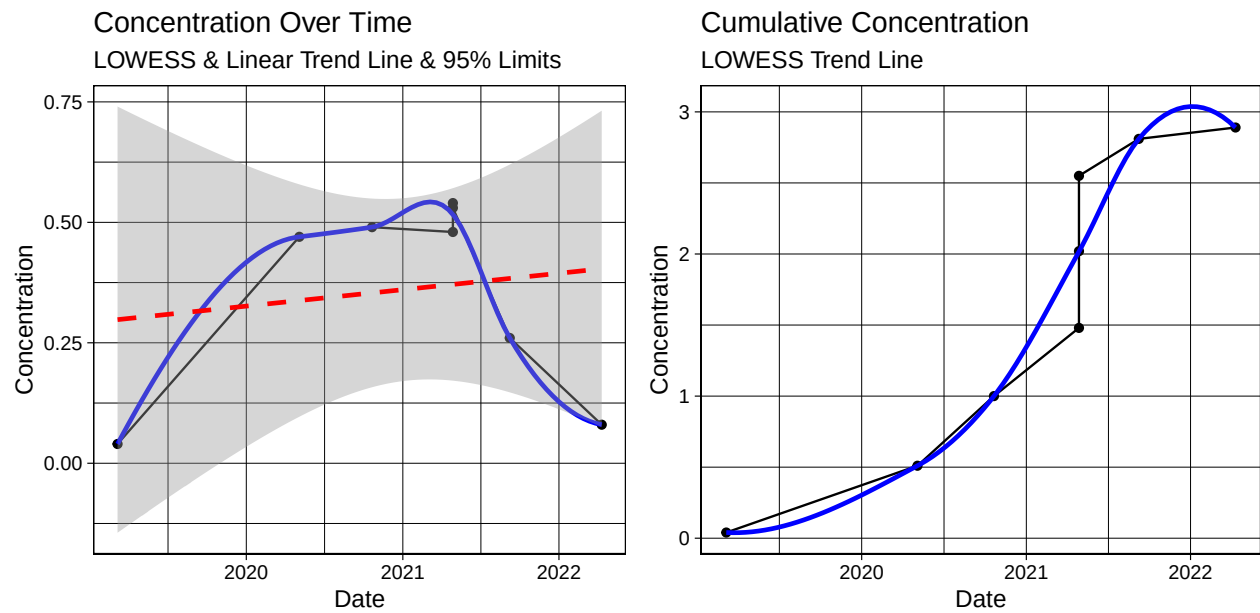
Kendall Trend Test Results Continuous	
n	6
z	-0.57
p	0.57
S	-4
varS	27.33
tau	-0.28
mean	0.48
sd	0.15
cov	0.3
results	STABLE

Report for ID : MW101I and Analyte : SUMPFOS&PFHxS



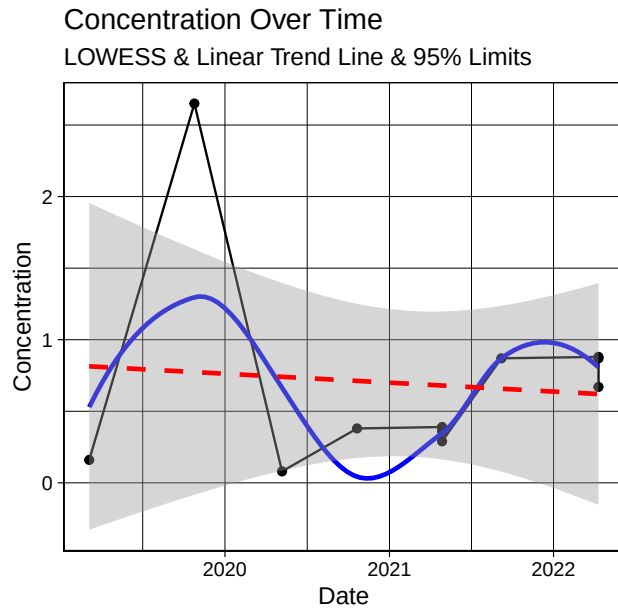
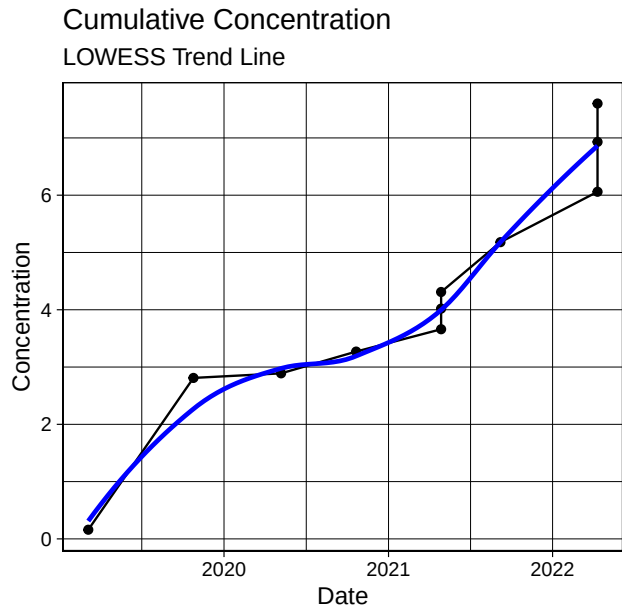
Kendall Trend Test Results Continuous	
n	8
z	0.12
p	0.9
S	2
varS	65.33
tau	0.07
mean	0.36
sd	0.21
cov	0.57
results	NO CLEAR TREND

Report for ID : MW102D and Analyte : SUMPFOS&PFHxS



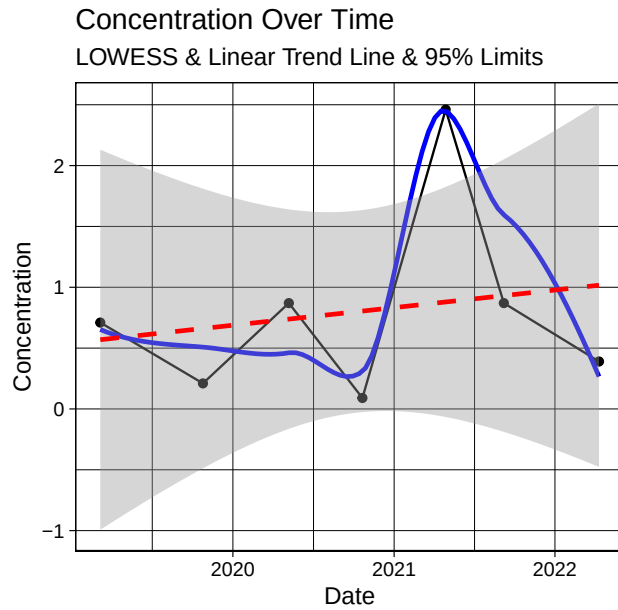
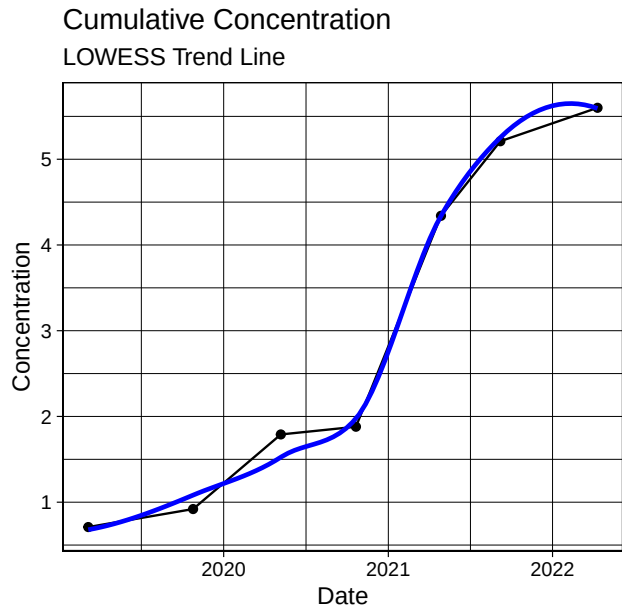
Kendall Trend Test Results Continuous	
n	11
z	1.17
p	0.24
S	16
varS	164
tau	0.29
mean	0.69
sd	0.71
cov	1.03
results	NO CLEAR TREND

Report for ID : MW104I and Analyte : SUMPFOS&PFHxS



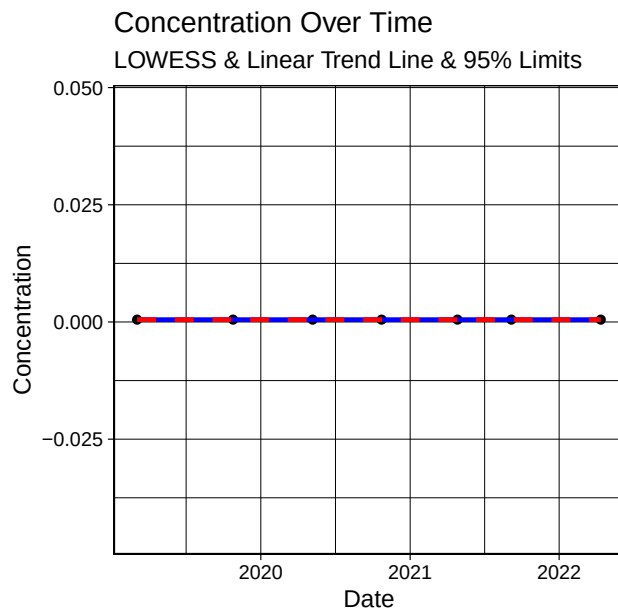
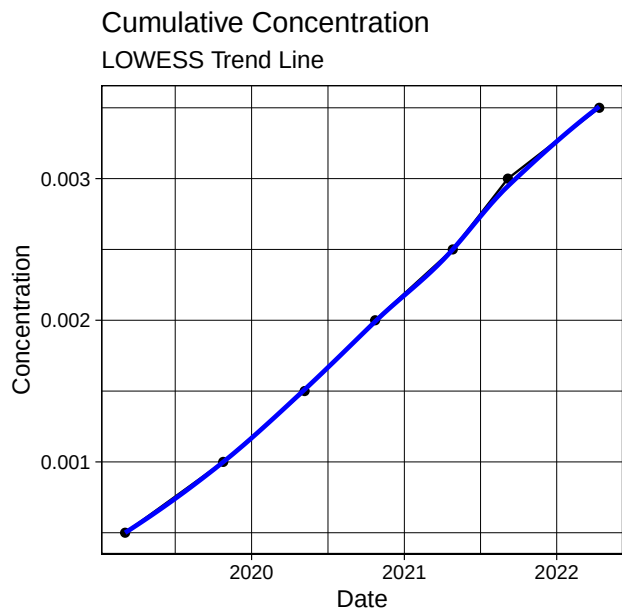
Kendall Trend Test Results Continuous	
n	7
z	0.15
p	0.88
S	2
varS	43.33
tau	0.1
mean	0.8
sd	0.8
cov	0.99
results	NO CLEAR TREND

Report for ID : MW105D and Analyte : SUMPFOS&PFHxS



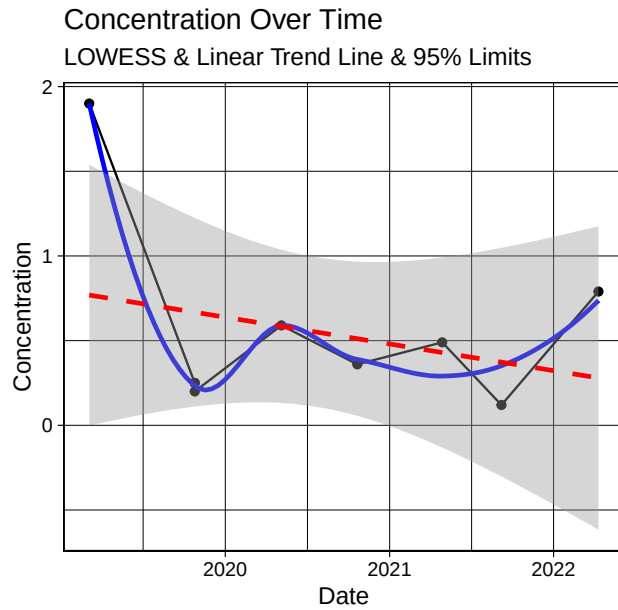
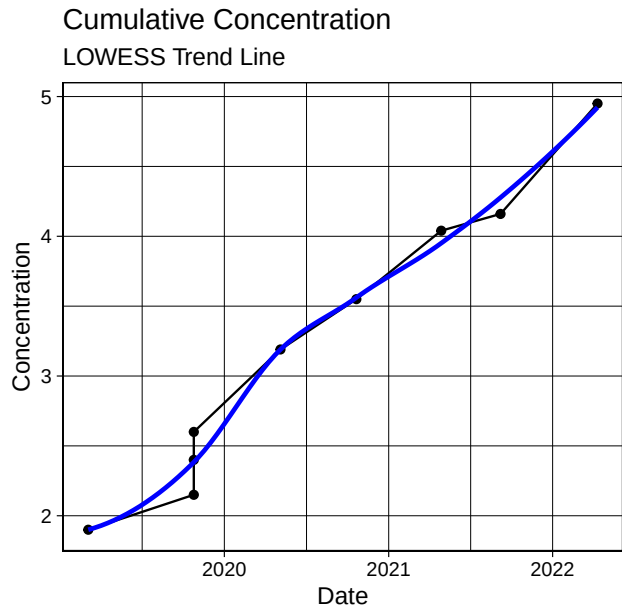
Kendall Trend Test Results Continuous	
n	7
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW106S and Analyte : SUMPFOS&PFHxS



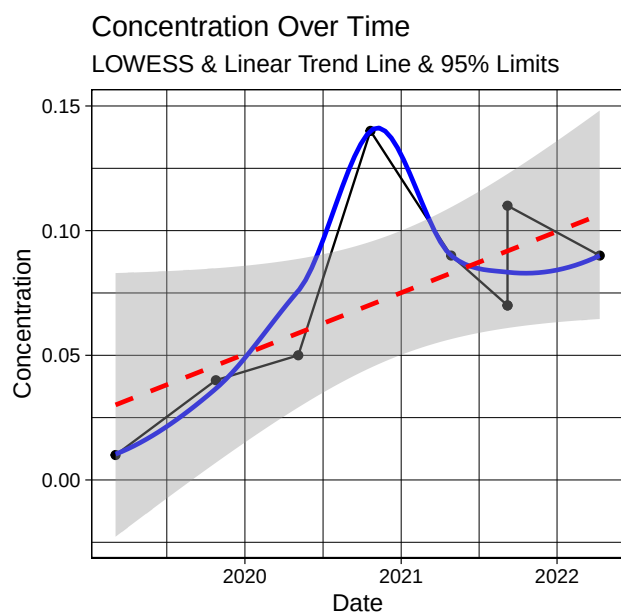
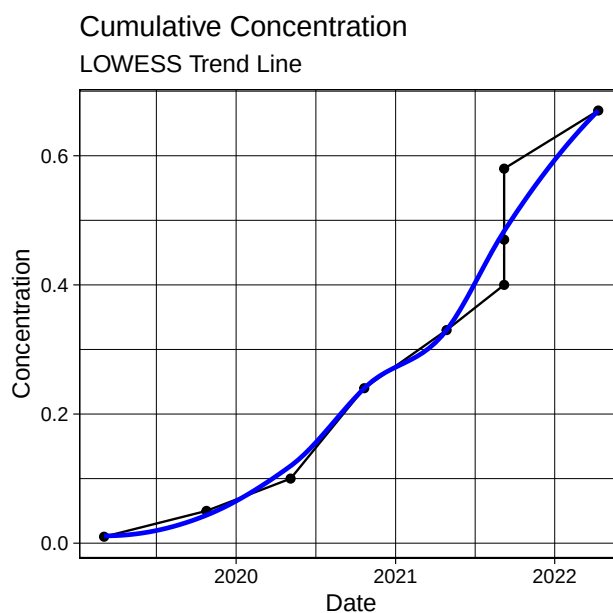
Kendall Trend Test Results Continuous	
n	9
z	0
p	1
S	-1
varS	91
tau	-0.03
mean	0.55
sd	0.55
cov	1
results	STABLE

Report for ID : MW109S and Analyte : SUMPFOS&PFHxS



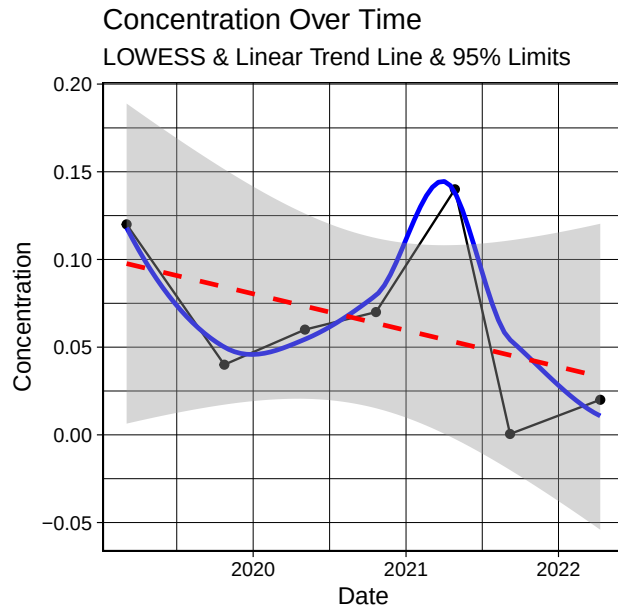
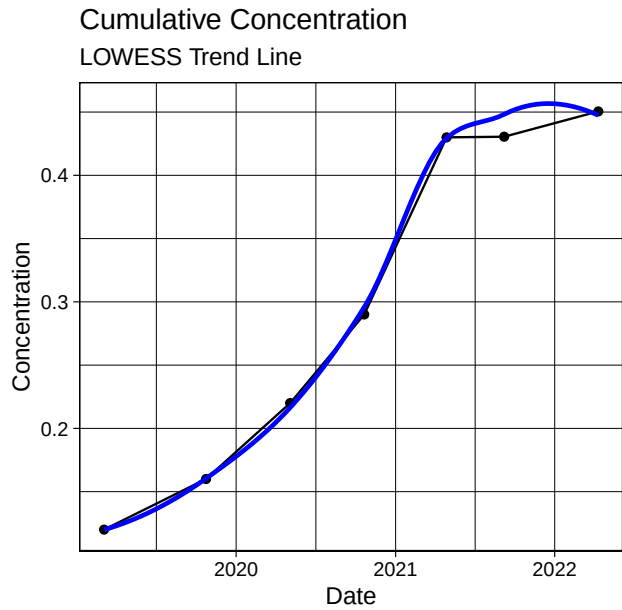
Kendall Trend Test Results Continuous	
n	9
z	1.79
p	0.07
S	18
varS	90
tau	0.51
mean	0.07
sd	0.04
cov	0.52
results	POSSIBLY INCREASING

Report for ID : MW110S and Analyte : SUMPFOS&PFHxS



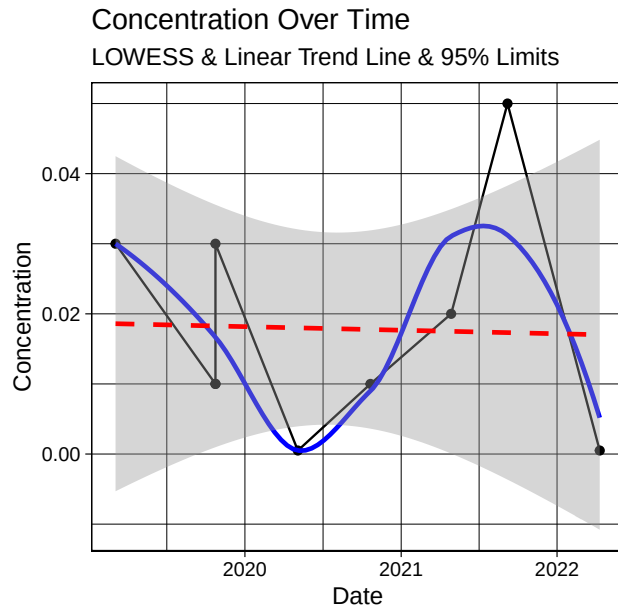
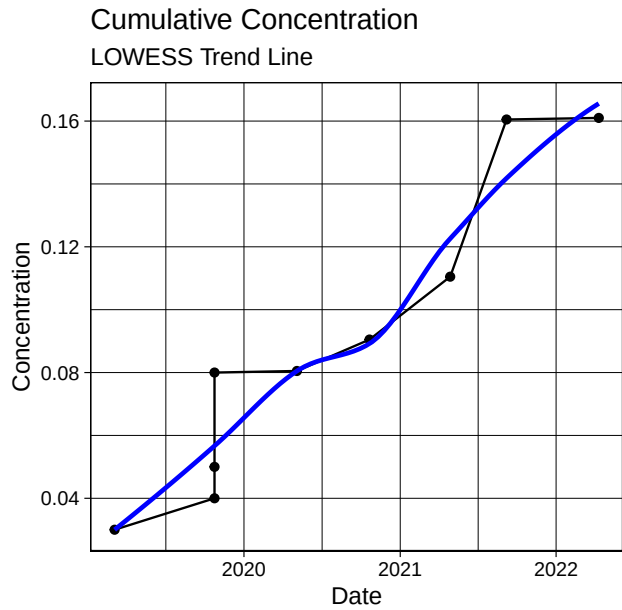
Kendall Trend Test Results Continuous	
n	7
z	-0.6
p	0.55
S	-5
varS	44.33
tau	-0.24
mean	0.06
sd	0.05
cov	0.79
results	STABLE

Report for ID : MW112S and Analyte : SUMPFOS&PFHxS



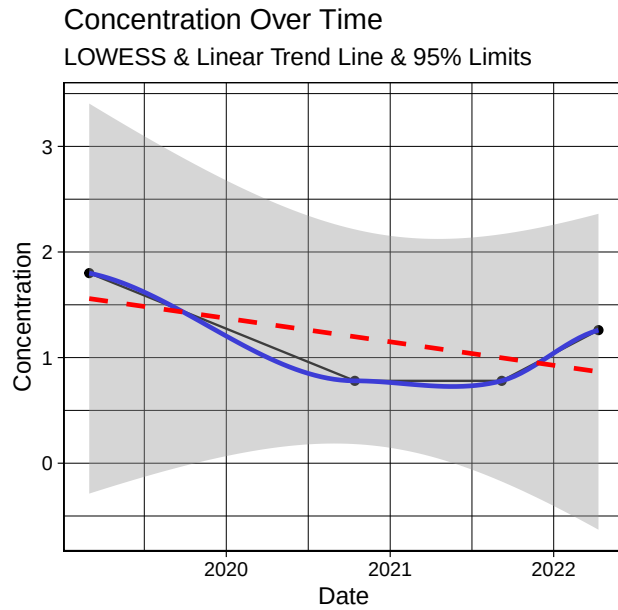
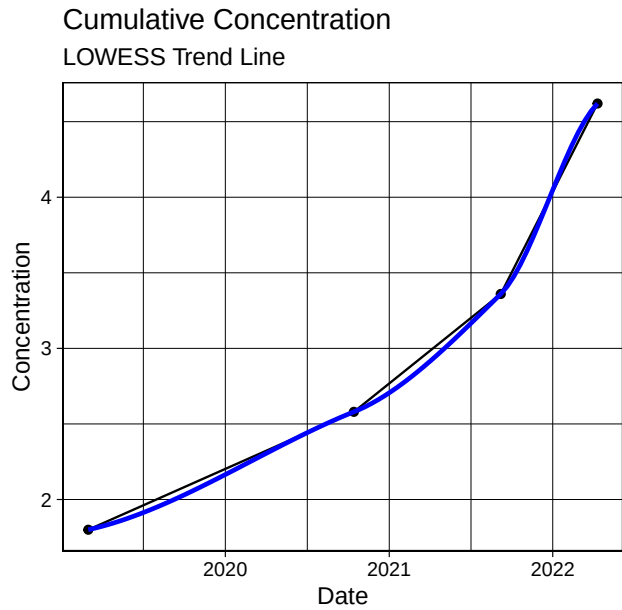
Kendall Trend Test Results Continuous	
n	9
z	-0.22
p	0.83
S	-3
varS	86.33
tau	-0.09
mean	0.02
sd	0.02
cov	0.91
results	STABLE

Report for ID : MW113S and Analyte : SUMPFOS&PFHxS



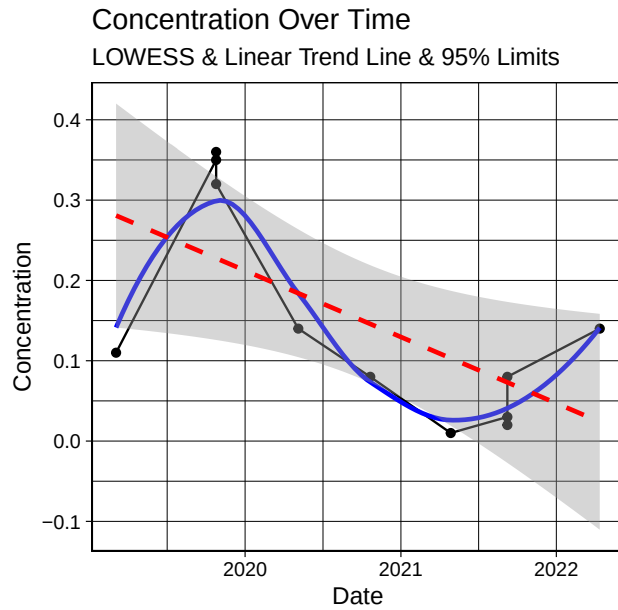
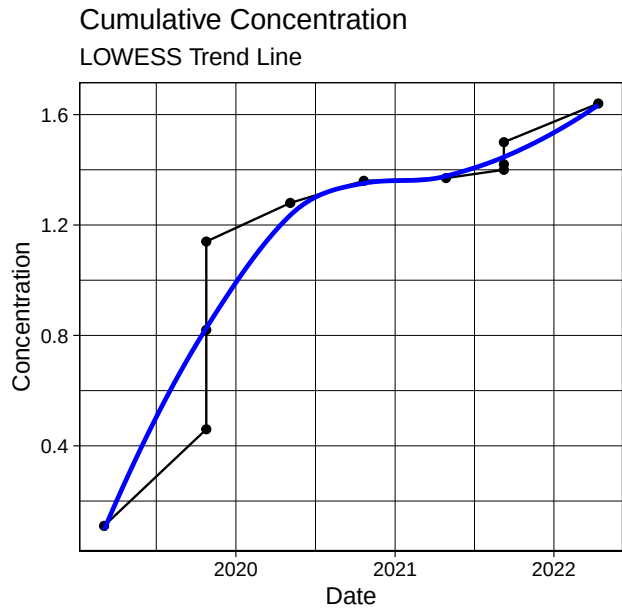
Kendall Trend Test Results Continuous	
n	4
z	0
p	1
S	-1
varS	7.67
tau	-0.18
mean	1.16
sd	0.49
cov	0.42
results	STABLE

Report for ID : MW114S and Analyte : SUMPFOS&PFHxS



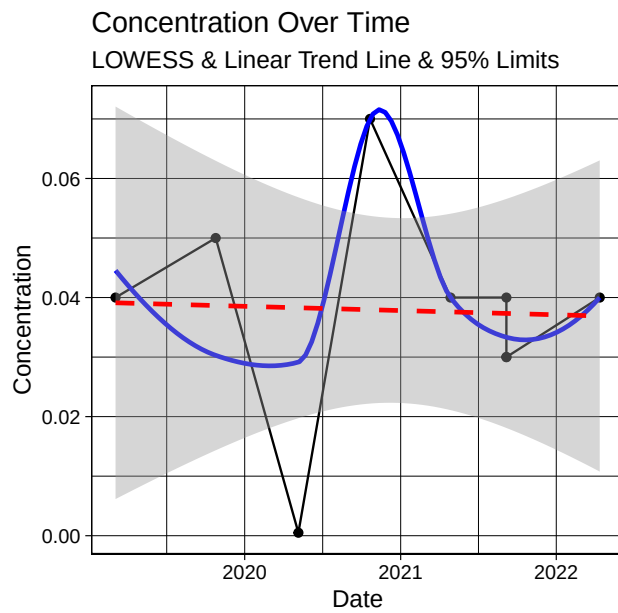
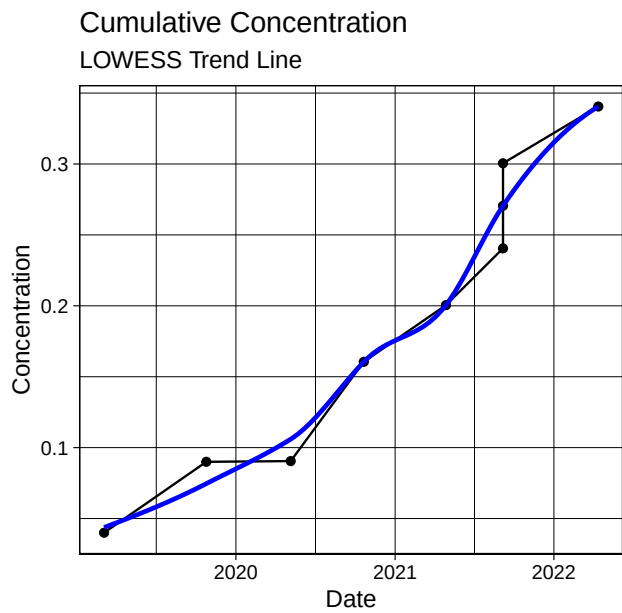
Kendall Trend Test Results Continuous	
n	11
z	-1.57
p	0.12
S	-21
varS	163
tau	-0.39
mean	0.15
sd	0.13
cov	0.89
results	STABLE

Report for ID : MW115S and Analyte : SUMPFOS&PFHxS



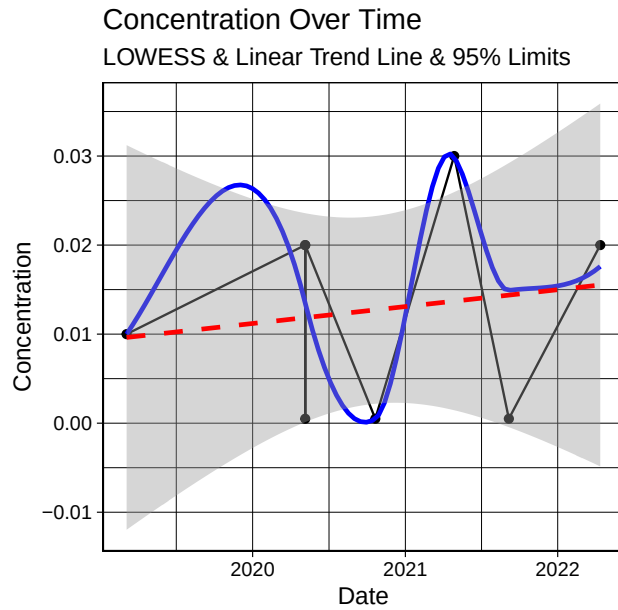
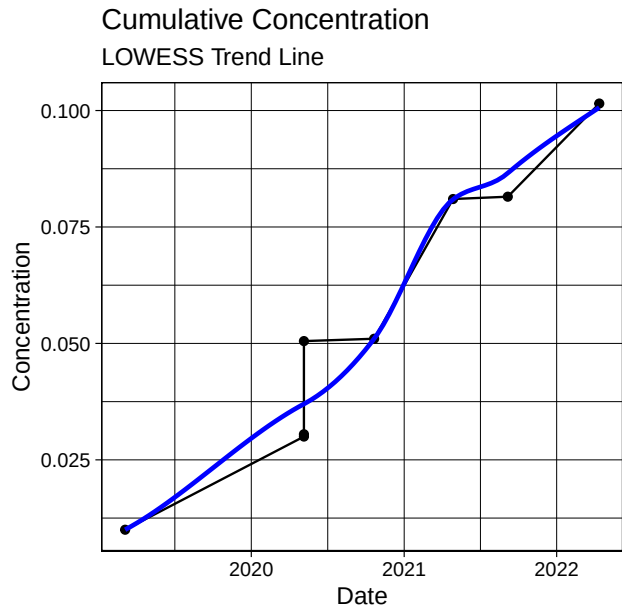
Kendall Trend Test Results Continuous	
n	9
z	-0.66
p	0.51
S	-7
varS	82.33
tau	-0.22
mean	0.04
sd	0.02
cov	0.49
results	STABLE

Report for ID : MW116S and Analyte : SUMPFOS&PFHxS



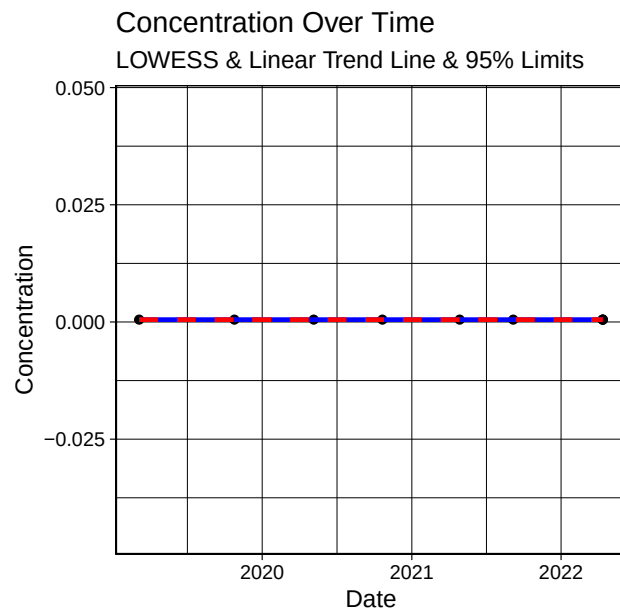
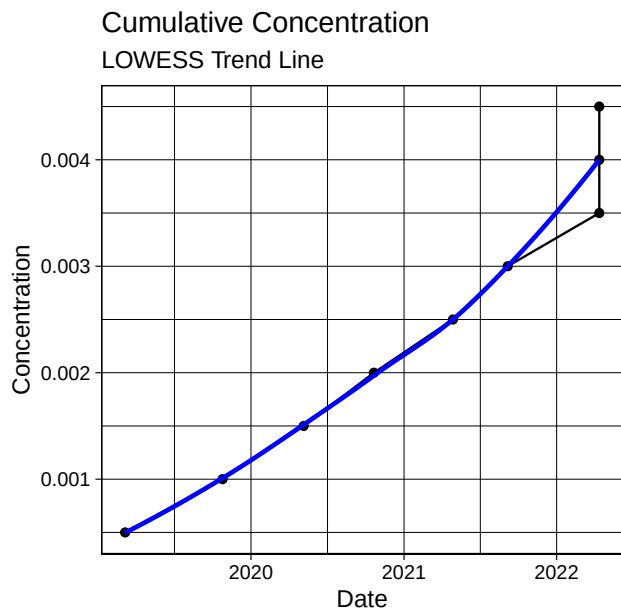
Kendall Trend Test Results Continuous	
n	8
z	0.13
p	0.9
S	2
varS	58
tau	0.08
mean	0.01
sd	0.01
cov	0.9
results	NO CLEAR TREND

Report for ID : MW117I and Analyte : SUMPFOS&PFHxS



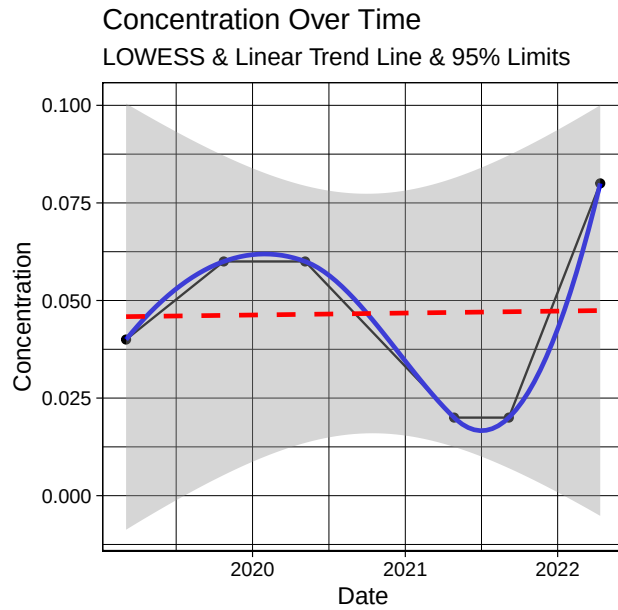
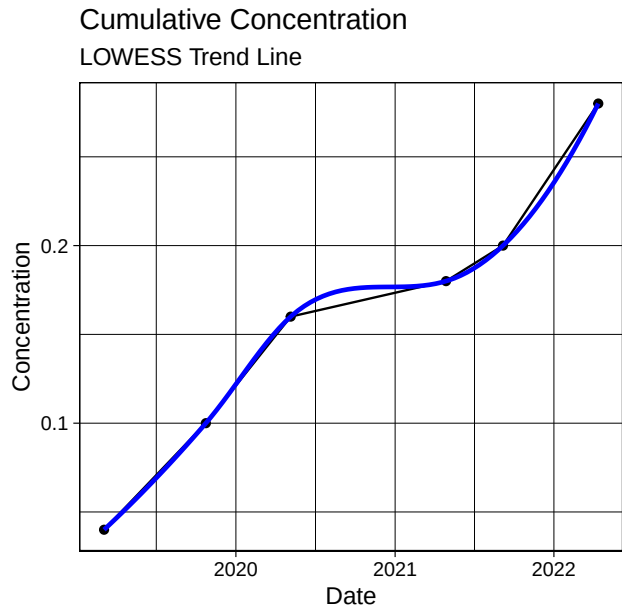
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW118D and Analyte : SUMPFOS&PFHxS



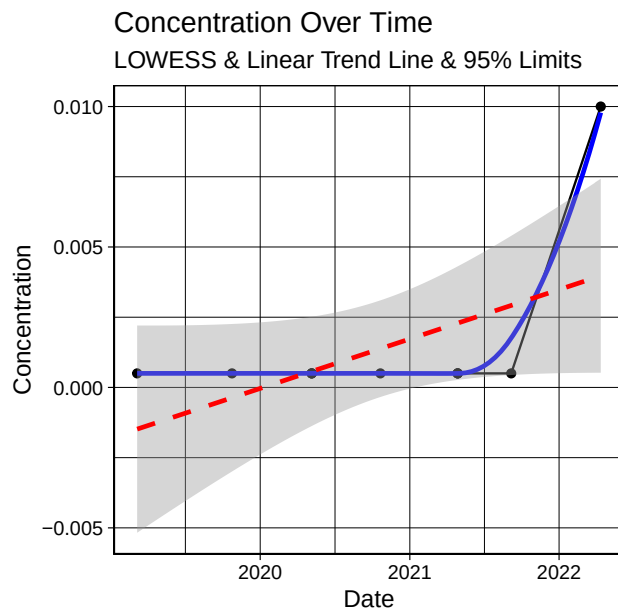
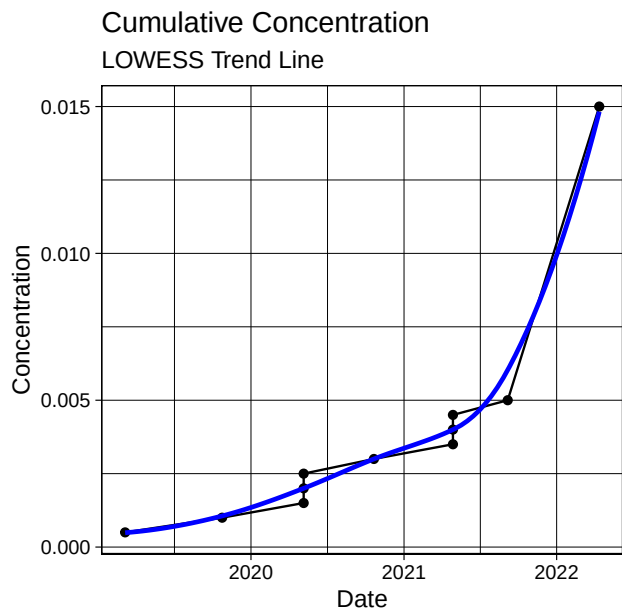
Kendall Trend Test Results Continuous	
n	6
z	0
p	1
S	1
varS	26.33
tau	0.07
mean	0.05
sd	0.02
cov	0.52
results	NO CLEAR TREND

Report for ID : MW119S and Analyte : SUMPFOS&PFHxS



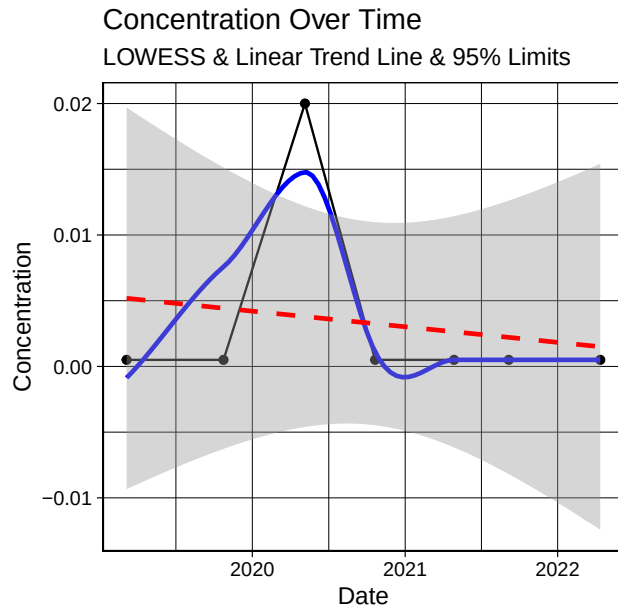
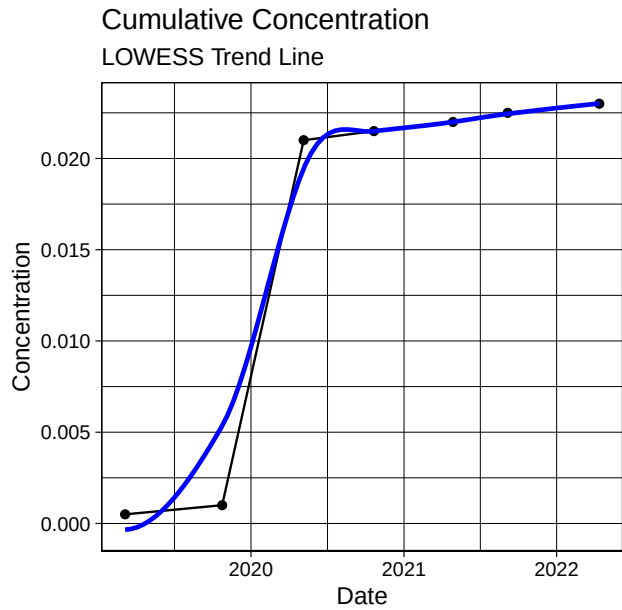
Kendall Trend Test Results Continuous	
n	11
z	1.42
p	0.15
S	10
varS	40
tau	0.43
mean	0
sd	0
cov	2.1
results	NO CLEAR TREND

Report for ID : MW120I and Analyte : SUMPFOS&PFHxS



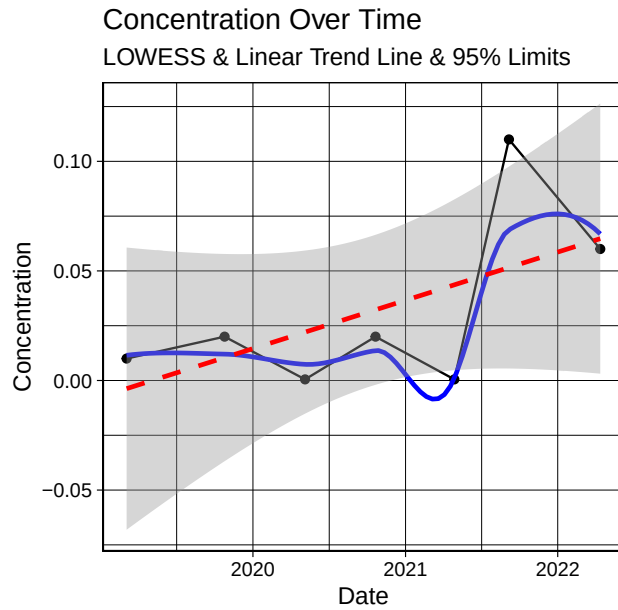
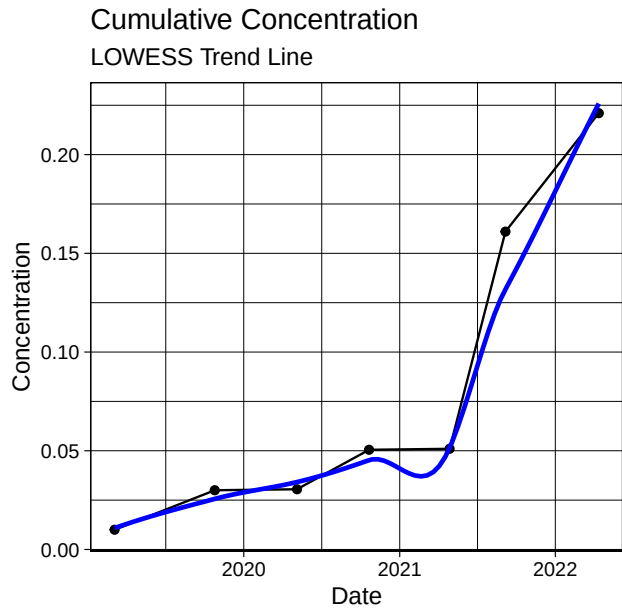
Kendall Trend Test Results Continuous	
n	7
z	-0.25
p	0.8
S	-2
varS	16
tau	-0.18
mean	0
sd	0.01
cov	2.24
results	NO CLEAR TREND

Report for ID : MW121D and Analyte : SUMPFOS&PFHxS



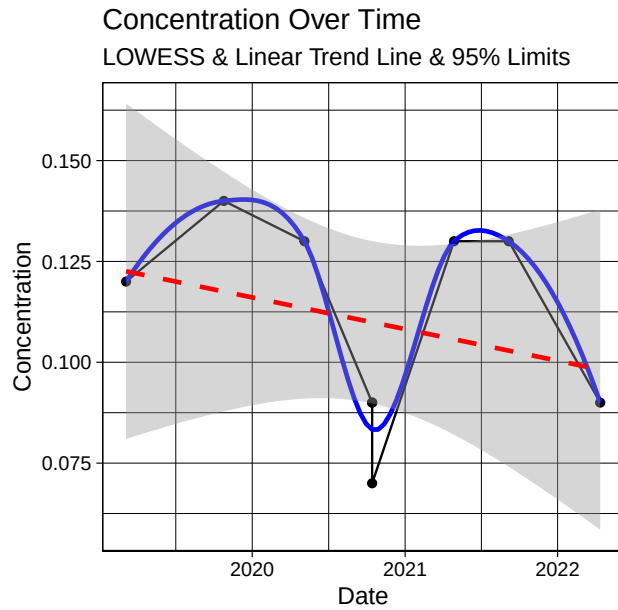
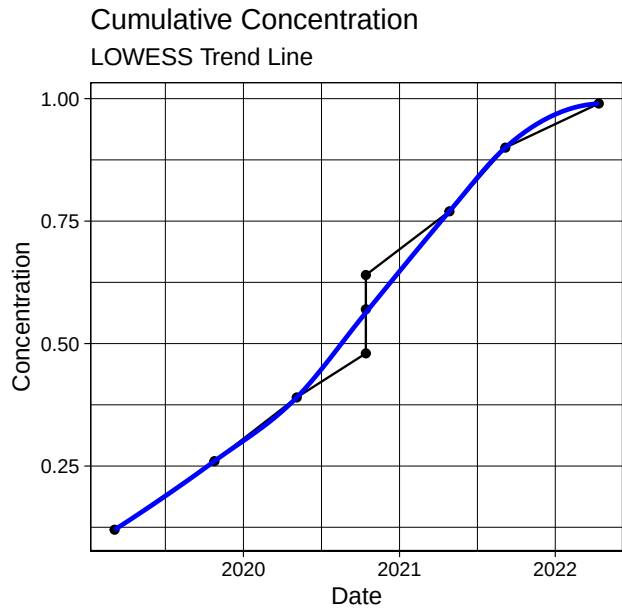
Kendall Trend Test Results Continuous	
n	7
z	0.92
p	0.36
S	7
varS	42.33
tau	0.35
mean	0.03
sd	0.04
cov	1.27
results	NO CLEAR TREND

Report for ID : MW122S and Analyte : SUMPFOS&PFHxS



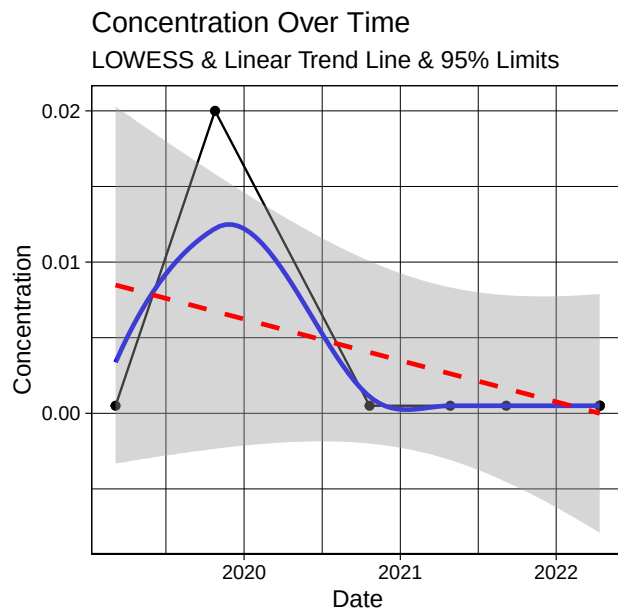
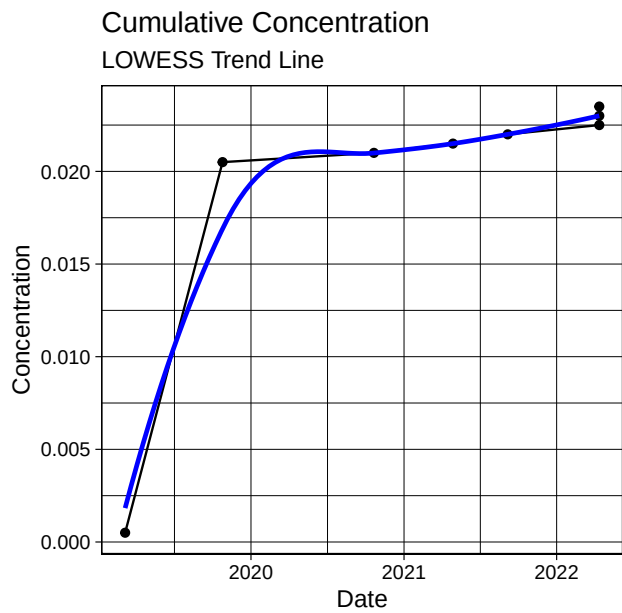
Kendall Trend Test Results Continuous	
n	9
z	-0.76
p	0.45
S	-8
varS	84.67
tau	-0.24
mean	0.11
sd	0.03
cov	0.23
results	STABLE

Report for ID : MW123I and Analyte : SUMPFOS&PFHxS



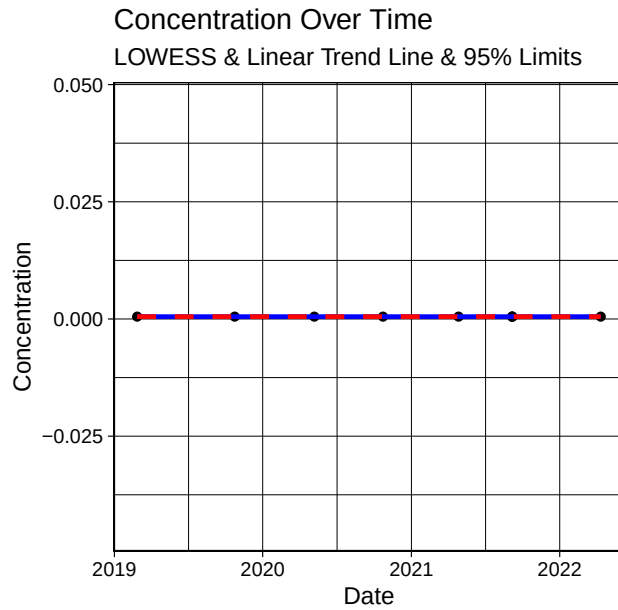
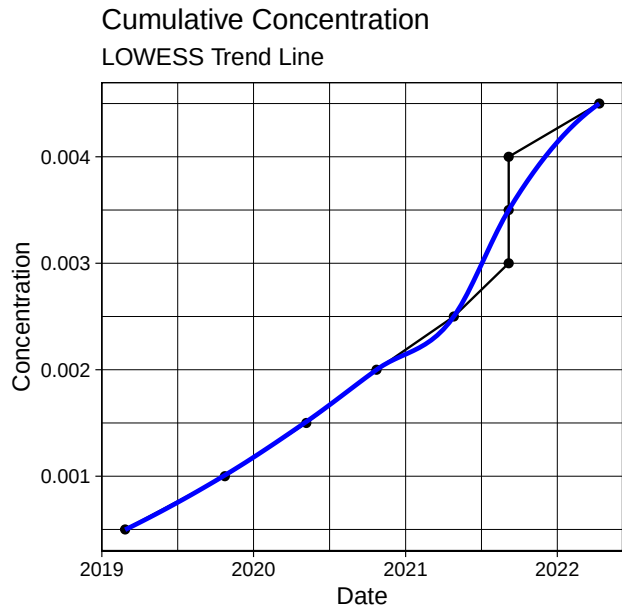
Kendall Trend Test Results Continuous	
n	8
z	-0.87
p	0.38
S	-5
varS	21
tau	-0.36
mean	0
sd	0.01
cov	2.35
results	NO CLEAR TREND

Report for ID : MW124D and Analyte : SUMPFOS&PFHxS



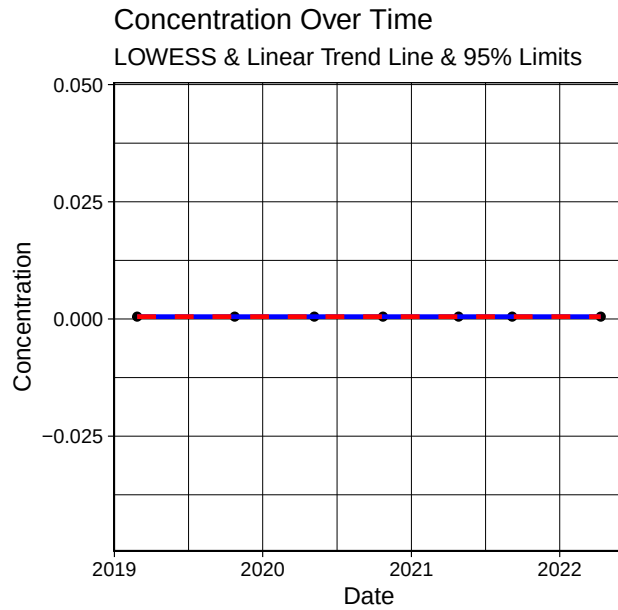
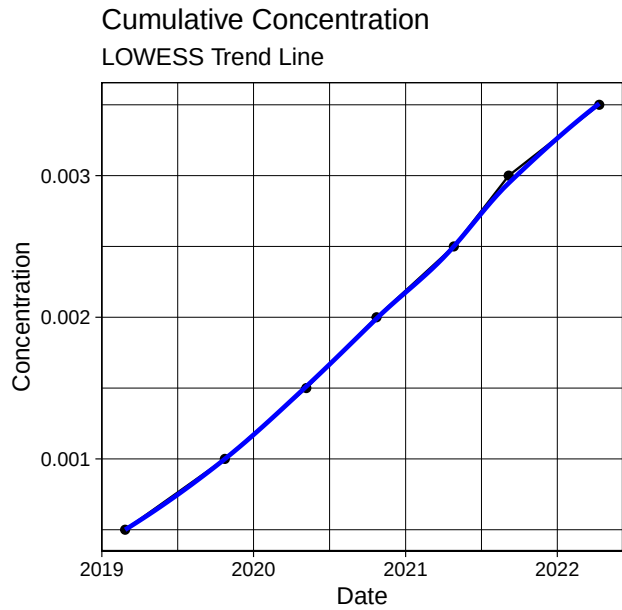
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW125S and Analyte : SUMPFOS&PFHxS



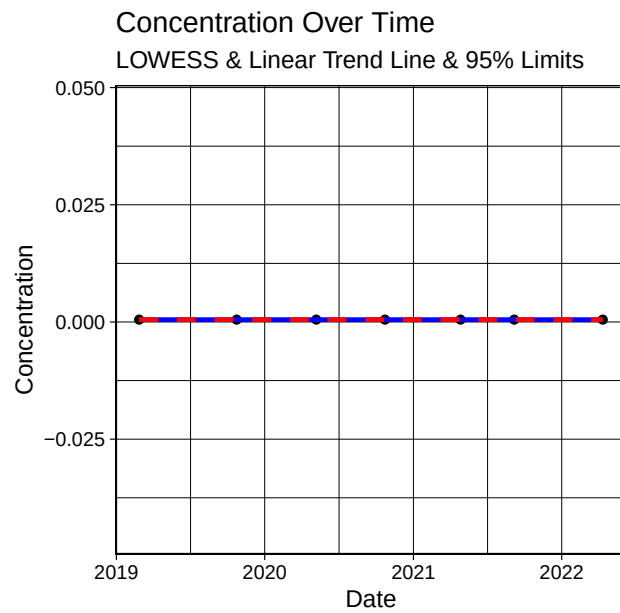
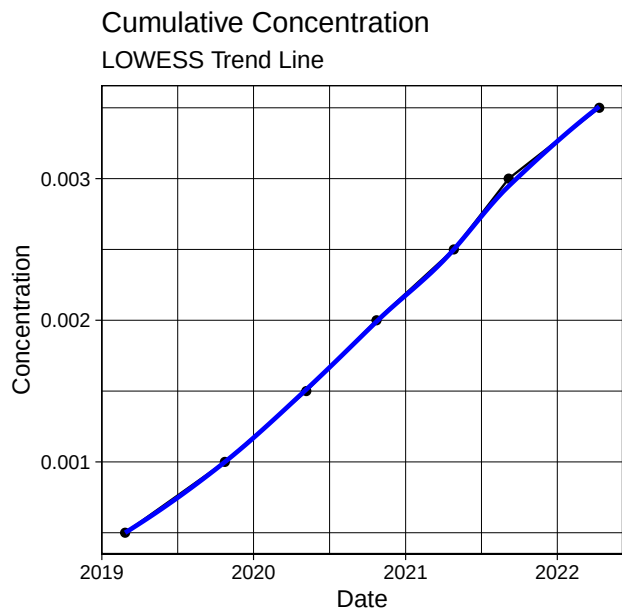
Kendall Trend Test Results Continuous	
n	7
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW126I and Analyte : SUMPFOS&PFHxS



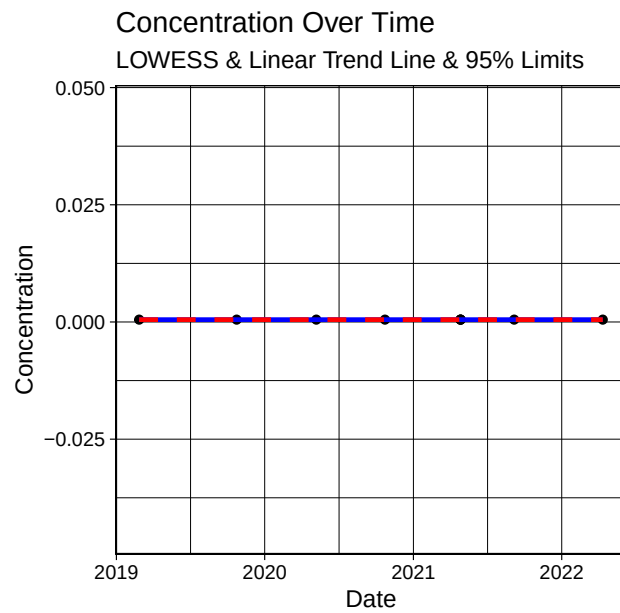
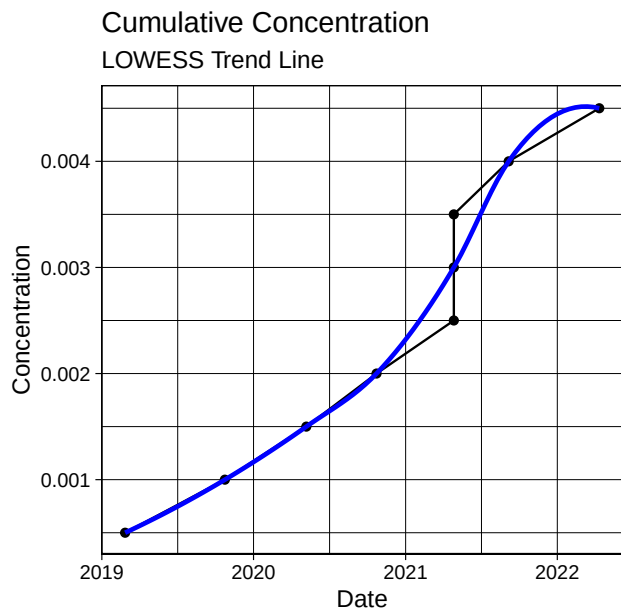
Kendall Trend Test Results Continuous	
n	7
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW128D and Analyte : SUMPFOS&PFHxS



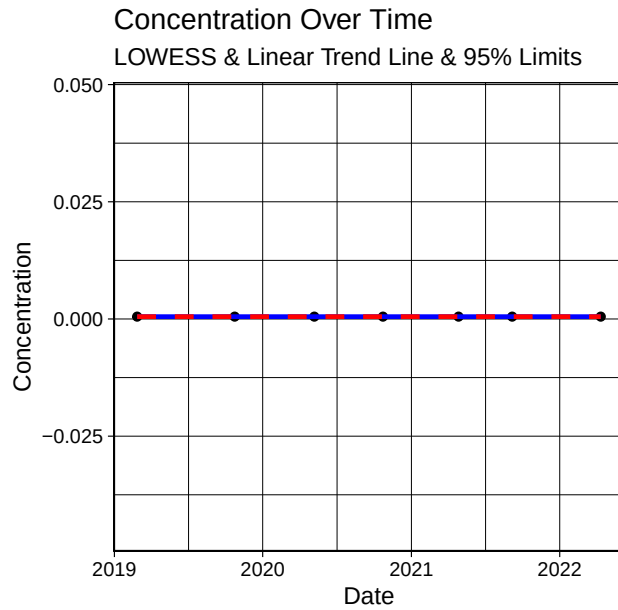
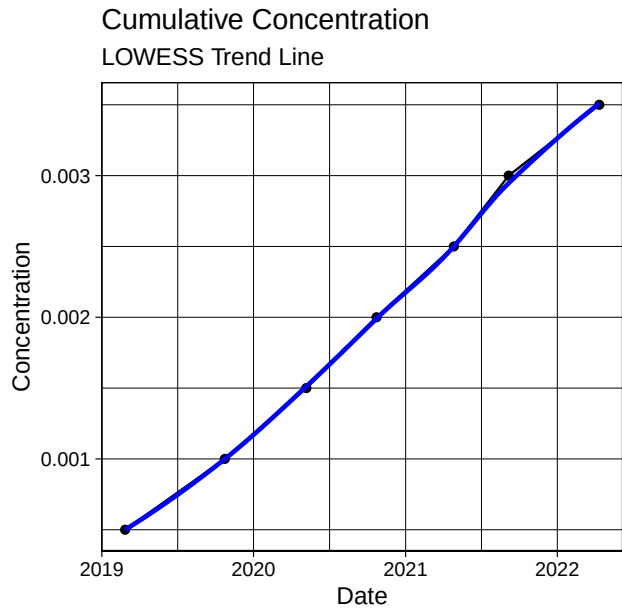
Kendall Trend Test Results Continuous	
n	9
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW129S and Analyte : SUMPFOS&PFHxS



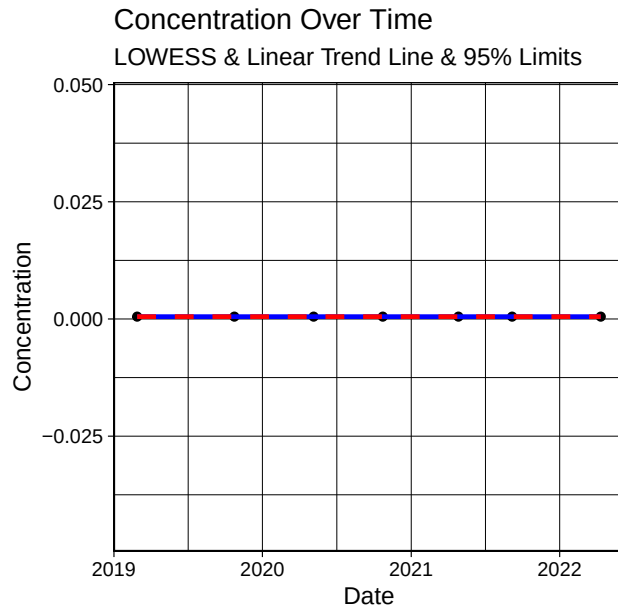
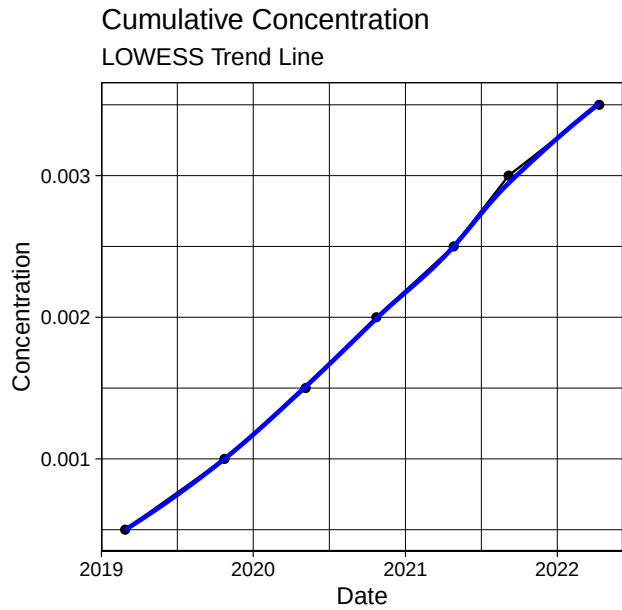
Kendall Trend Test Results Continuous	
n	7
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW130D and Analyte : SUMPFOS&PFHxS



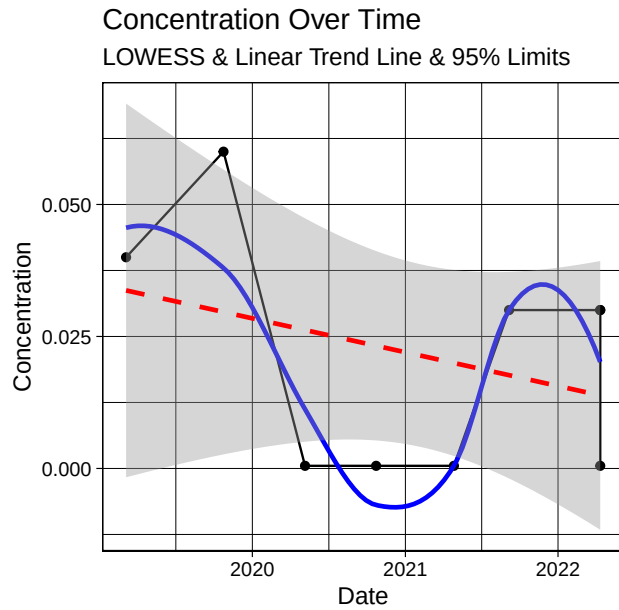
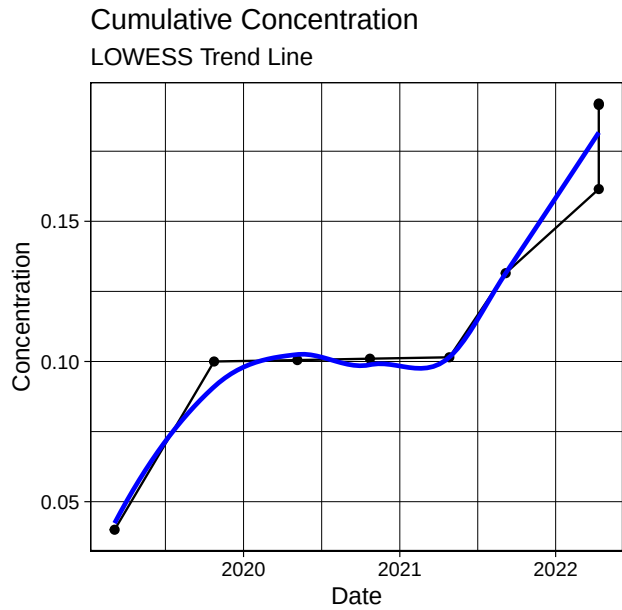
Kendall Trend Test Results Continuous	
n	7
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW131D and Analyte : SUMPFOS&PFHxS



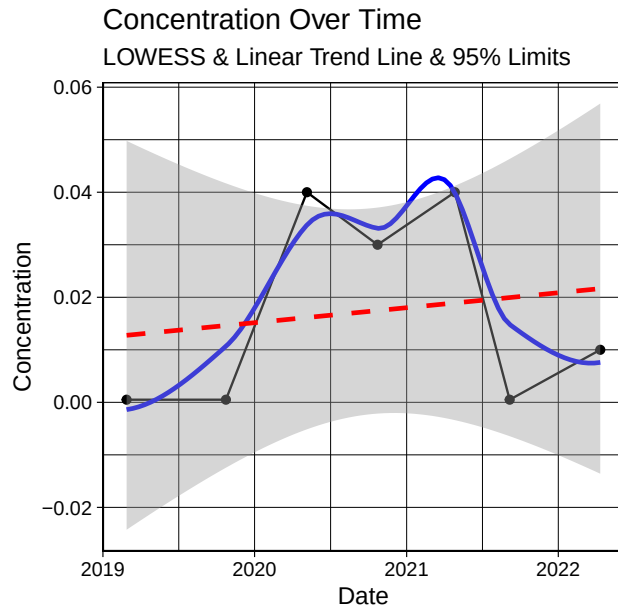
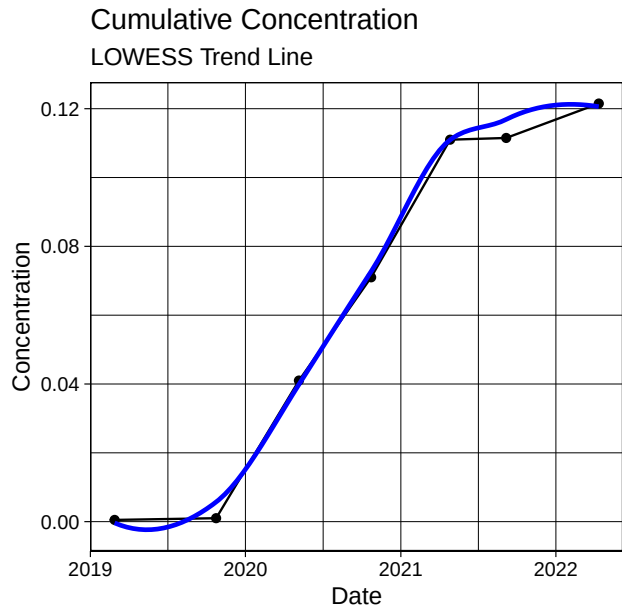
Kendall Trend Test Results Continuous	
n	9
z	-0.67
p	0.5
S	-7
varS	79.67
tau	-0.22
mean	0.02
sd	0.02
cov	1.02
results	NO CLEAR TREND

Report for ID : MW132I and Analyte : SUMPFOS&PFHxS



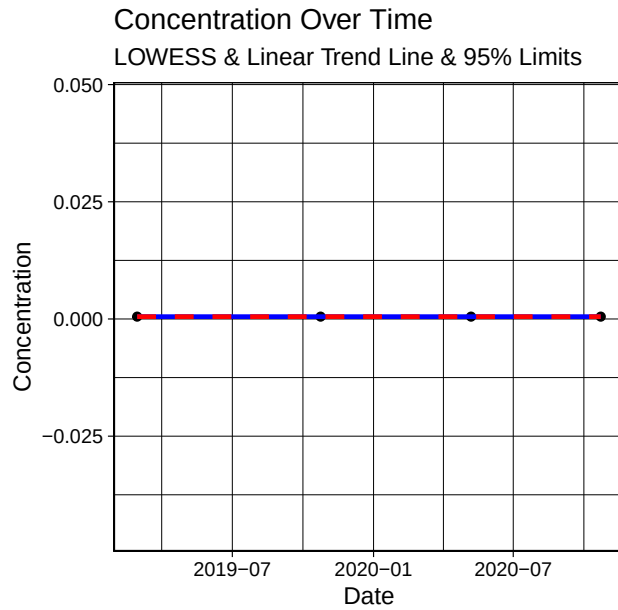
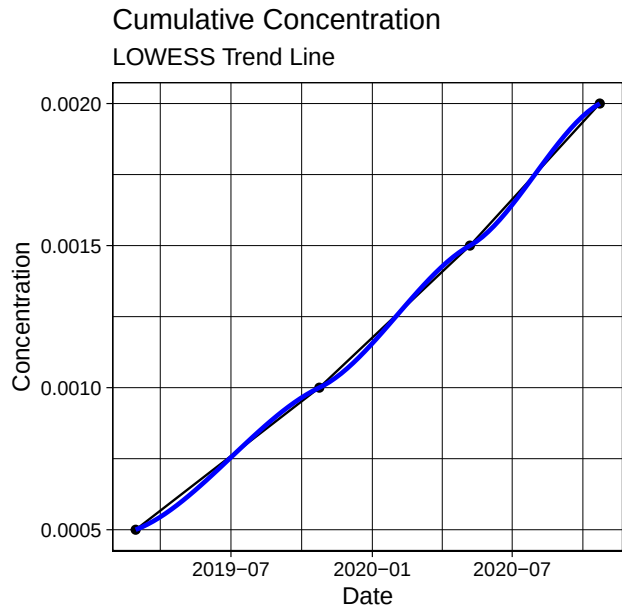
Kendall Trend Test Results Continuous	
n	7
z	0.32
p	0.75
S	3
varS	39.67
tau	0.16
mean	0.02
sd	0.02
cov	1.08
results	NO CLEAR TREND

Report for ID : MW133D and Analyte : SUMPFOS&PFHxS



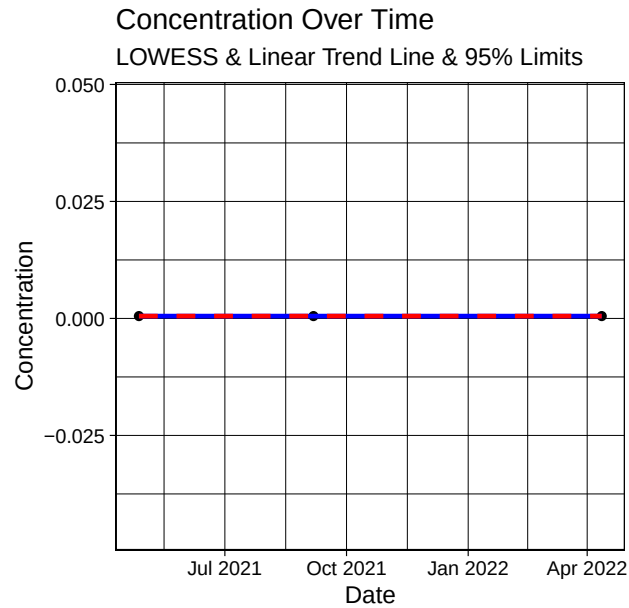
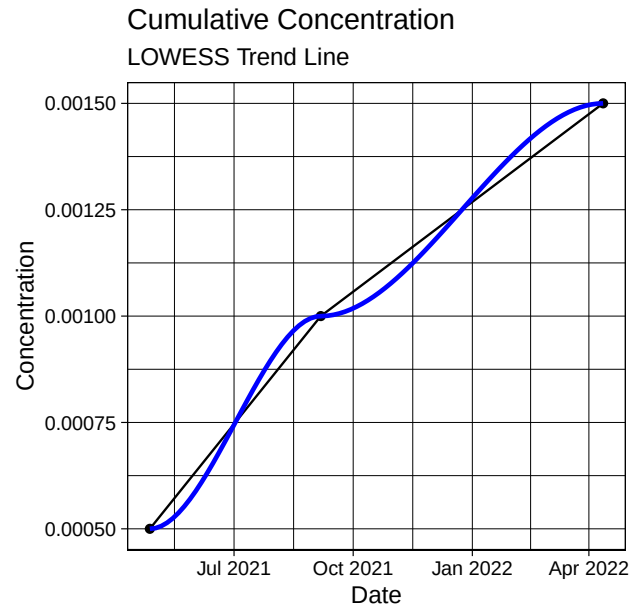
Kendall Trend Test Results Continuous	
n	4
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW134D and Analyte : SUMPFOS&PFHxS



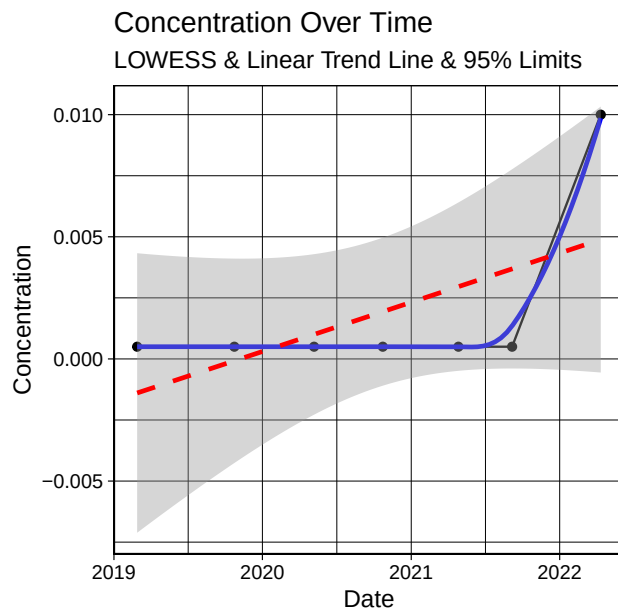
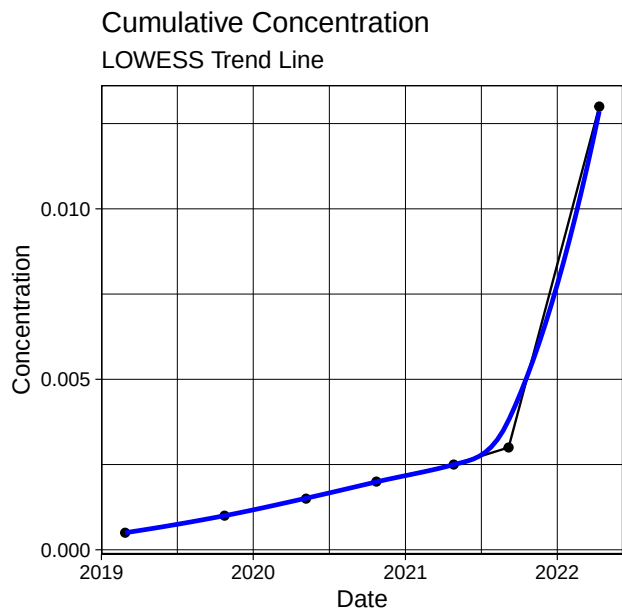
Kendall Trend Test Results Continuous	
n	3
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW135I and Analyte : SUMPFOS&PFHxS



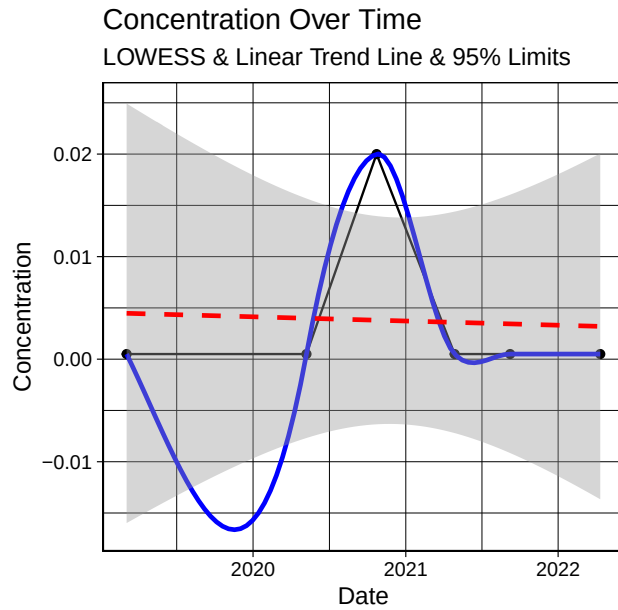
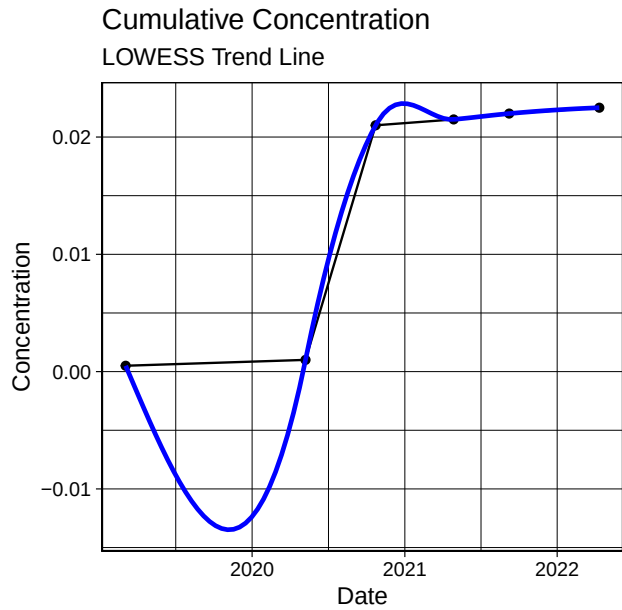
Kendall Trend Test Results Continuous	
n	7
z	1.25
p	0.21
S	6
varS	16
tau	0.53
mean	0
sd	0
cov	1.93
results	NO CLEAR TREND

Report for ID : MW136D and Analyte : SUMPFOS&PFHxS



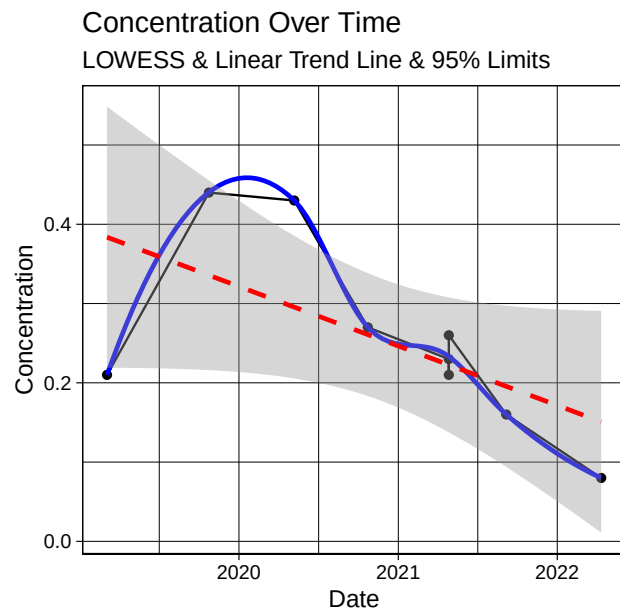
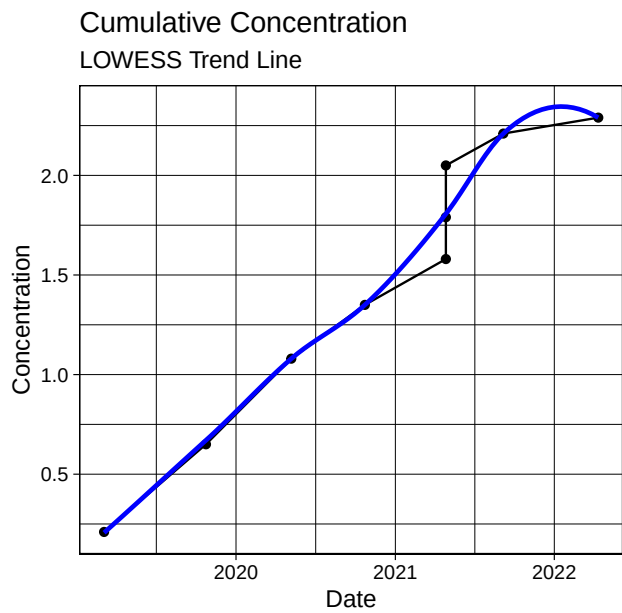
Kendall Trend Test Results Continuous	
n	6
z	0
p	1
S	-1
varS	11.67
tau	-0.12
mean	0
sd	0.01
cov	2.12
results	NO CLEAR TREND

Report for ID : MW137S and Analyte : SUMPFOS&PFHxS



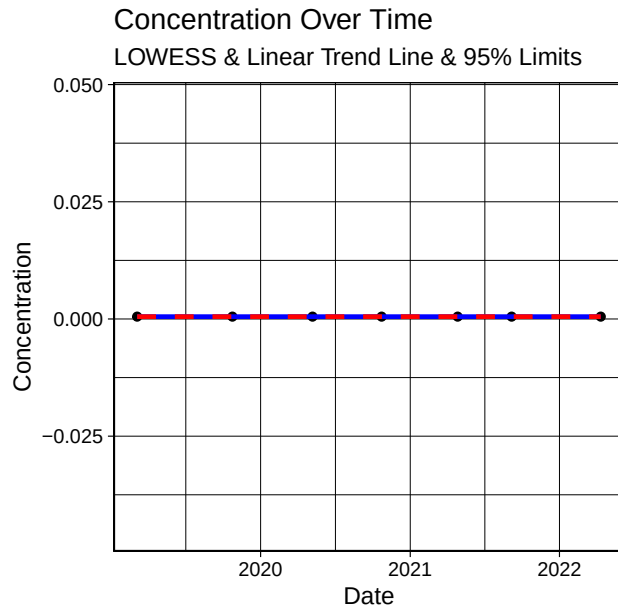
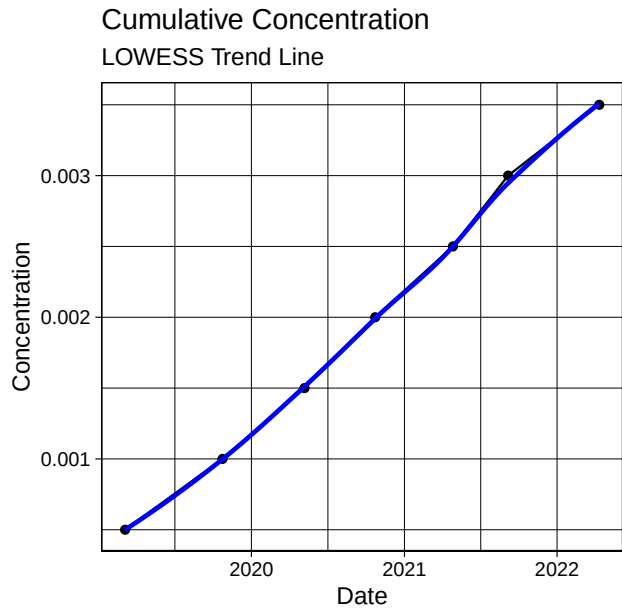
Kendall Trend Test Results Continuous	
n	9
z	-2.1
p	0.04
S	-21
varS	91
tau	-0.59
mean	0.25
sd	0.12
cov	0.46
results	DECREASING

Report for ID : MW138S and Analyte : SUMPFOS&PFHxS



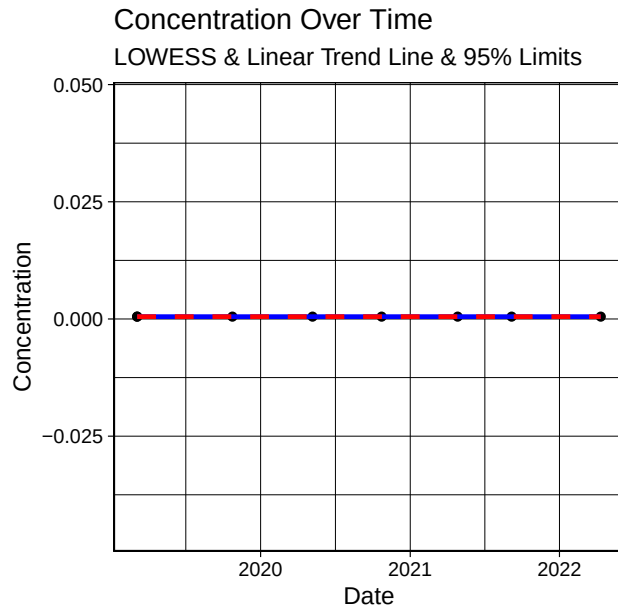
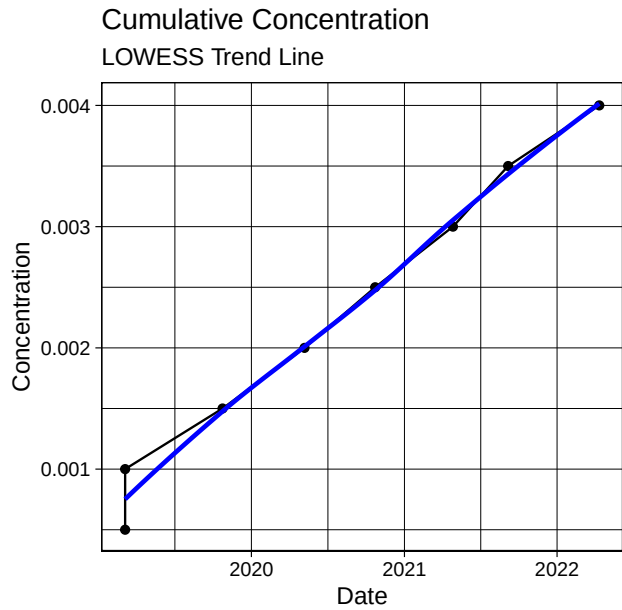
Kendall Trend Test Results Continuous	
n	7
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW139I and Analyte : SUMPFOS&PFHxS



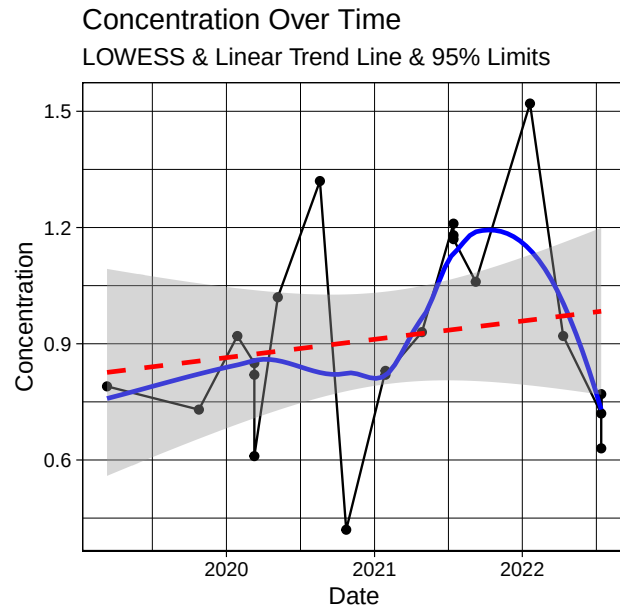
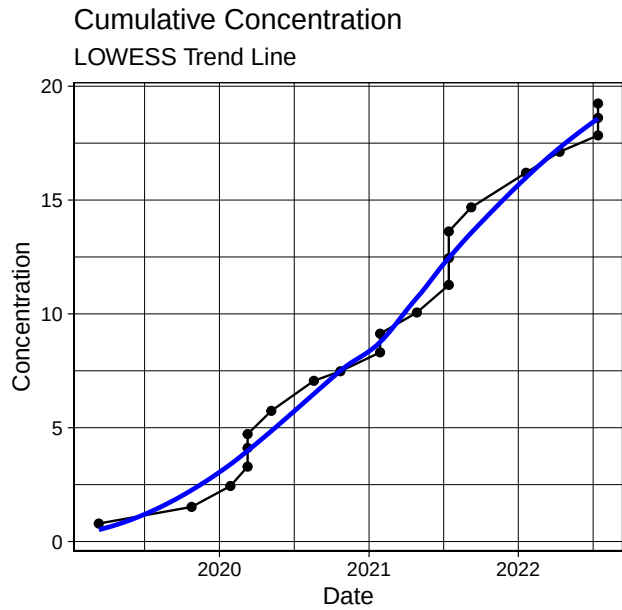
Kendall Trend Test Results Continuous	
n	8
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW140D and Analyte : SUMPFOS&PFHxS



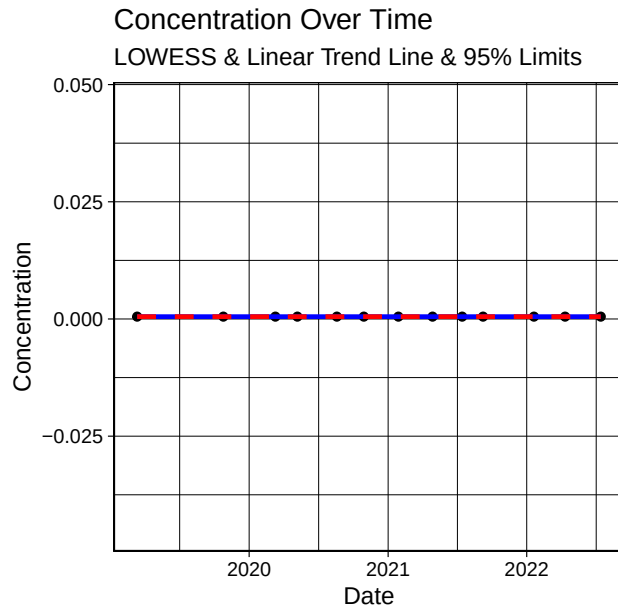
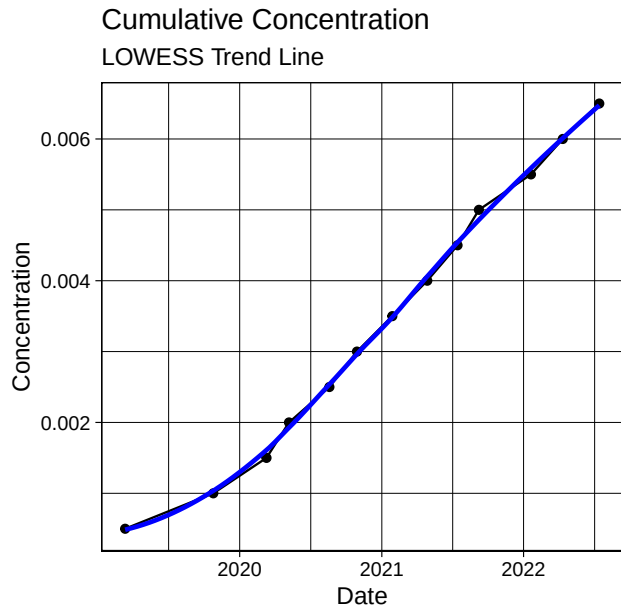
Kendall Trend Test Results Continuous	
n	21
z	0.51
p	0.61
S	18
varS	1094.67
tau	0.09
mean	0.92
sd	0.26
cov	0.28
results	NO CLEAR TREND

Report for ID : MW141S and Analyte : SUMPFOS&PFHxS



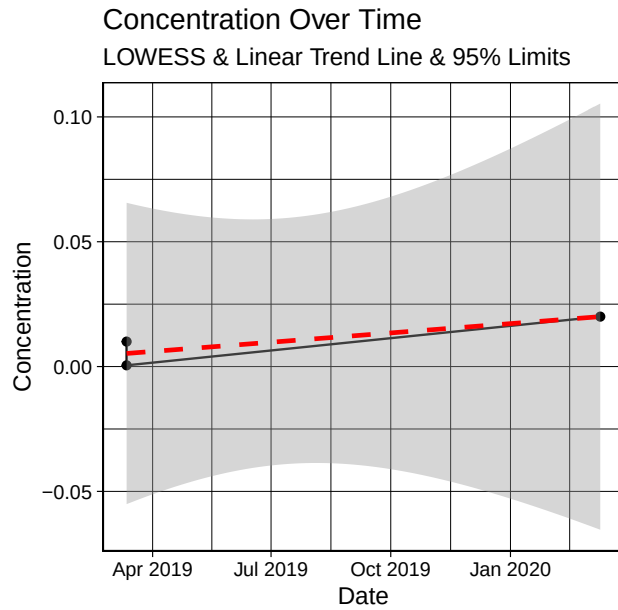
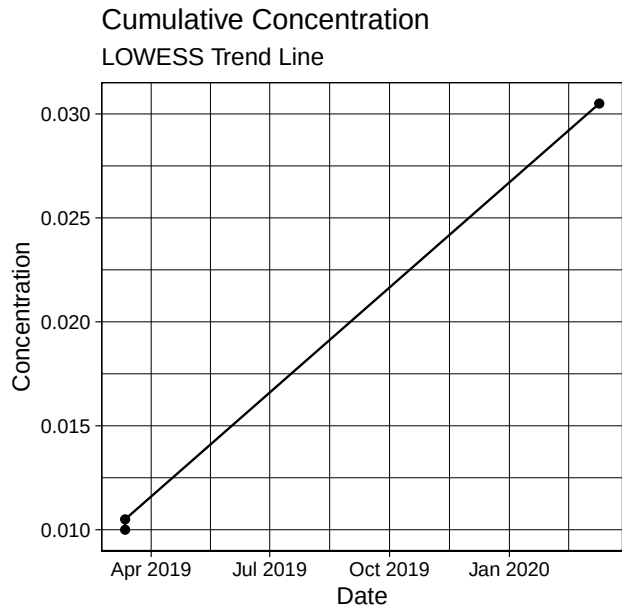
Kendall Trend Test Results Continuous	
n	13
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW142S and Analyte : SUMPFOS&PFHxS



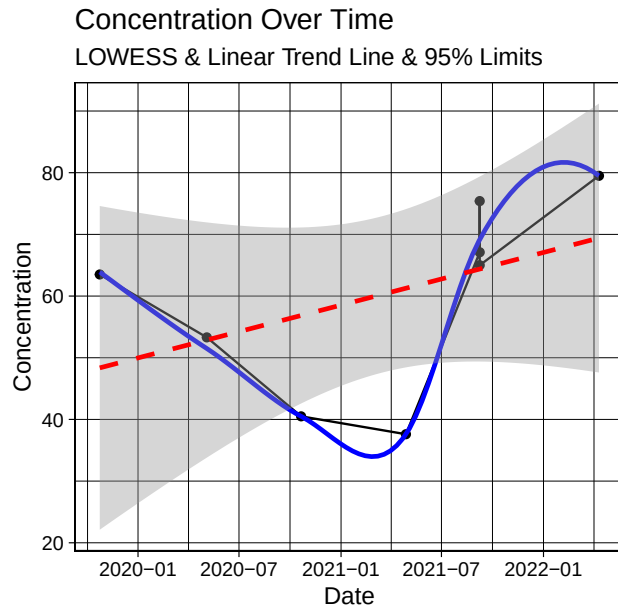
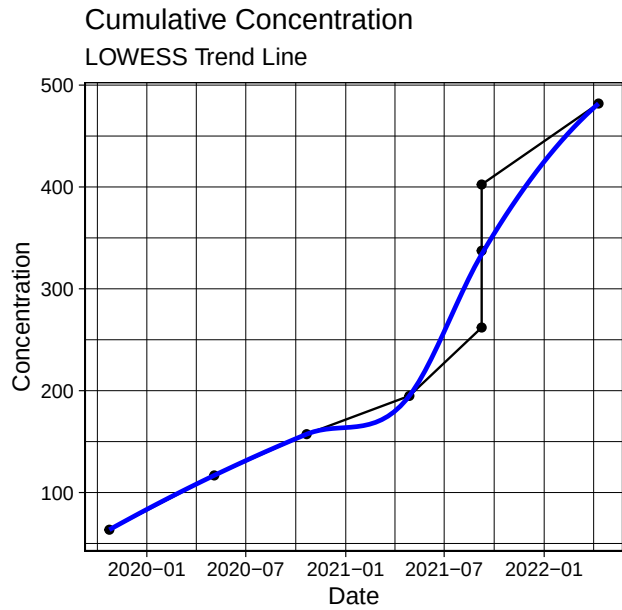
Kendall Trend Test Results Continuous	
n	3
z	0
p	1
S	1
varS	3.67
tau	0.33
mean	0.01
sd	0.01
cov	0.96
results	NO CLEAR TREND

Report for ID : MW143S and Analyte : SUMPFOS&PFHxS



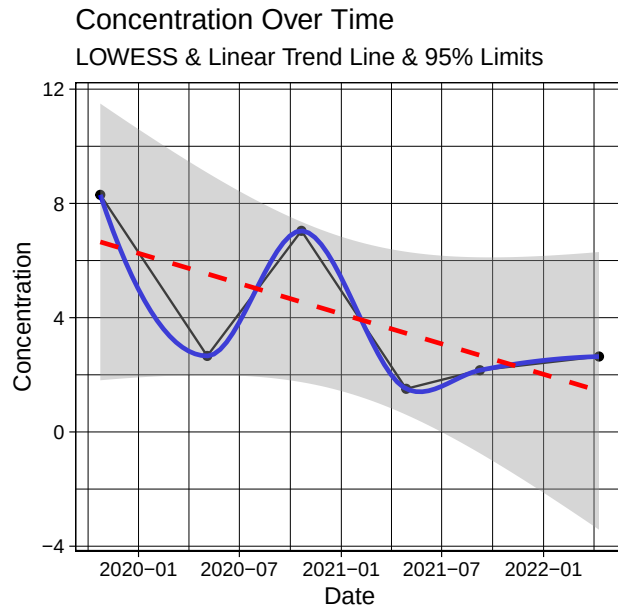
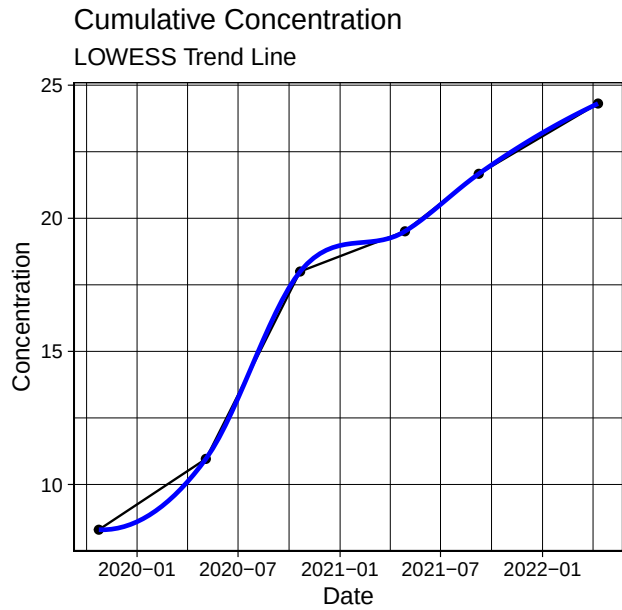
Kendall Trend Test Results Continuous	
n	8
z	1.36
p	0.17
S	12
varS	65.33
tau	0.43
mean	60.24
sd	15.27
cov	0.25
results	NO CLEAR TREND

Report for ID : MW301 and Analyte : SUMPFOS&PFHxS



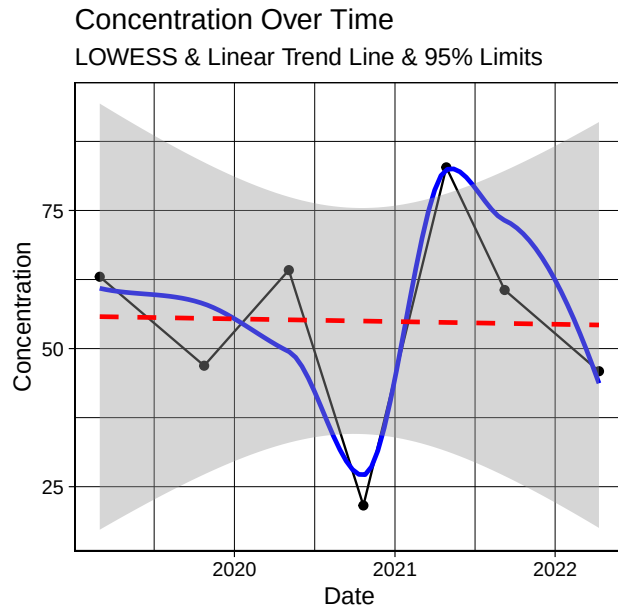
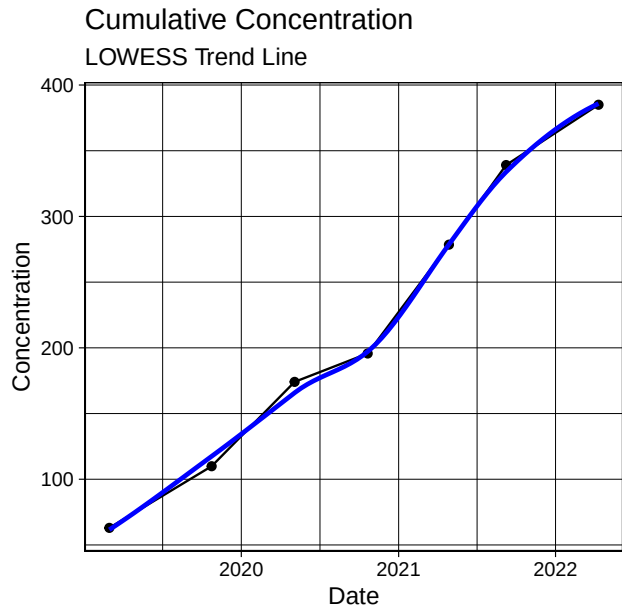
Kendall Trend Test Results Continuous	
n	6
z	-1.13
p	0.26
S	-7
varS	28.33
tau	-0.47
mean	4.05
sd	2.86
cov	0.71
results	STABLE

Report for ID : MW302 and Analyte : SUMPFOS&PFHxS



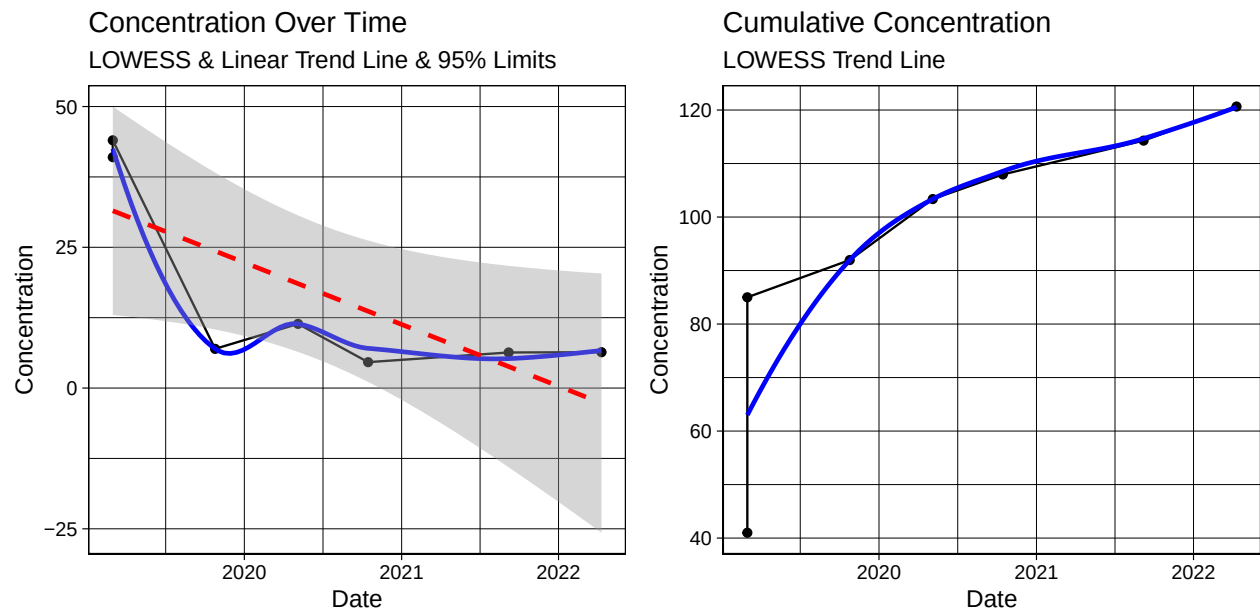
Kendall Trend Test Results Continuous	
n	7
z	-0.3
p	0.76
S	-3
varS	44.33
tau	-0.14
mean	55
sd	19.22
cov	0.35
results	STABLE

Report for ID : MW303 and Analyte : SUMPFOS&PFHxS



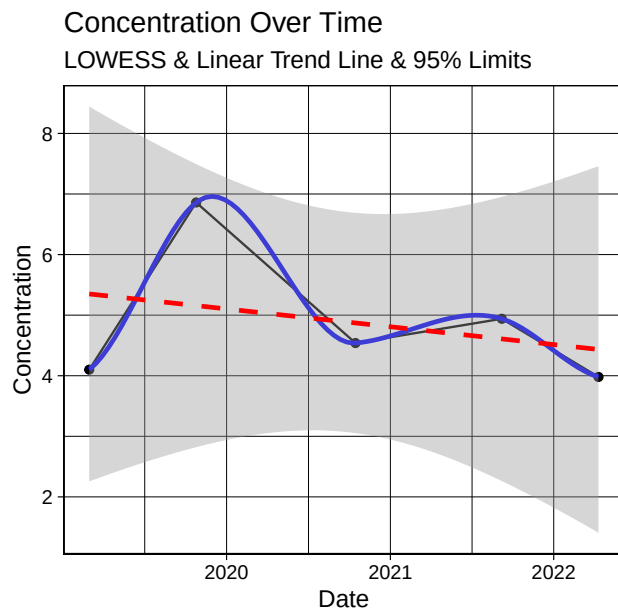
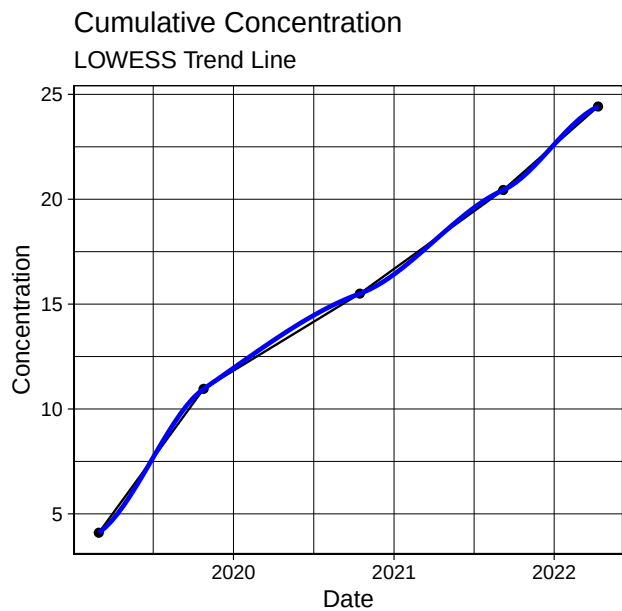
Kendall Trend Test Results Continuous	
n	7
z	-1.5
p	0.13
S	-11
varS	44.33
tau	-0.52
mean	17.24
sd	17.4
cov	1.01
results	NO CLEAR TREND

Report for ID : MW304 and Analyte : SUMPFOS&PFHxS



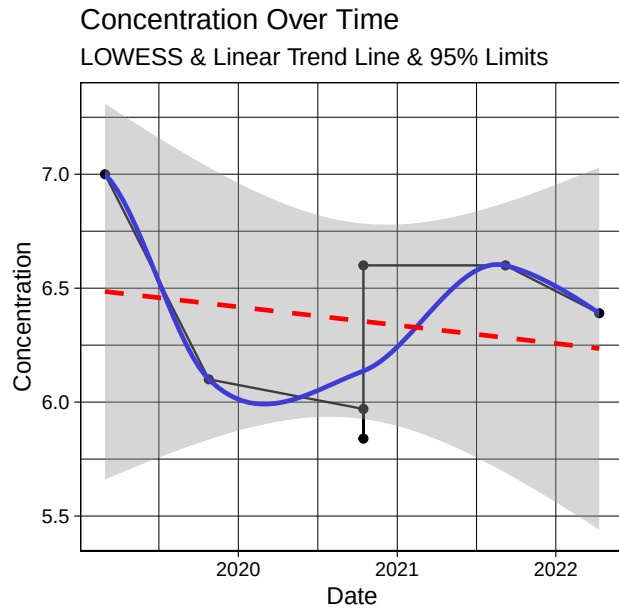
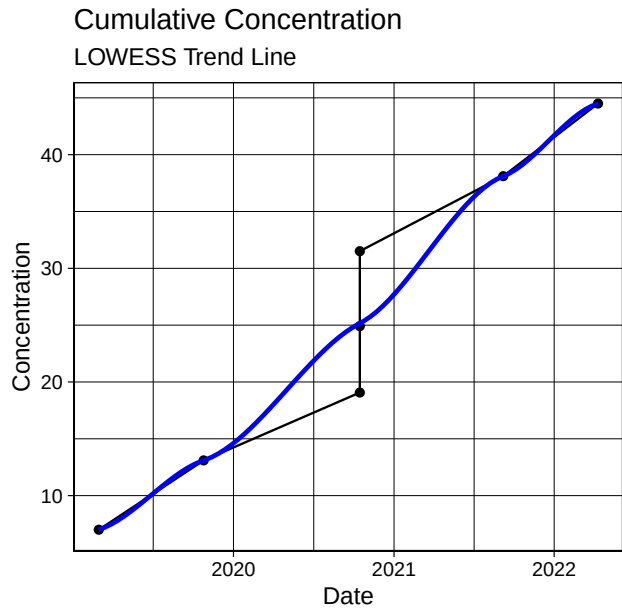
Kendall Trend Test Results Continuous	
n	5
z	-0.24
p	0.81
S	-2
varS	16.67
tau	-0.2
mean	4.88
sd	1.17
cov	0.24
results	STABLE

Report for ID : MW305 and Analyte : SUMPFOS&PFHxS



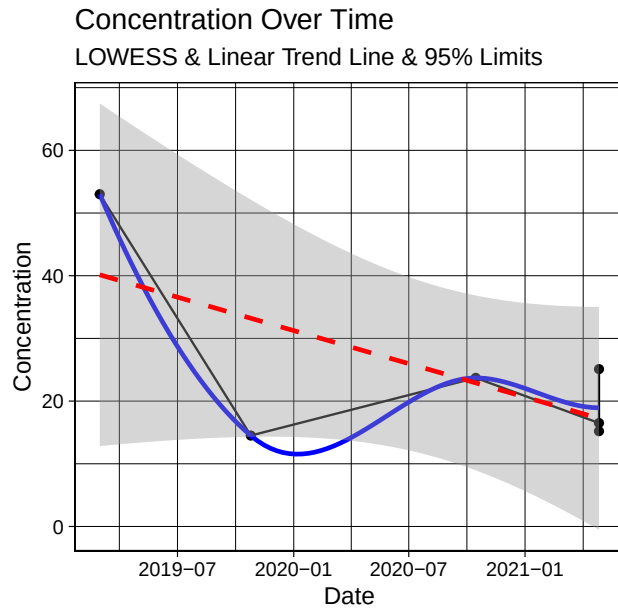
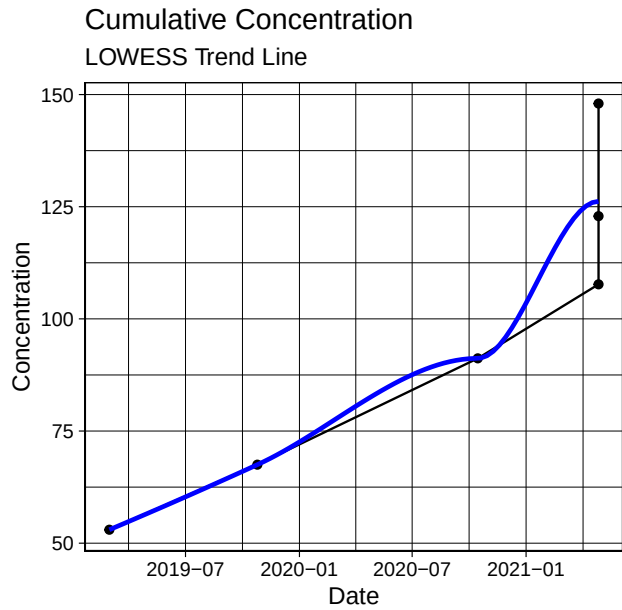
Kendall Trend Test Results Continuous	
n	7
z	-0.15
p	0.88
S	-2
varS	43.33
tau	-0.1
mean	6.36
sd	0.41
cov	0.06
results	STABLE

Report for ID : MW306 and Analyte : SUMPFOS&PFHxS



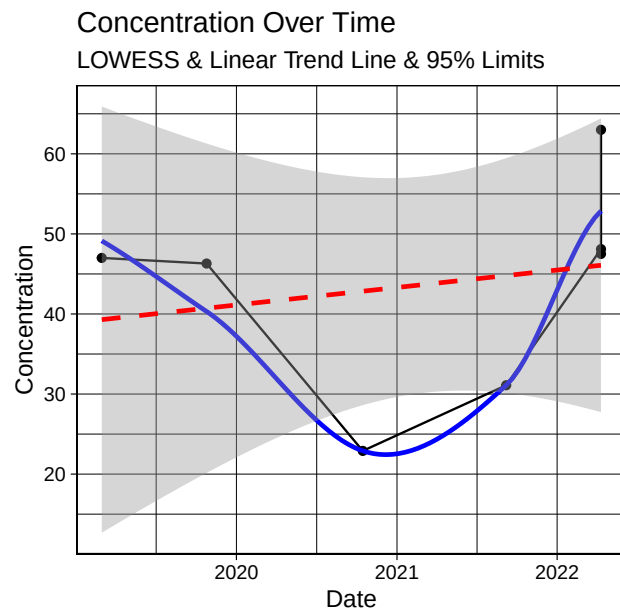
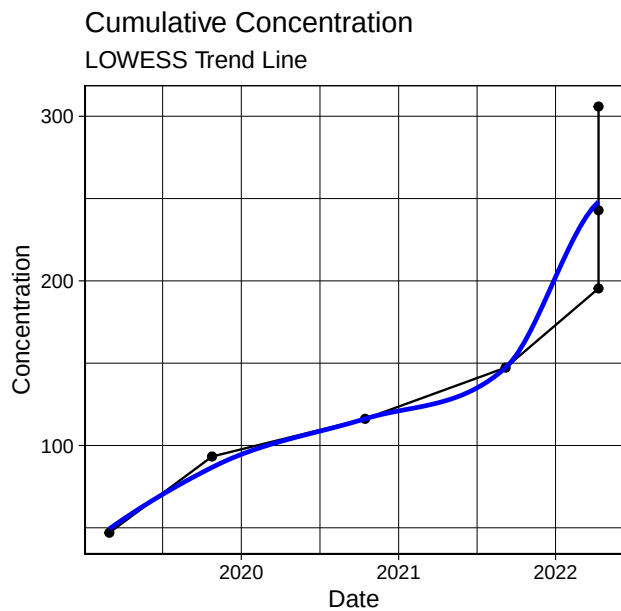
Kendall Trend Test Results Continuous	
n	6
z	0
p	1
S	-1
varS	28.33
tau	-0.07
mean	24.67
sd	14.58
cov	0.59
results	STABLE

Report for ID : MW307 and Analyte : SUMPFOS&PFHxS



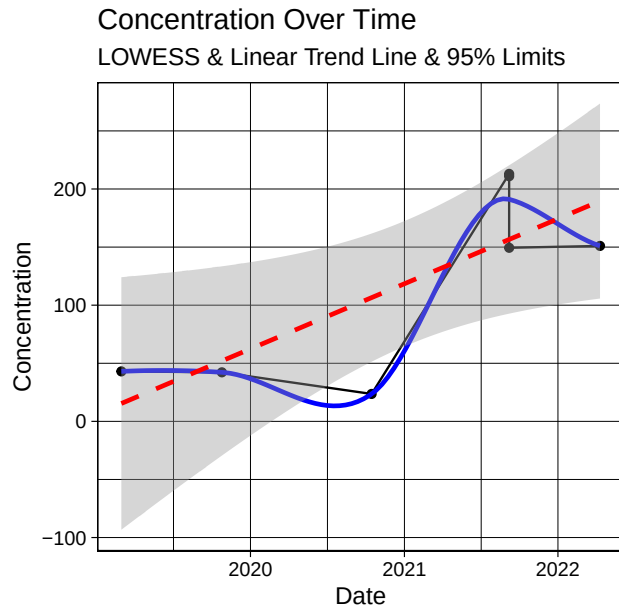
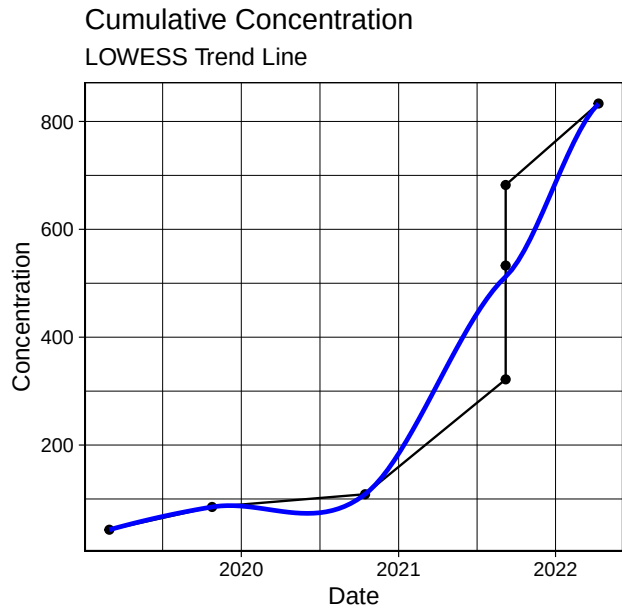
Kendall Trend Test Results Continuous	
n	7
z	1.2
p	0.23
S	9
varS	44.33
tau	0.43
mean	43.7
sd	13.01
cov	0.3
results	NO CLEAR TREND

Report for ID : MW308 and Analyte : SUMPFOS&PFHxS



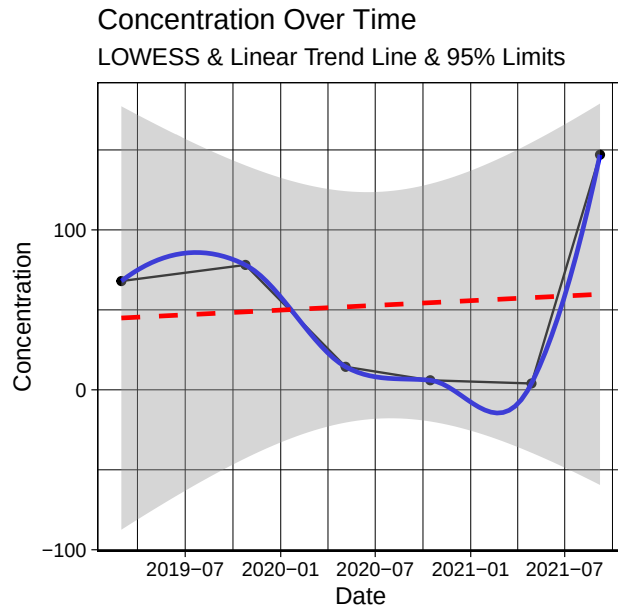
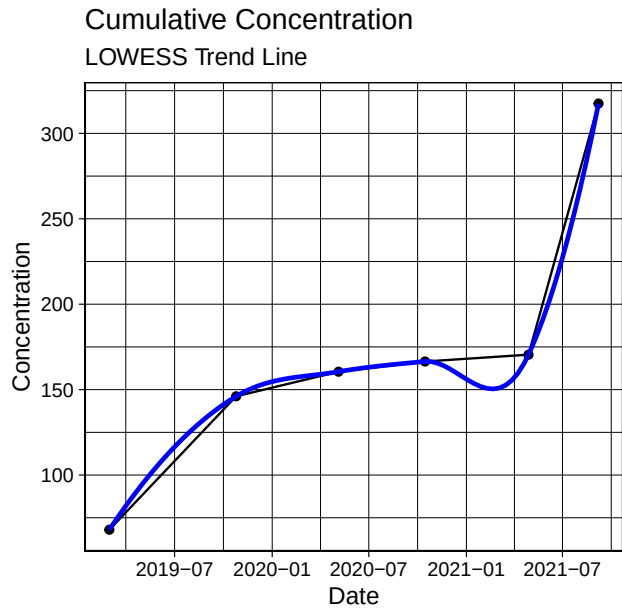
Kendall Trend Test Results Continuous	
n	7
z	0.6
p	0.55
S	5
varS	44.33
tau	0.24
mean	119.03
sd	81.67
cov	0.69
results	NO CLEAR TREND

Report for ID : MW309 and Analyte : SUMPFOS&PFHxS



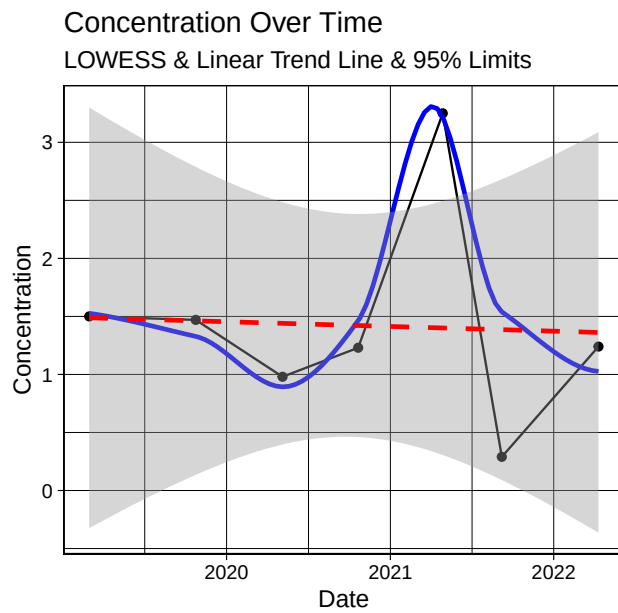
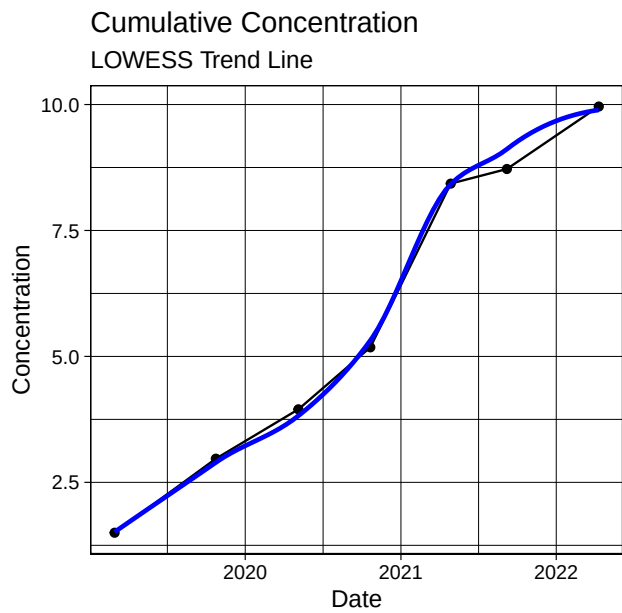
Kendall Trend Test Results Continuous	
n	6
z	-0.38
p	0.71
S	-3
varS	28.33
tau	-0.2
mean	52.91
sd	56.2
cov	1.06
results	NO CLEAR TREND

Report for ID : MW310 and Analyte : SUMPFOS&PFHxS



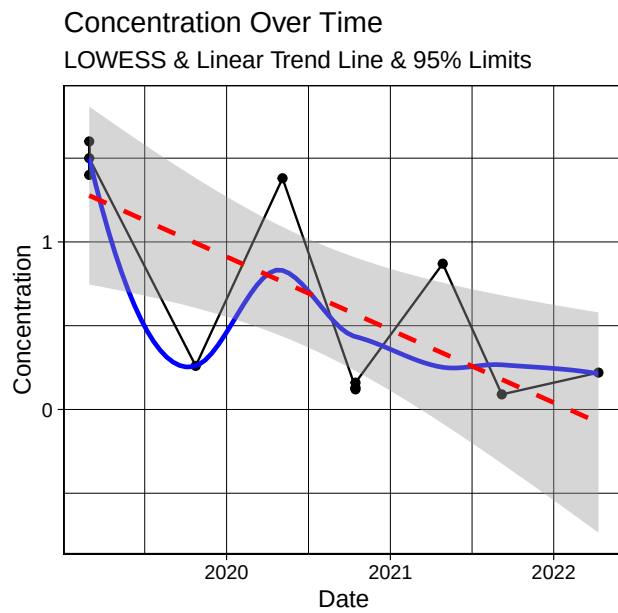
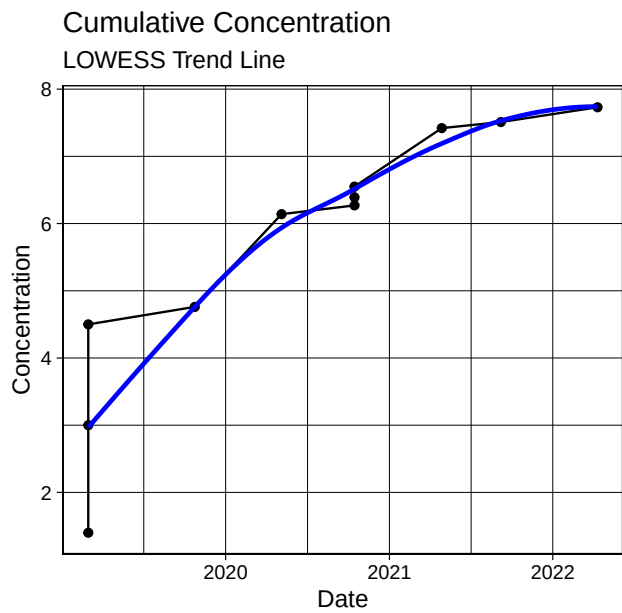
Kendall Trend Test Results Continuous	
n	7
z	-0.6
p	0.55
S	-5
varS	44.33
tau	-0.24
mean	1.42
sd	0.9
cov	0.63
results	STABLE

Report for ID : MW312 and Analyte : SUMPFOS&PFHxS



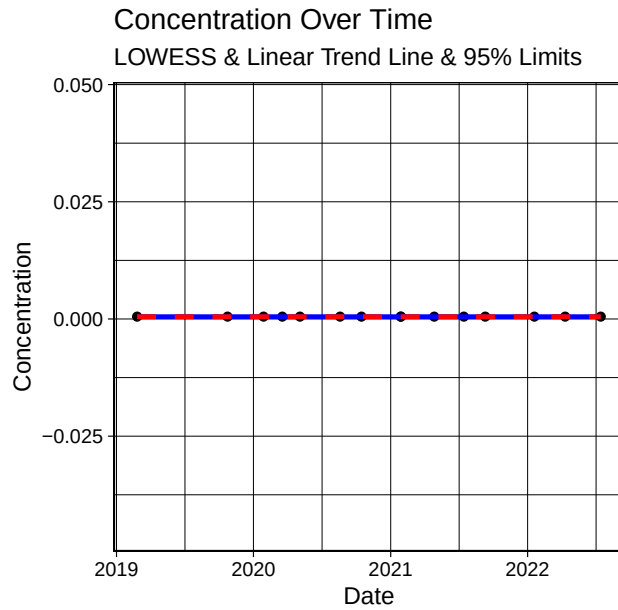
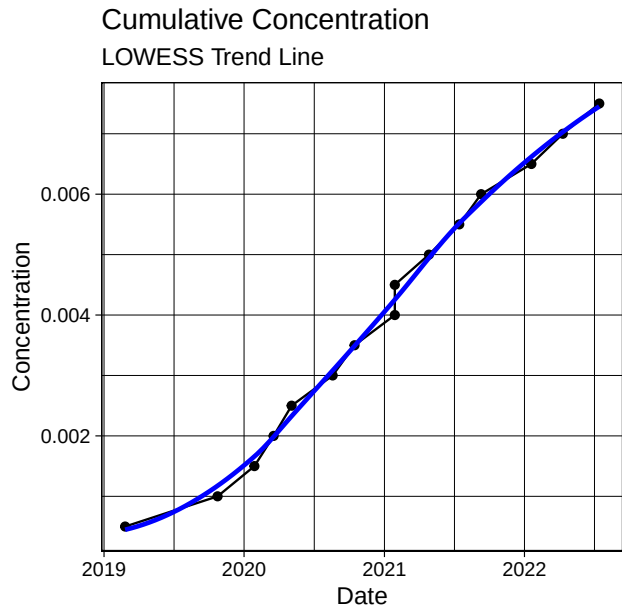
Kendall Trend Test Results Continuous	
n	11
z	-2.18
p	0.03
S	-29
varS	165
tau	-0.53
mean	0.7
sd	0.65
cov	0.92
results	DECREASING

Report for ID : MW313 and Analyte : SUMPFOS&PFHxS



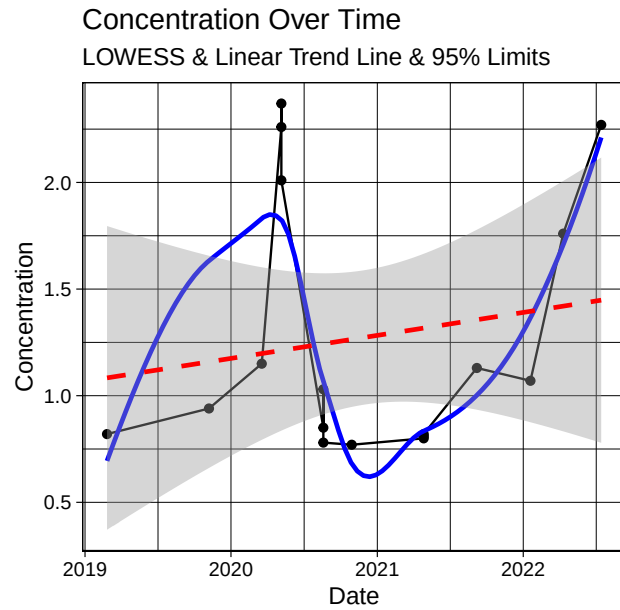
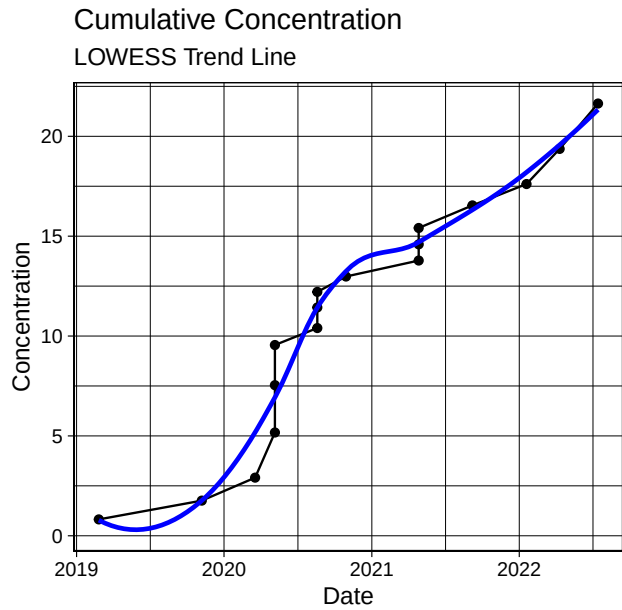
Kendall Trend Test Results Continuous	
n	15
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW401 and Analyte : SUMPFOS&PFHxS



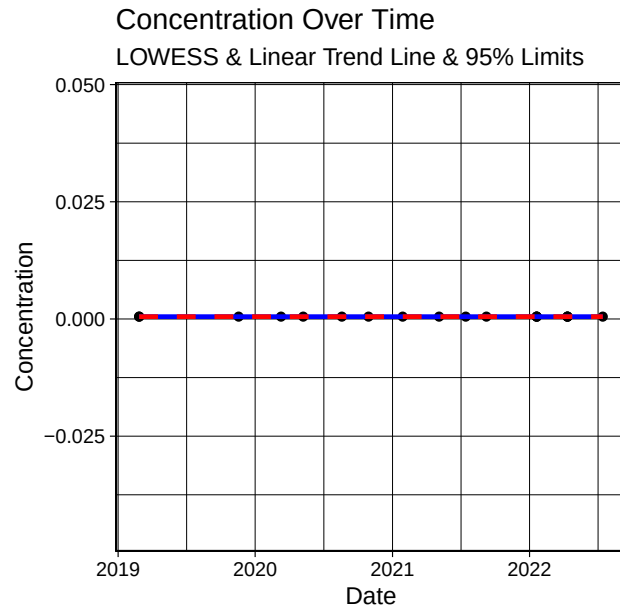
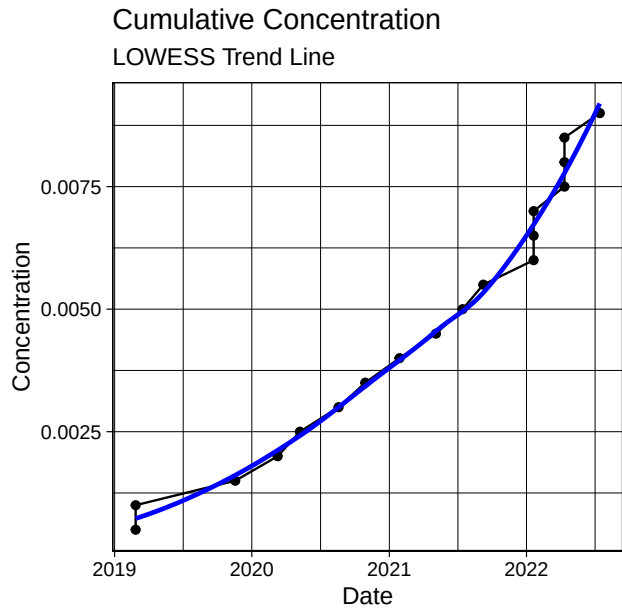
Kendall Trend Test Results Continuous	
n	17
z	0.25
p	0.8
S	7
varS	588.33
tau	0.05
mean	1.27
sd	0.6
cov	0.47
results	NO CLEAR TREND

Report for ID : MW402 and Analyte : SUMPFOS&PFHxS



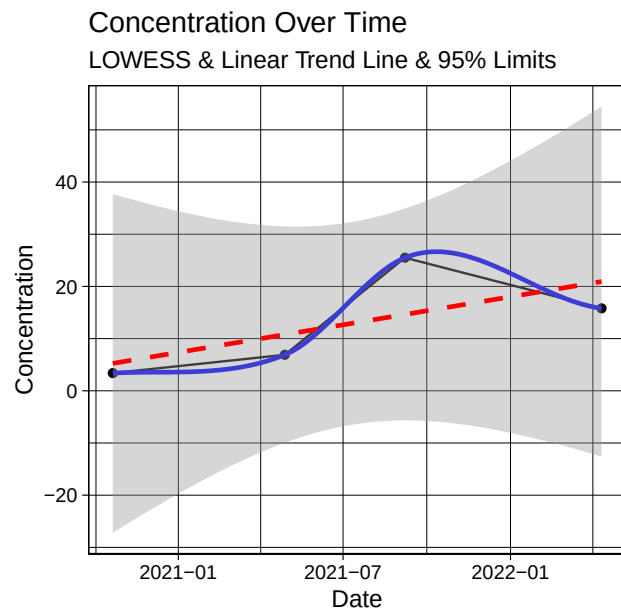
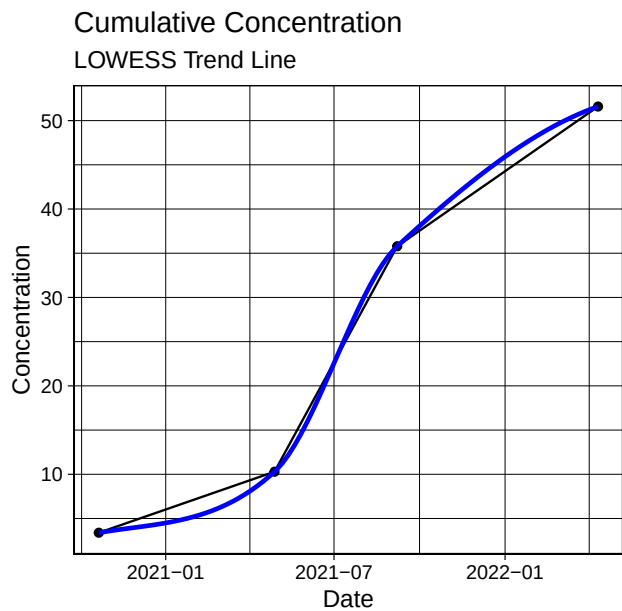
Kendall Trend Test Results Continuous	
n	18
z	NaN
p	NaN
S	0
varS	0
tau	NaN
mean	0
sd	0
cov	0
results	NA

Report for ID : MW403 and Analyte : SUMPFOS&PFHxS



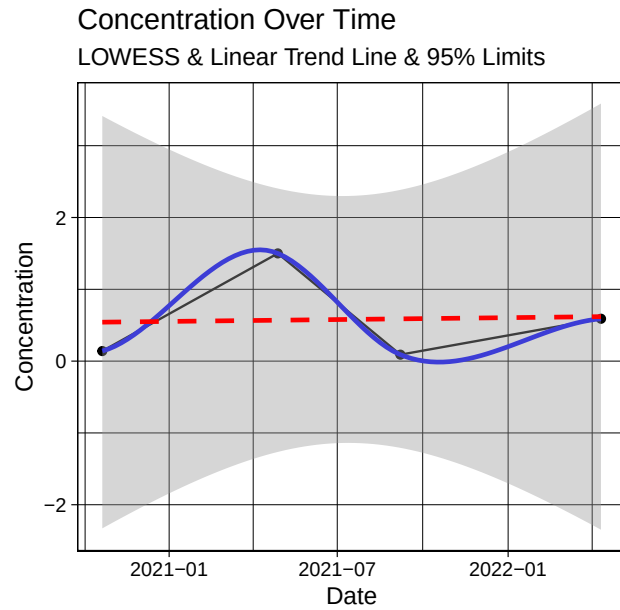
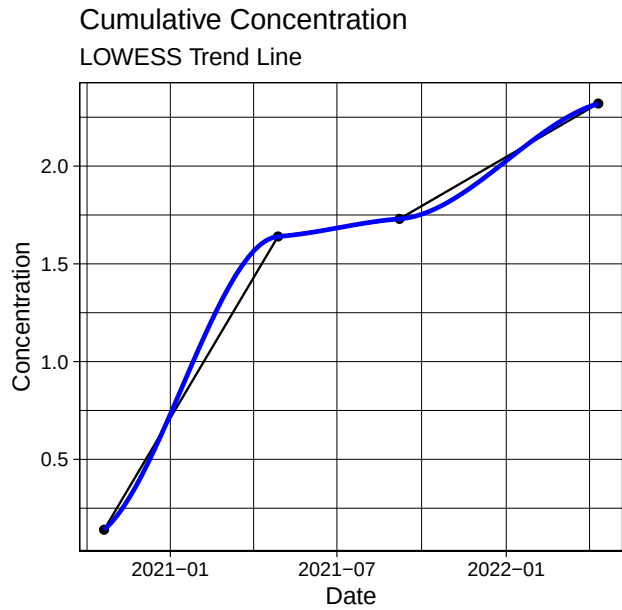
Kendall Trend Test Results Continuous	
n	4
z	1.02
p	0.31
S	4
varS	8.67
tau	0.67
mean	12.9
sd	9.89
cov	0.77
results	NO CLEAR TREND

Report for ID : MW504 and Analyte : SUMPFOS&PFHxS



Kendall Trend Test Results Continuous	
n	4
z	0
p	1
S	0
varS	8.67
tau	0
mean	0.58
sd	0.65
cov	1.13
results	NO CLEAR TREND

Report for ID : MW505 and Analyte : SUMPFOS&PFHxS



Trend Report

Report Date & Time: 2023-04-20 05:36:40

Data File Name: POTinputSUMPFOS&PFHxS.csv

Report Title: POT Trend Data

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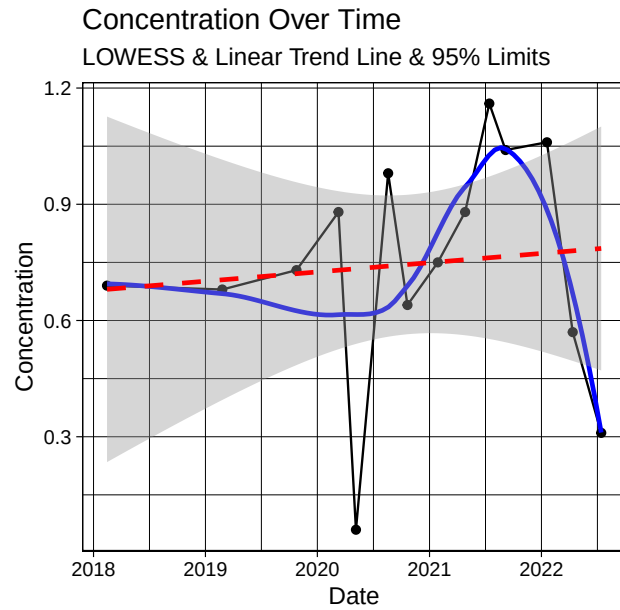
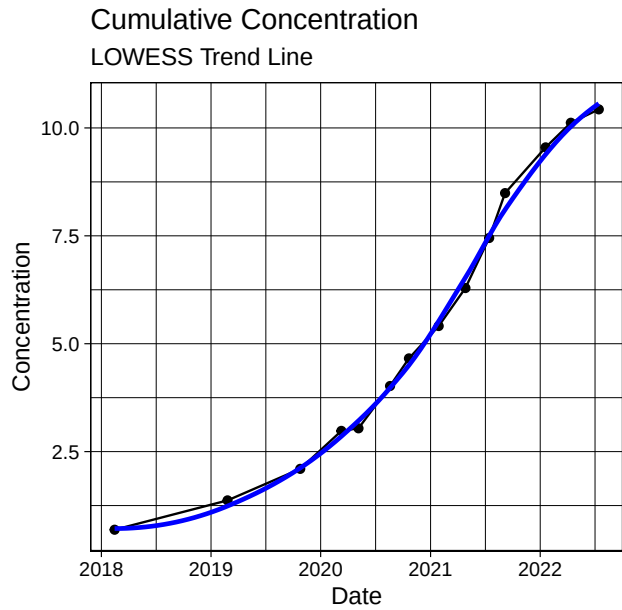
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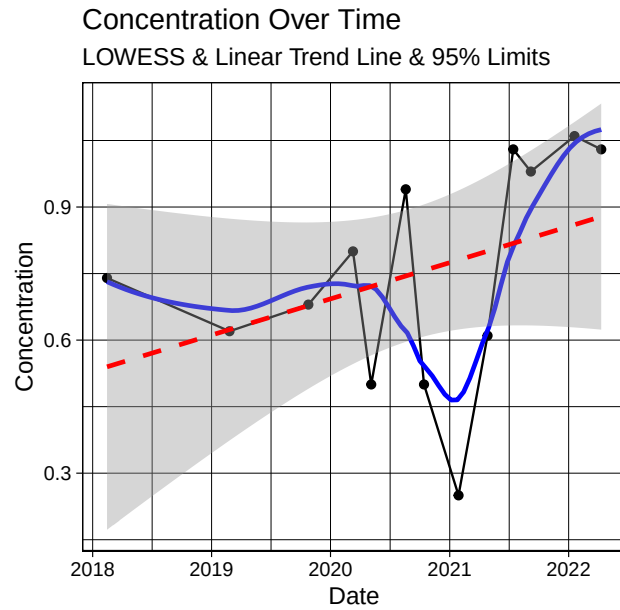
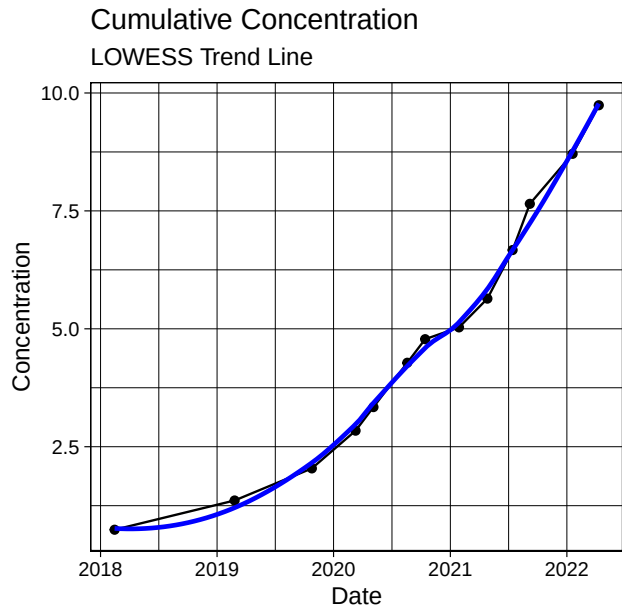
Kendall Trend Test Results Continuous	
n	14
z	0.71
p	0.48
S	14
varS	332.67
tau	0.15
mean	0.74
sd	0.3
cov	0.4
results	NO CLEAR TREND

Report for ID : POT102 and Analyte : SUMPFOS&PFHxS



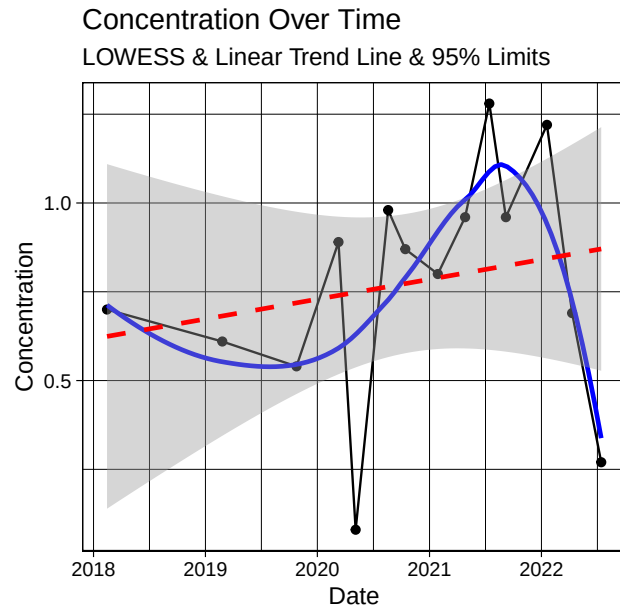
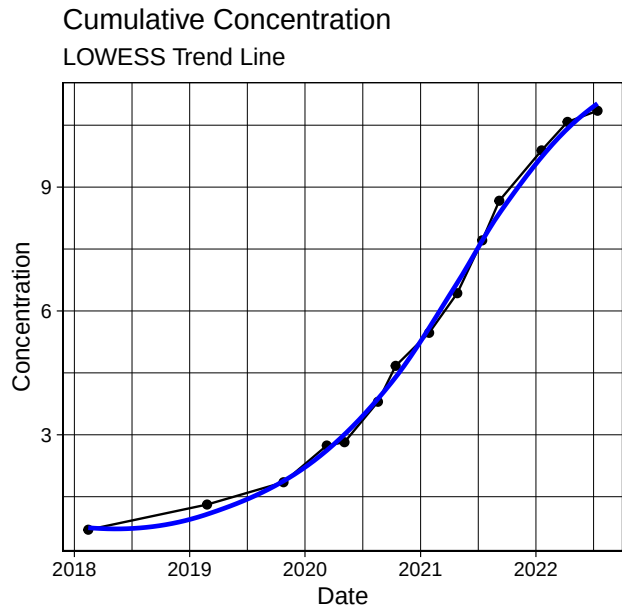
Kendall Trend Test Results Continuous	
n	13
z	1.53
p	0.13
S	26
varS	266.67
tau	0.34
mean	0.75
sd	0.25
cov	0.34
results	NO CLEAR TREND

Report for ID : POT103 and Analyte : SUMPFOS&PFHxS



Kendall Trend Test Results Continuous	
n	14
z	0.82
p	0.41
S	16
varS	332.67
tau	0.18
mean	0.78
sd	0.33
cov	0.43
results	NO CLEAR TREND

Report for ID : POT104 and Analyte : SUMPFOS&PFHxS



Trend Report

Report Date & Time: 2023-04-20 05:05:57

Data File Name: inputPFOA.csv

Report Title: PFOA Trend in groundwater

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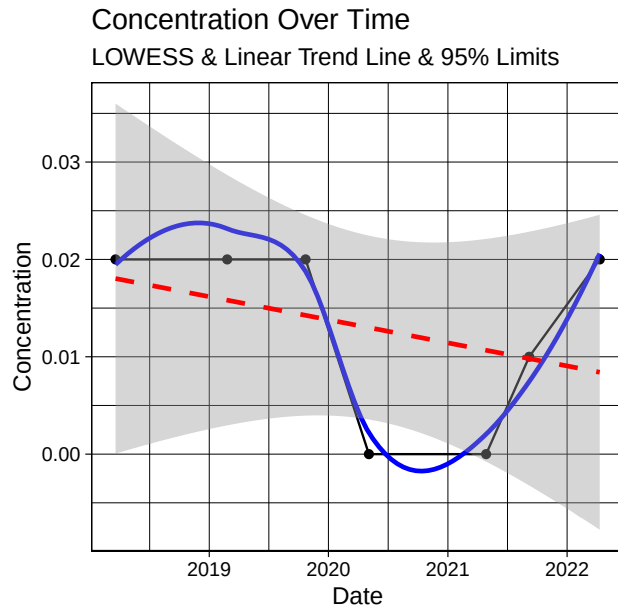
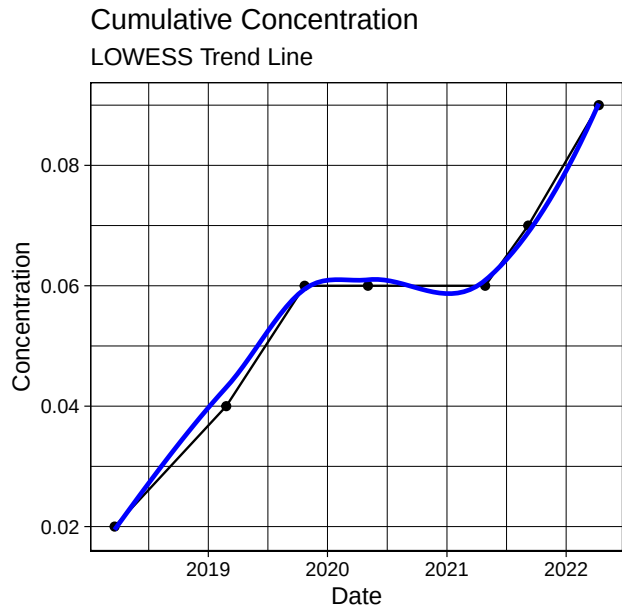
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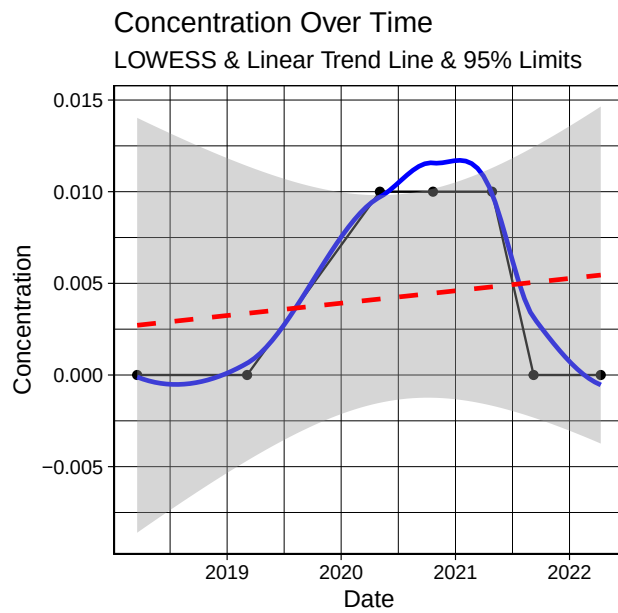
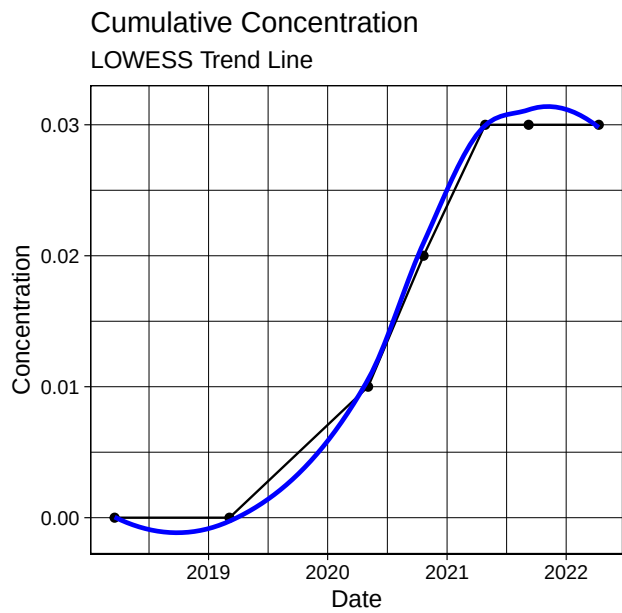
Kendall Trend Test Results Continuous	
n	7
z	-0.51
p	0.61
S	-4
varS	34.67
tau	-0.23
mean	0.01
sd	0.01
cov	0.74
results	STABLE

Report for ID : MW101I and Analyte : PFOA



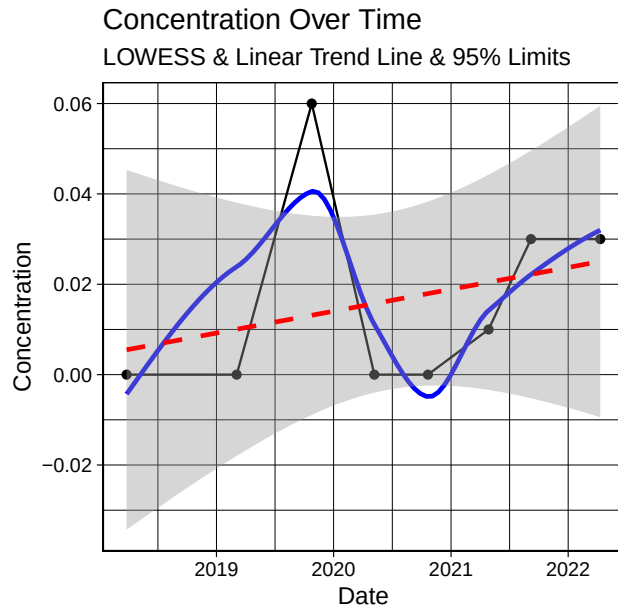
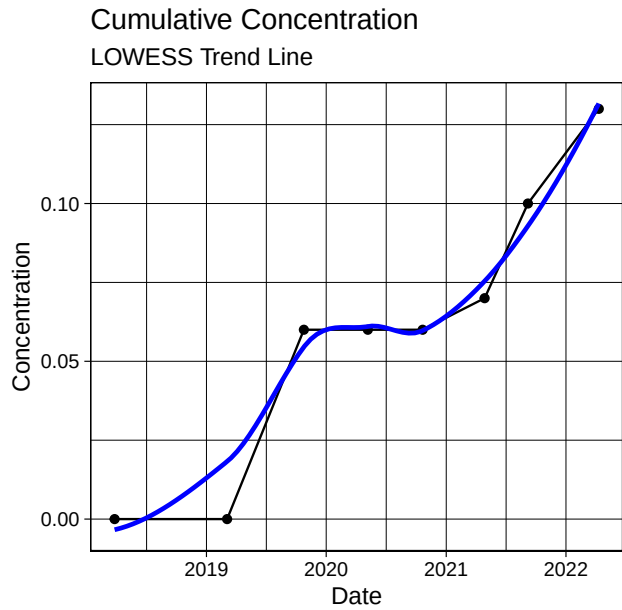
Kendall Trend Test Results Continuous	
n	7
z	0
p	1
S	0
varS	32
tau	0
mean	0
sd	0.01
cov	1.25
results	NO CLEAR TREND

Report for ID : MW102D and Analyte : PFOA



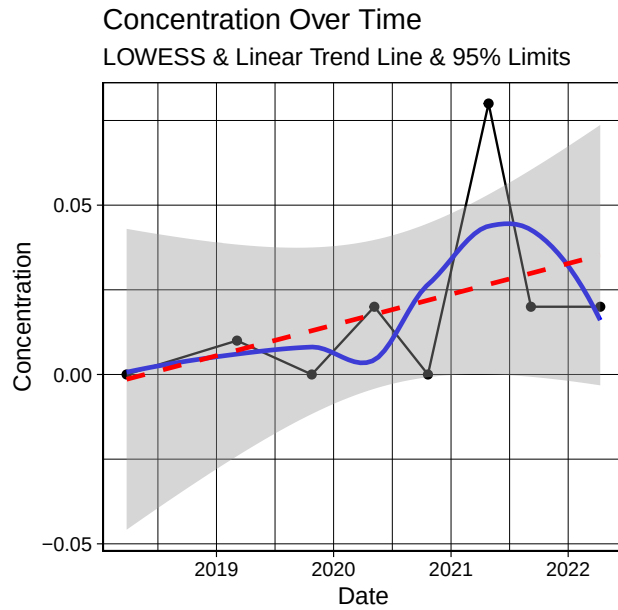
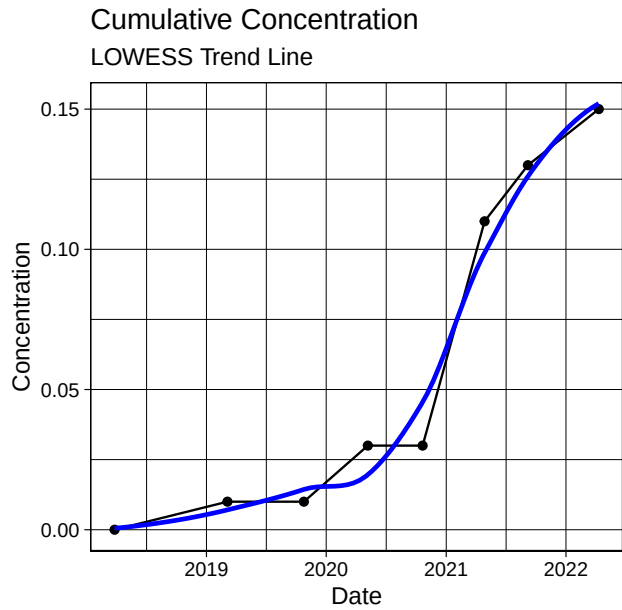
Kendall Trend Test Results Continuous	
n	8
z	1.34
p	0.18
S	11
varS	55.67
tau	0.45
mean	0.02
sd	0.02
cov	1.35
results	NO CLEAR TREND

Report for ID : MW104I and Analyte : PFOA



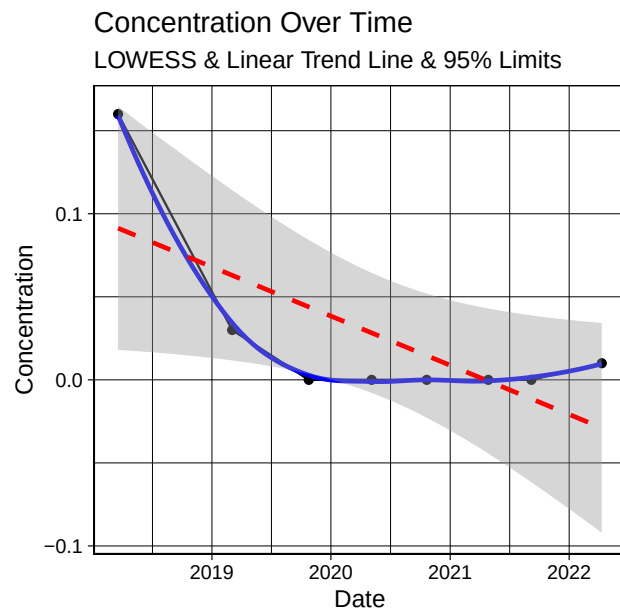
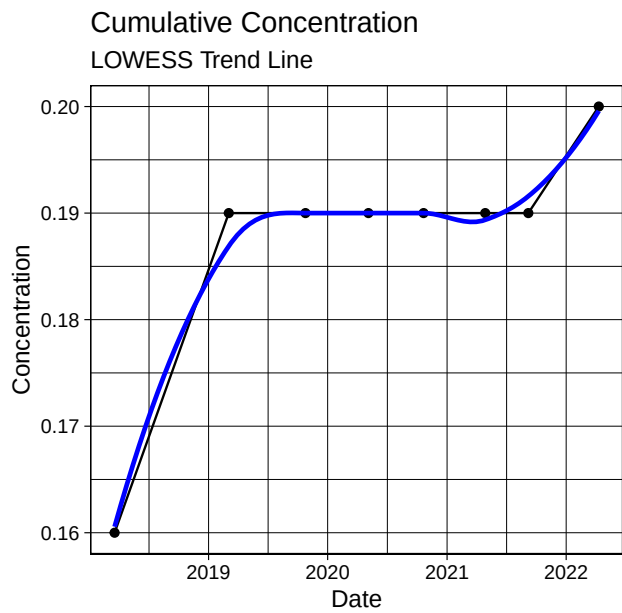
Kendall Trend Test Results Continuous	
n	8
z	1.44
p	0.15
S	12
varS	58
tau	0.48
mean	0.02
sd	0.03
cov	1.41
results	NO CLEAR TREND

Report for ID : MW105D and Analyte : PFOA



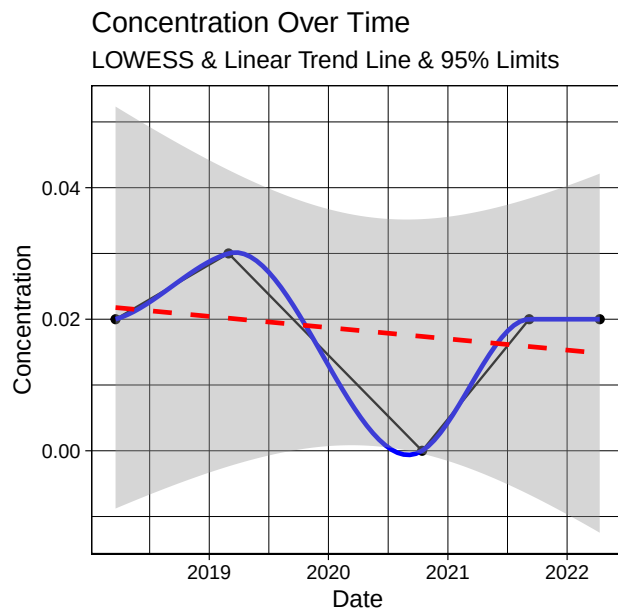
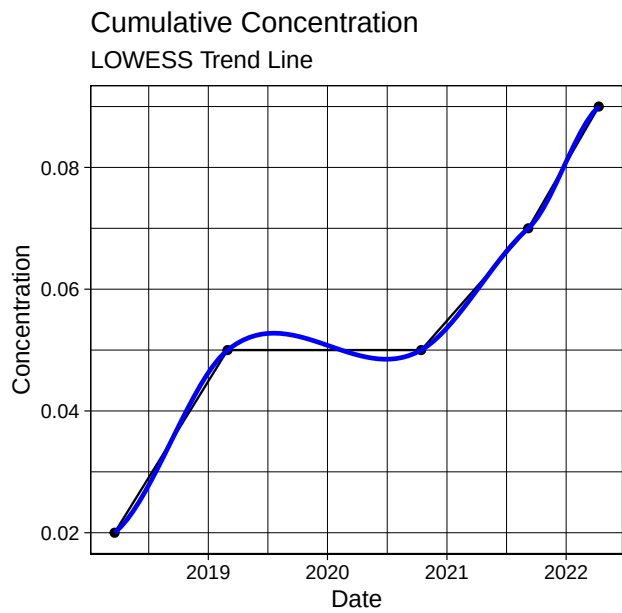
Kendall Trend Test Results Continuous	
n	8
z	-1
p	0.32
S	-8
varS	48.67
tau	-0.36
mean	0.03
sd	0.06
cov	2.22
results	NO CLEAR TREND

Report for ID : MW109S and Analyte : PFOA



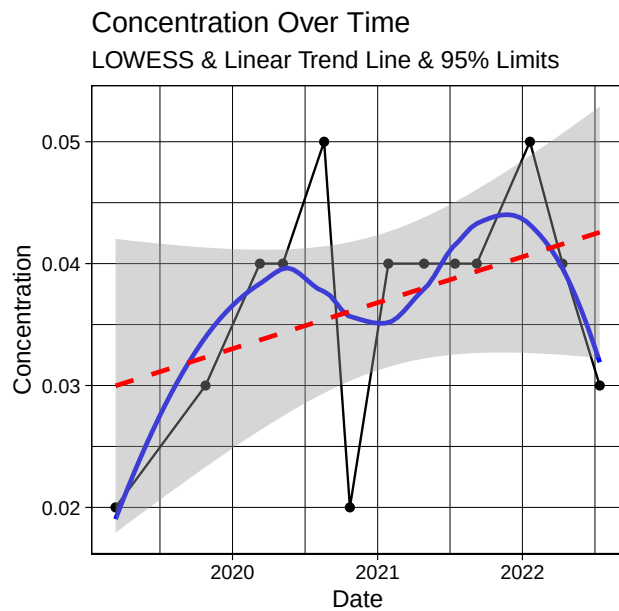
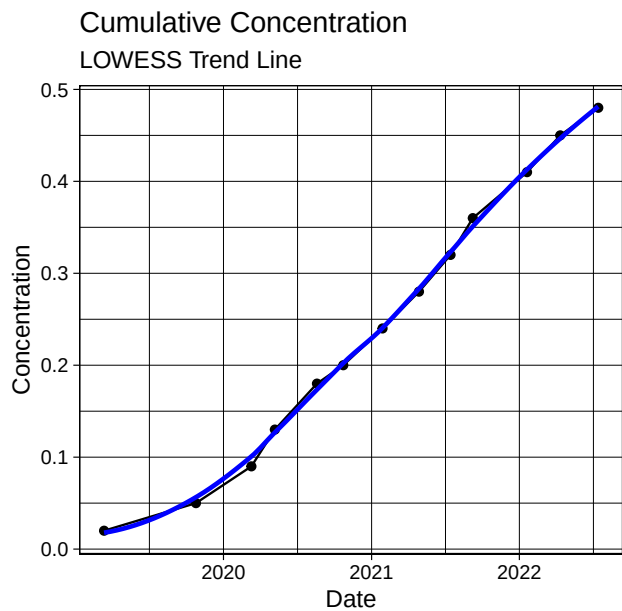
Kendall Trend Test Results Continuous	
n	5
z	0
p	1
S	-1
varS	13
tau	-0.12
mean	0.02
sd	0.01
cov	0.61
results	STABLE

Report for ID : MW114S and Analyte : PFOA



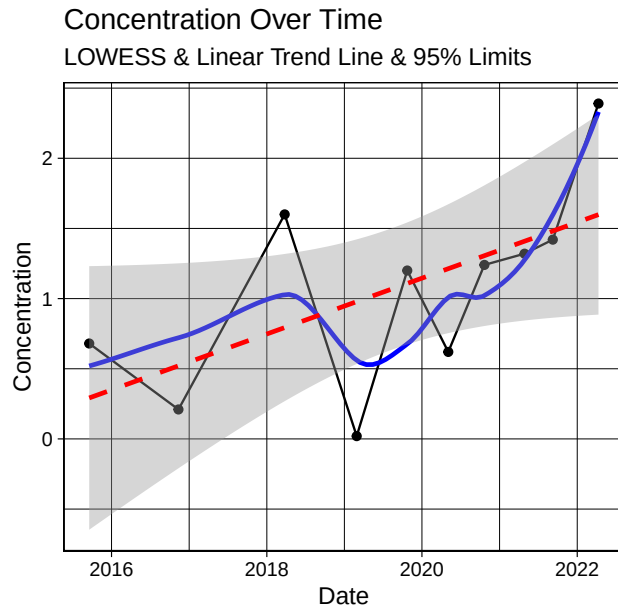
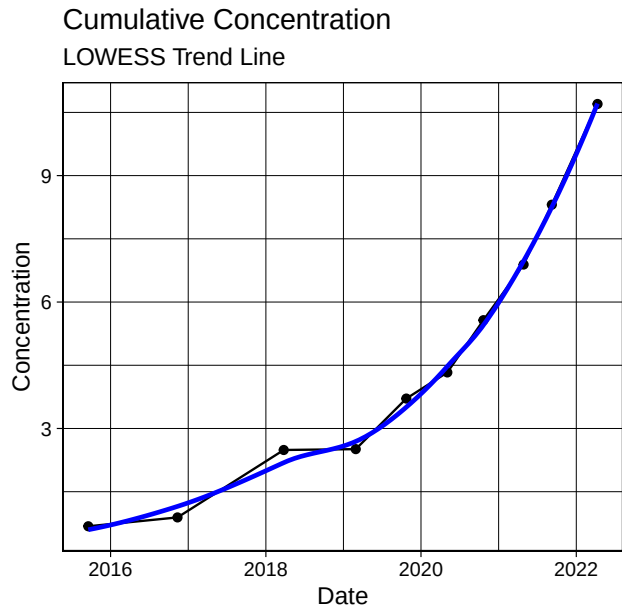
Kendall Trend Test Results Continuous	
n	13
z	1.01
p	0.31
S	16
varS	221.33
tau	0.25
mean	0.04
sd	0.01
cov	0.26
results	NO CLEAR TREND

Report for ID : MW141S and Analyte : PFOA



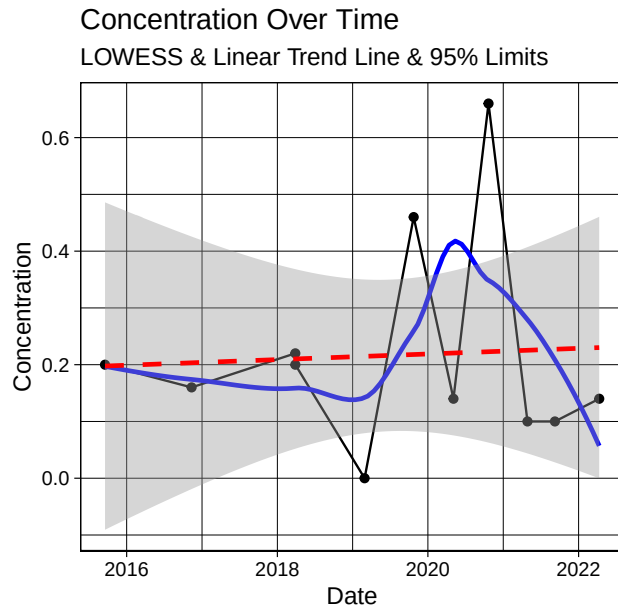
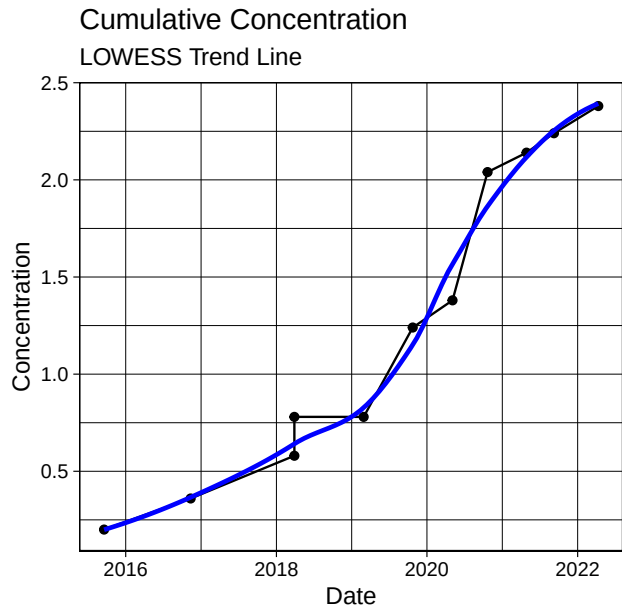
Kendall Trend Test Results Continuous	
n	10
z	1.97
p	0.05
S	23
varS	125
tau	0.51
mean	1.07
sd	0.7
cov	0.66
results	INCREASING

Report for ID : MW301 and Analyte : PFOA



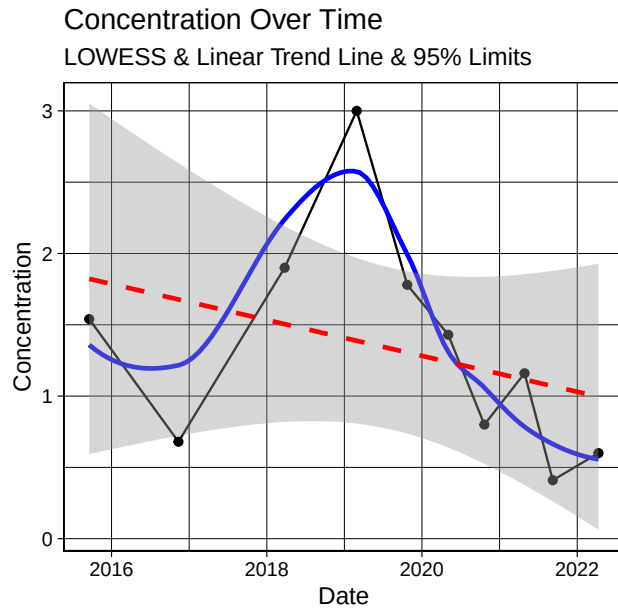
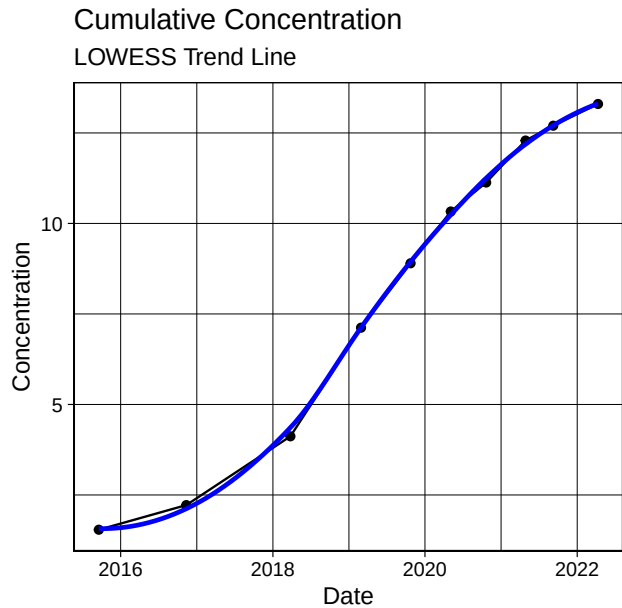
Kendall Trend Test Results Continuous	
n	11
z	-0.71
p	0.48
S	-10
varS	162
tau	-0.19
mean	0.22
sd	0.19
cov	0.86
results	STABLE

Report for ID : MW302 and Analyte : PFOA



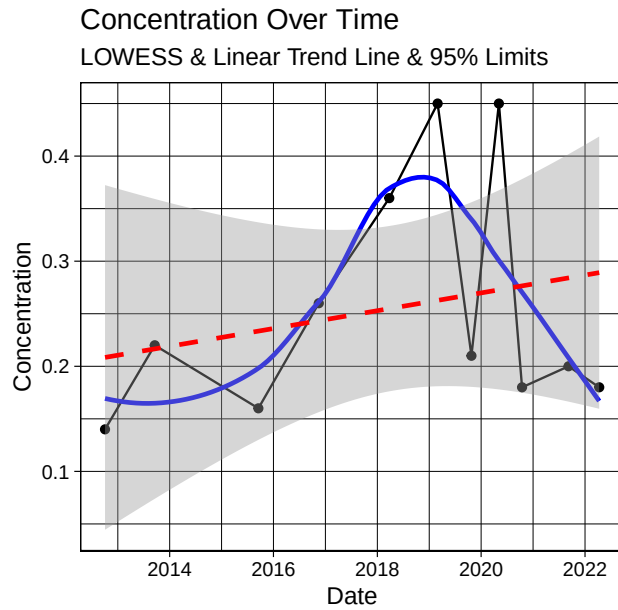
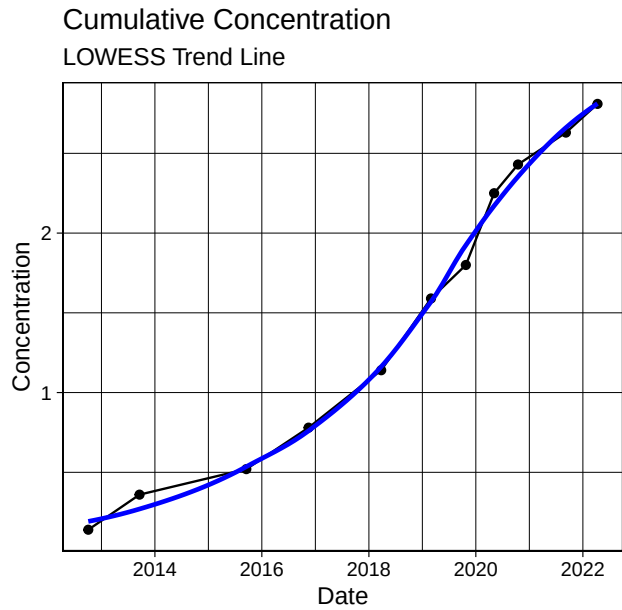
Kendall Trend Test Results Continuous	
n	10
z	-1.79
p	0.07
S	-21
varS	125
tau	-0.47
mean	1.33
sd	0.78
cov	0.59
results	POSSIBLY DECREASING

Report for ID : MW303 and Analyte : PFOA



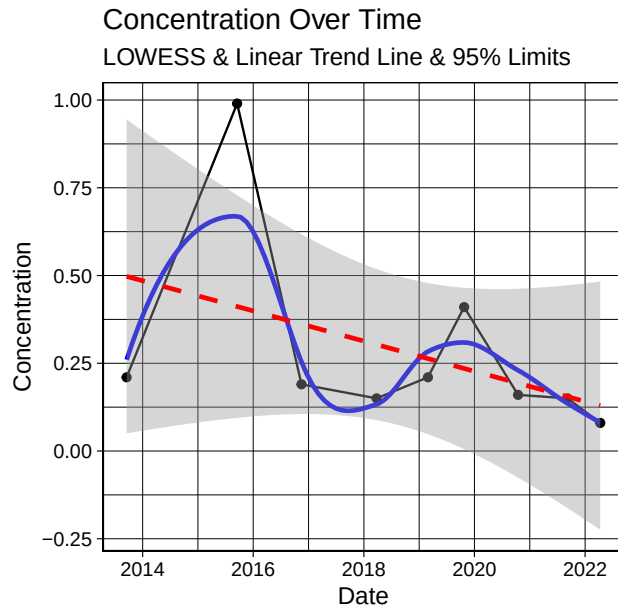
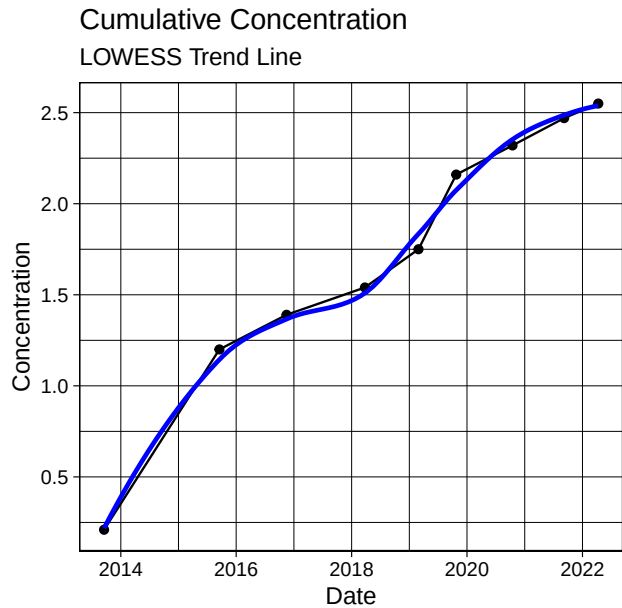
Kendall Trend Test Results Continuous	
n	11
z	0.31
p	0.75
S	5
varS	163
tau	0.09
mean	0.26
sd	0.11
cov	0.44
results	NO CLEAR TREND

Report for ID : MW304 and Analyte : PFOA



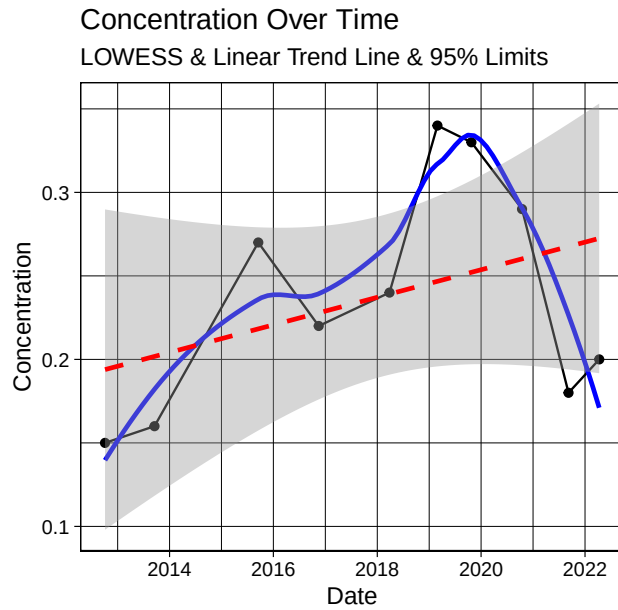
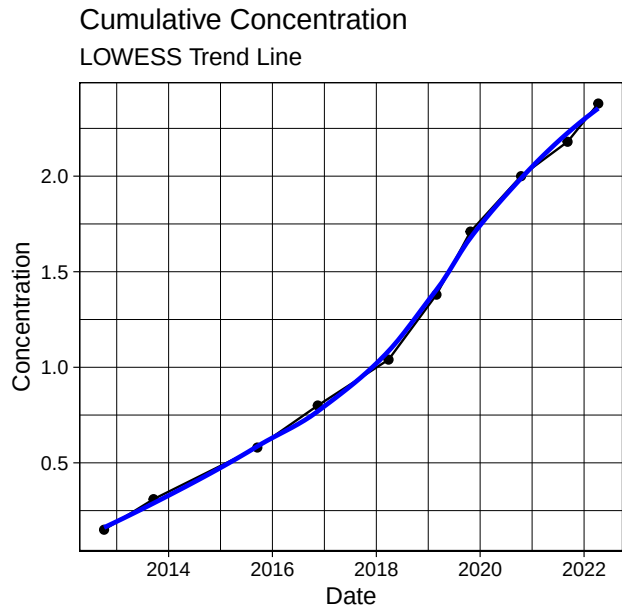
Kendall Trend Test Results Continuous	
n	9
z	-1.79
p	0.07
S	-18
varS	90
tau	-0.51
mean	0.28
sd	0.28
cov	0.99
results	POSSIBLY DECREASING

Report for ID : MW305 and Analyte : PFOA



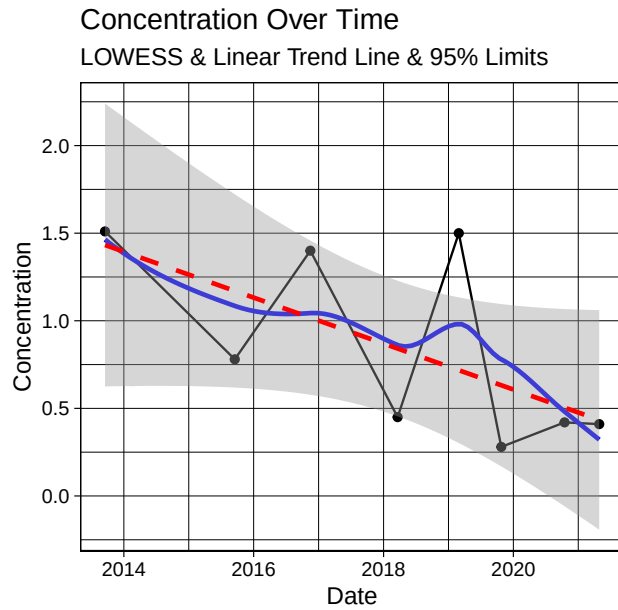
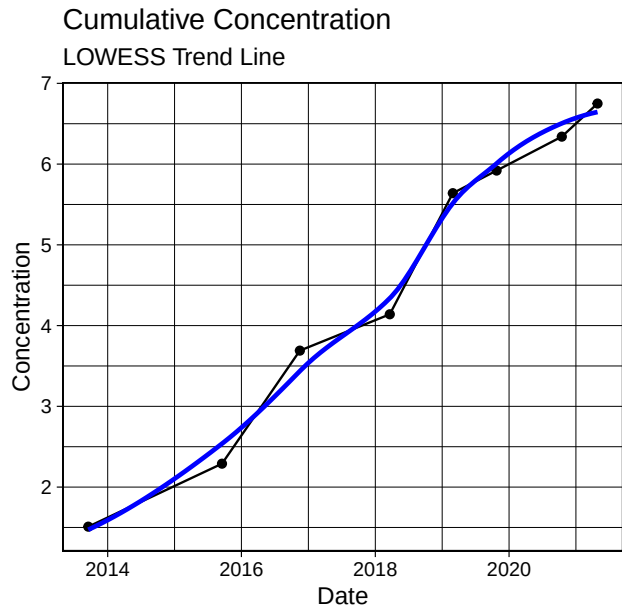
Kendall Trend Test Results Continuous	
n	10
z	0.89
p	0.37
S	11
varS	125
tau	0.24
mean	0.24
sd	0.07
cov	0.29
results	NO CLEAR TREND

Report for ID : MW306 and Analyte : PFOA



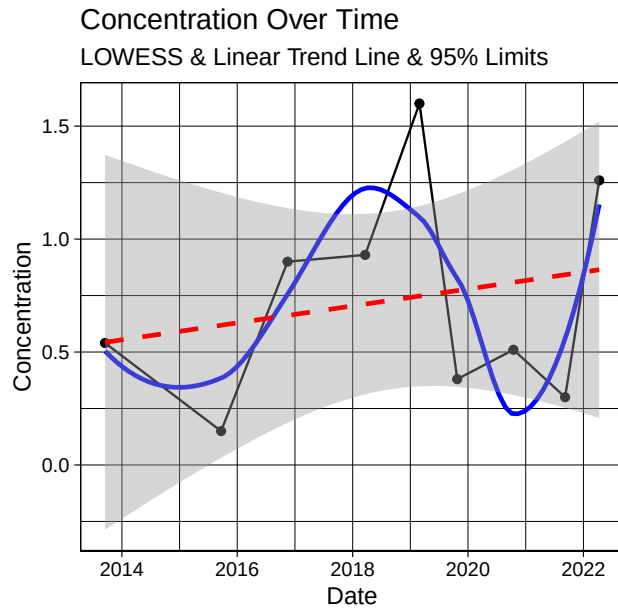
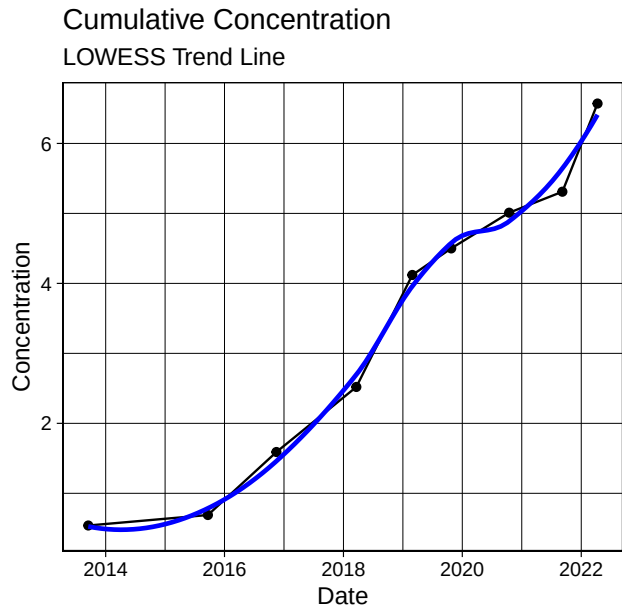
Kendall Trend Test Results Continuous	
n	8
z	-1.86
p	0.06
S	-16
varS	65.33
tau	-0.57
mean	0.84
sd	0.54
cov	0.64
results	POSSIBLY DECREASING

Report for ID : MW307 and Analyte : PFOA



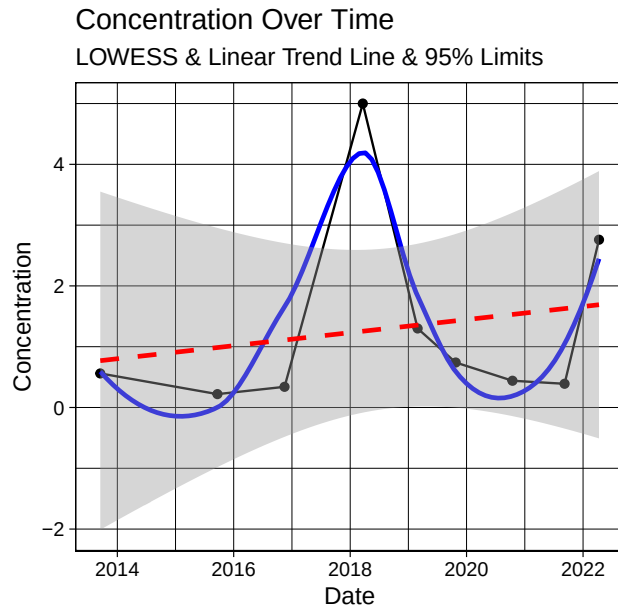
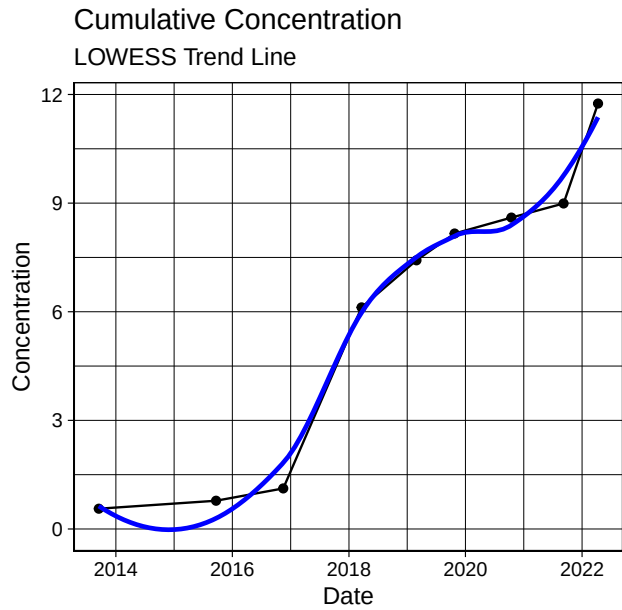
Kendall Trend Test Results Continuous	
n	9
z	0.31
p	0.75
S	4
varS	92
tau	0.11
mean	0.73
sd	0.48
cov	0.66
results	NO CLEAR TREND

Report for ID : MW308 and Analyte : PFOA



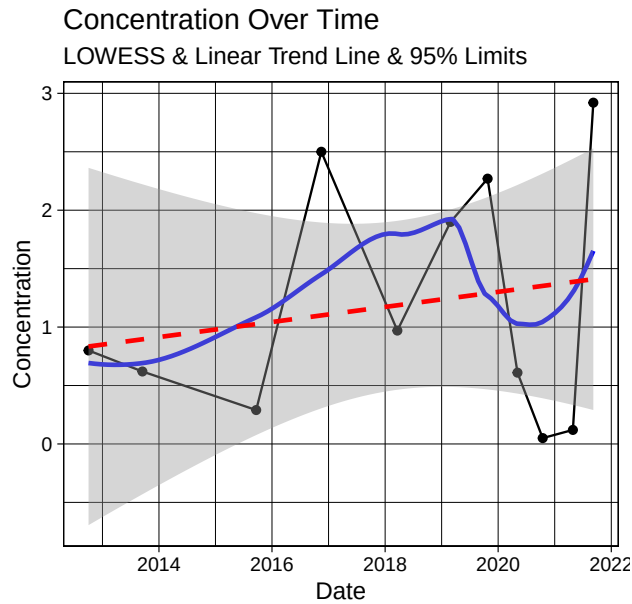
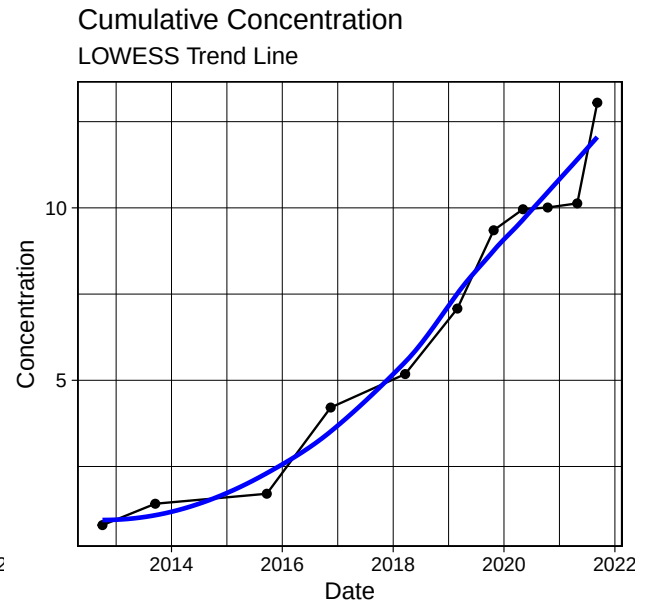
Kendall Trend Test Results Continuous	
n	9
z	0.52
p	0.6
S	6
varS	92
tau	0.17
mean	1.31
sd	1.59
cov	1.22
results	NO CLEAR TREND

Report for ID : MW309 and Analyte : PFOA



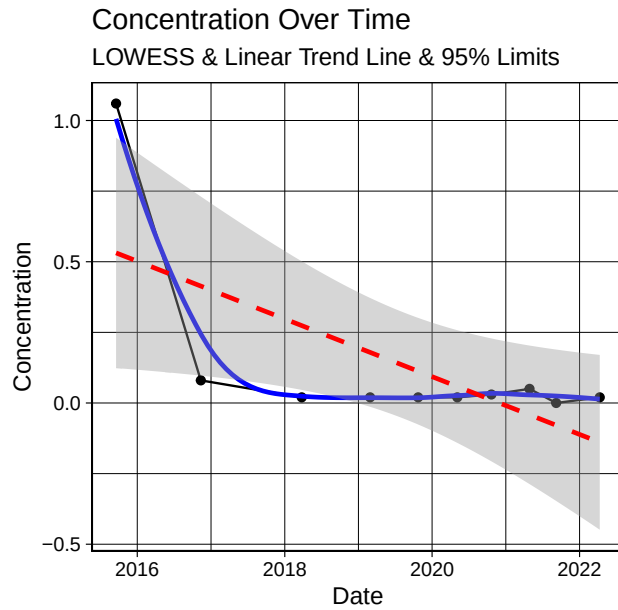
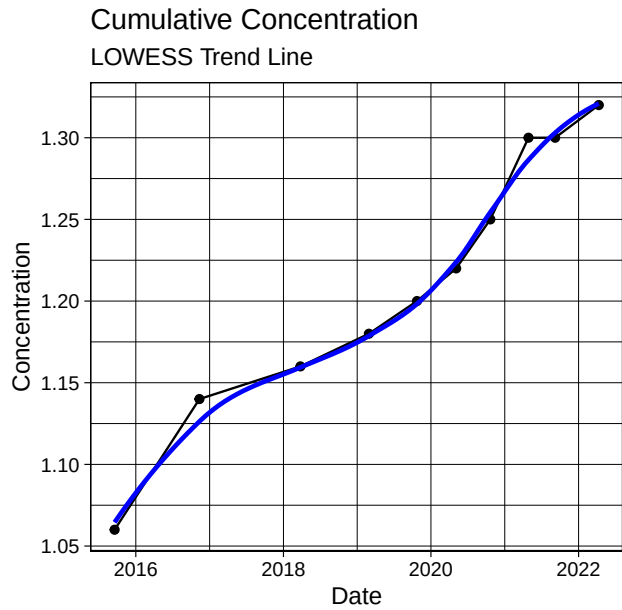
Kendall Trend Test Results Continuous	
n	11
z	0
p	1
S	-1
varS	165
tau	-0.02
mean	1.19
sd	1.02
cov	0.86
results	STABLE

Report for ID : MW310 and Analyte : PFOA



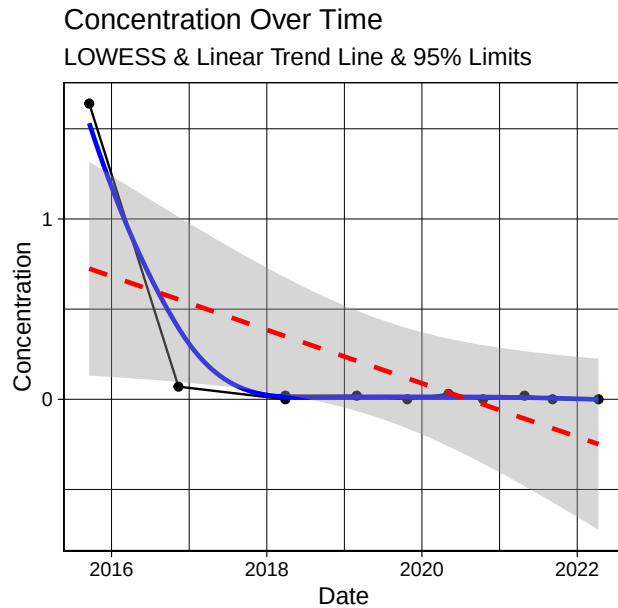
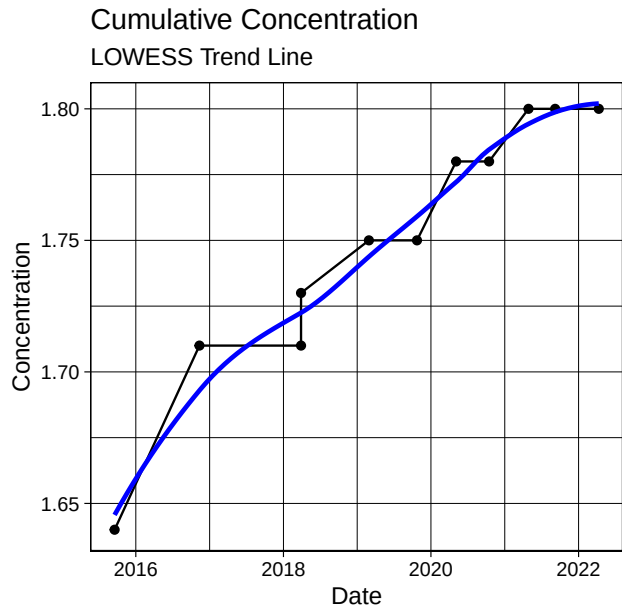
Kendall Trend Test Results Continuous	
n	10
z	-1.35
p	0.18
S	-15
varS	108.33
tau	-0.38
mean	0.13
sd	0.33
cov	2.48
results	NO CLEAR TREND

Report for ID : MW312 and Analyte : PFOA



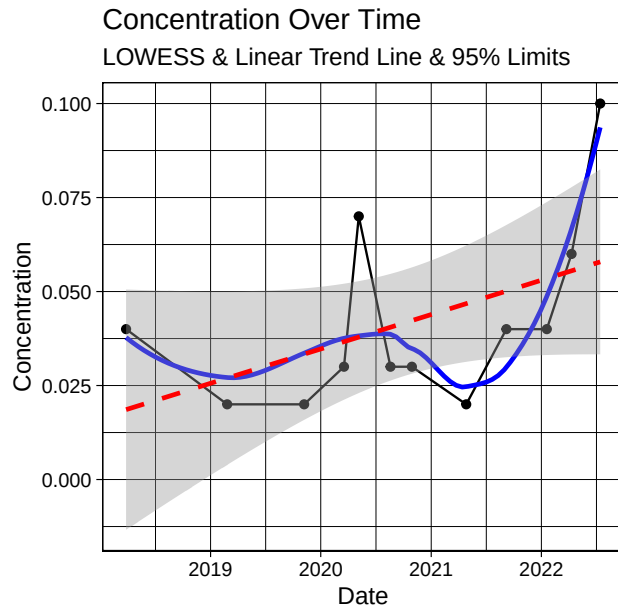
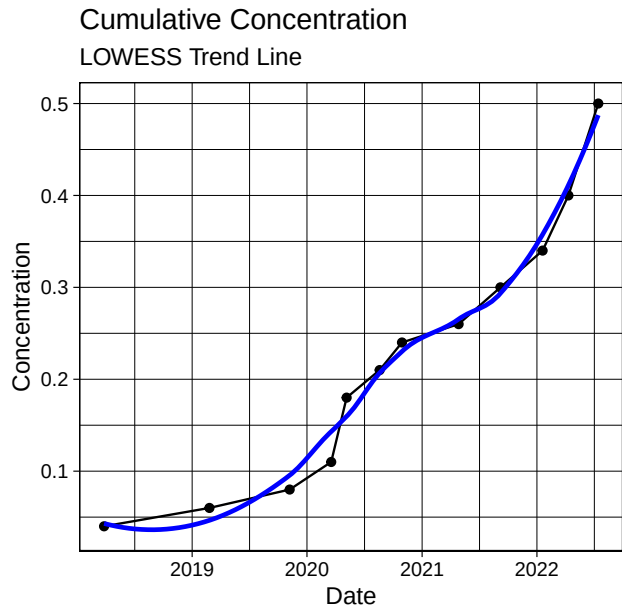
Kendall Trend Test Results Continuous	
n	11
z	-1.91
p	0.06
S	-24
varS	144.67
tau	-0.5
mean	0.16
sd	0.49
cov	3
results	POSSIBLY DECREASING

Report for ID : MW313 and Analyte : PFOA



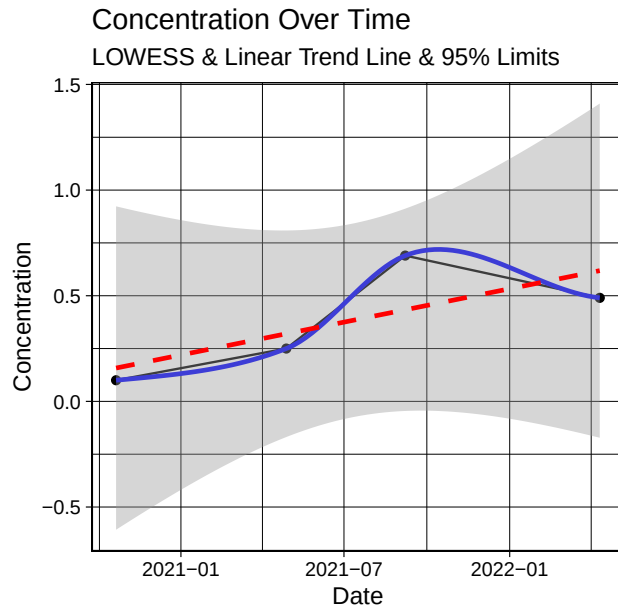
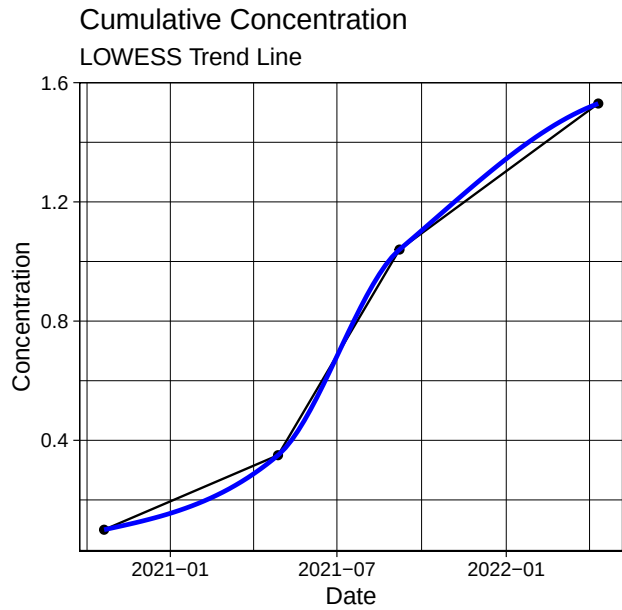
Kendall Trend Test Results Continuous	
n	12
z	1.83
p	0.07
S	27
varS	201.67
tau	0.44
mean	0.04
sd	0.02
cov	0.58
results	POSSIBLY INCREASING

Report for ID : MW402 and Analyte : PFOA



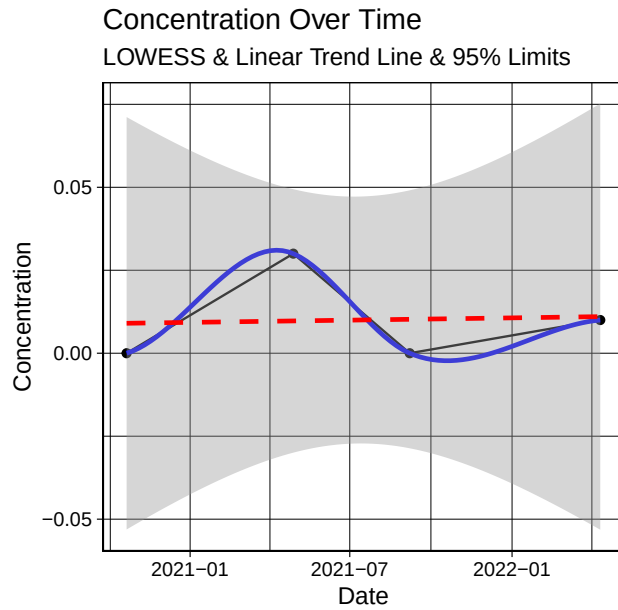
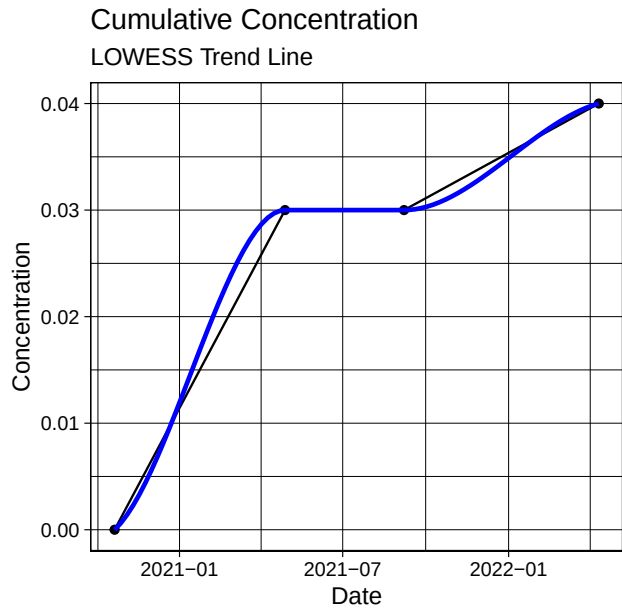
Kendall Trend Test Results Continuous	
n	4
z	1.02
p	0.31
S	4
varS	8.67
tau	0.67
mean	0.38
sd	0.26
cov	0.68
results	NO CLEAR TREND

Report for ID : MW504 and Analyte : PFOA



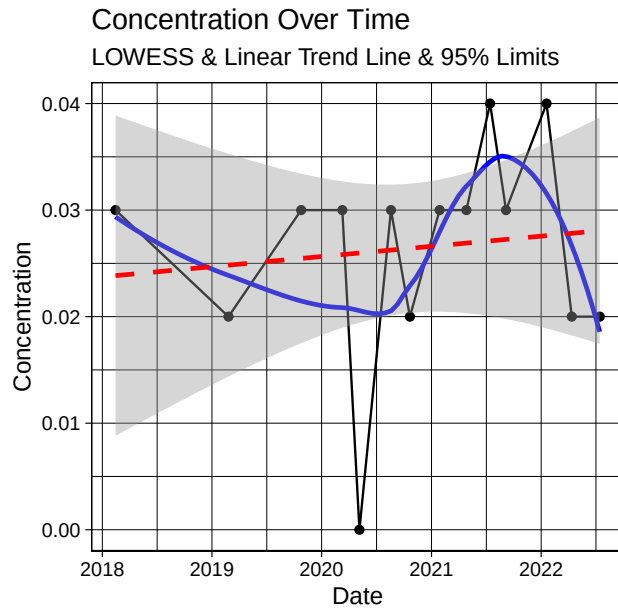
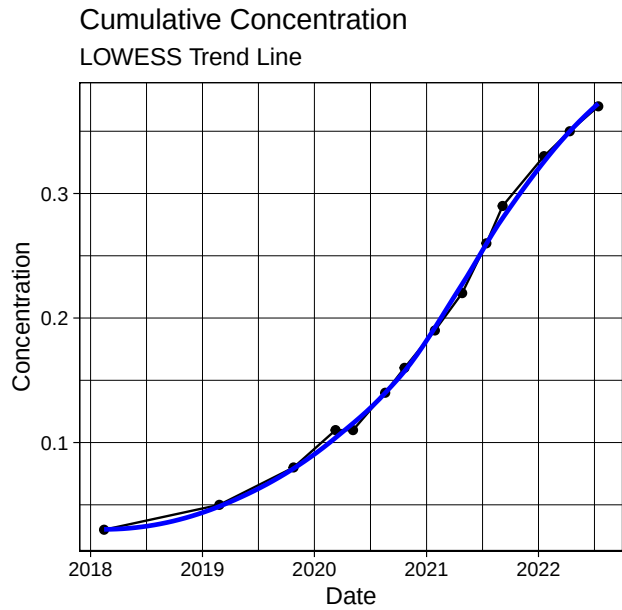
Kendall Trend Test Results Continuous	
n	4
z	0
p	1
S	1
varS	7.67
tau	0.18
mean	0.01
sd	0.01
cov	1.41
results	NO CLEAR TREND

Report for ID : MW505 and Analyte : PFOA



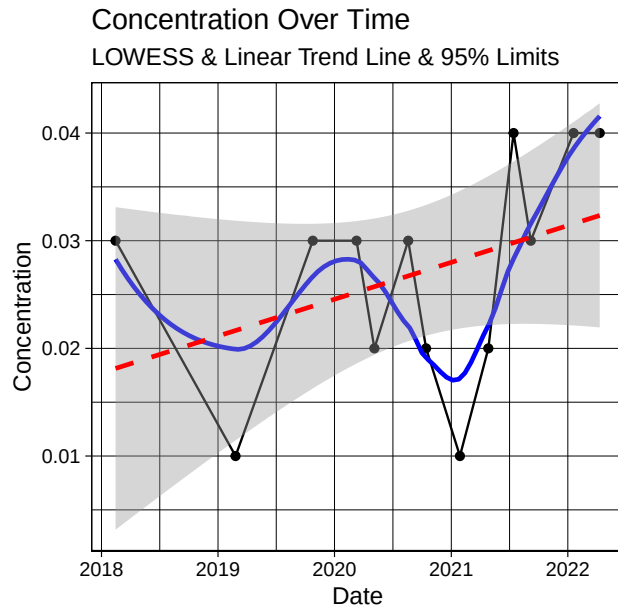
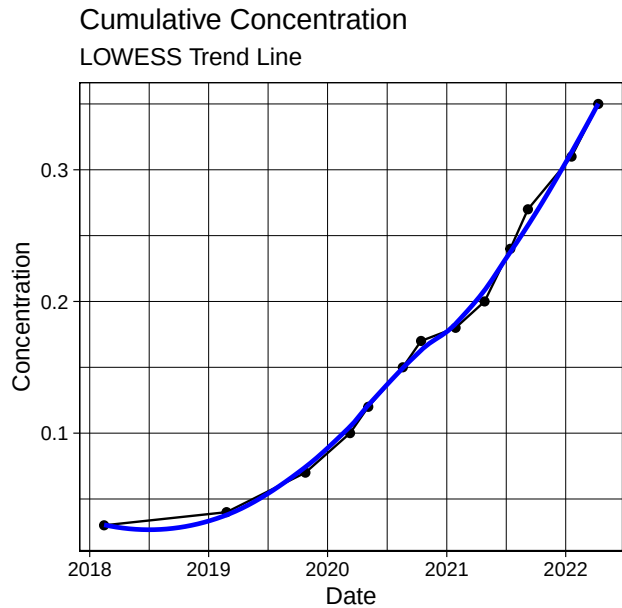
Kendall Trend Test Results Continuous	
n	14
z	0.36
p	0.72
S	7
varS	279.67
tau	0.09
mean	0.03
sd	0.01
cov	0.38
results	NO CLEAR TREND

Report for ID : POT102 and Analyte : PFOA



Kendall Trend Test Results Continuous	
n	13
z	1.41
p	0.16
S	23
varS	243.67
tau	0.33
mean	0.03
sd	0.01
cov	0.38
results	NO CLEAR TREND

Report for ID : POT103 and Analyte : PFOA



Kendall Trend Test Results Continuous	
n	14
z	1.23
p	0.22
S	21
varS	263.67
tau	0.29
mean	0.03
sd	0.01
cov	0.43
results	NO CLEAR TREND

Report for ID : POT104 and Analyte : PFOA

