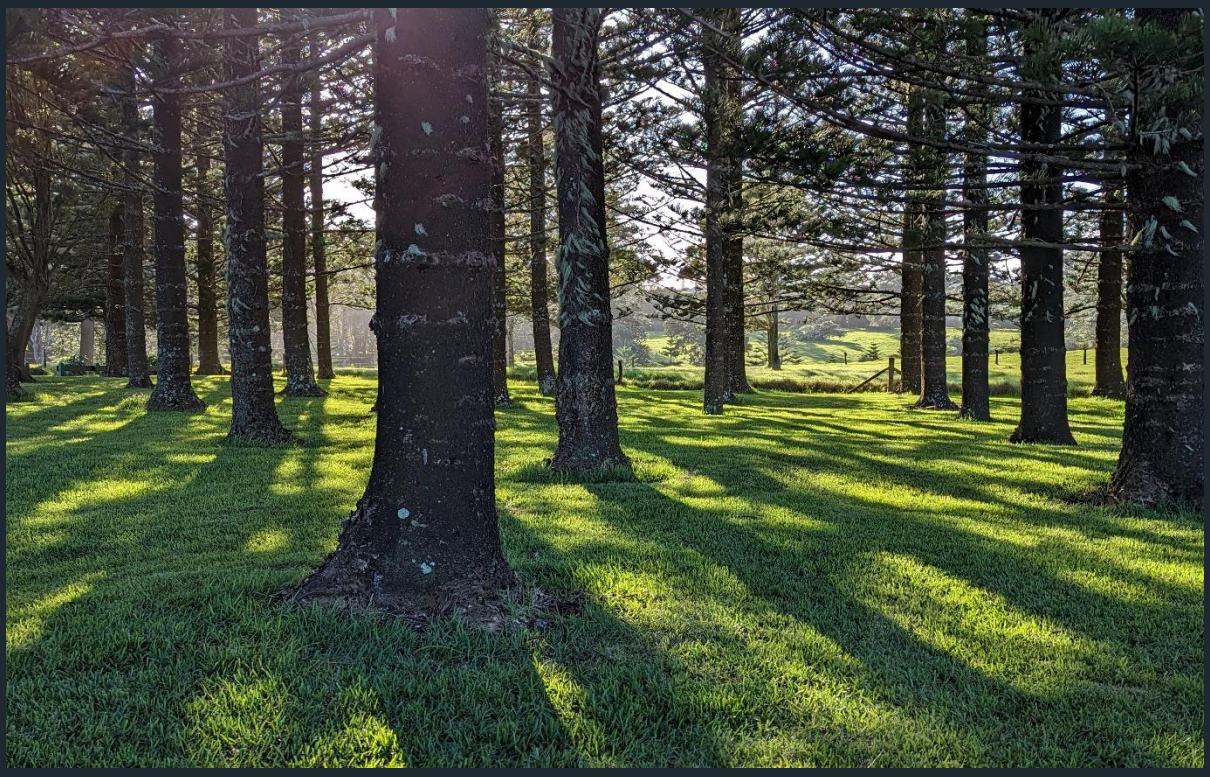

PFAS Ongoing Monitoring Plan - Year 2 Monitoring Report

Norfolk Island Airport

11 October 2023

Document Information

PFAS Ongoing Monitoring Plan - Year 2 Monitoring Report,
Norfolk Island Airport

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Senversa acknowledges the traditional custodians of the land on which this work was created and pay our respect to Elders past and present.

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Executive Summary

Senversa Pty Ltd (Senversa) has been engaged by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA), to implement the second year of the Norfolk Island Airport perfluoroalkyl and polyfluoroalkyl substances (PFAS) Ongoing Monitoring Plan (OMP). The draft PFAS OMP (Senversa, 2021d) establishes the ongoing monitoring actions required to assess the nature and extent of PFAS at the Norfolk Island Airport (the site) and surrounding catchments. The site location and surrounding catchments are indicated on **Figure 1.**

Scope and Objectives

This report details the results of the PFAS OMP Year 2 monitoring event, undertaken in May 2023. The monitoring event comprised:

- Water sampling of tanks and taps on-site (Airport terminal, maintenance shed, fire station, Airport reservoir and Airport Bore).
- Water sampling of tanks and taps on council sites (works depot, waste treatment facility and electrical shed).
- Sampling of surface water downgradient of proposed Airport drainage upgrade works to assess the baseline condition (sediment was collected in one location where surface water was absent).
- Sampling of surface water along Mission Creek and Watermill Creek and at the end of Cascade Creek and Headstone Creek.
- Sampling of surface water within Emily Bay, on the basis of PFAS being detected during the 2022 sampling event in surface water near the discharge point (WC_OMP05).

The objectives of the PFAS OMP Year 2 event were to assess:

- Trends in PFAS concentrations in the environment.
- The effectiveness of the selected management options in managing current risks.
- Whether changing conditions exist which may result in changes in the risk profile (and therefore changes to the required management actions).

Summary of Results

- PFAS concentrations were below the limit of reporting in Emily Bay, indicating that human health and ecological risks are low and acceptable.
- Targeted sampling of 54 surface water and groundwater locations and 1 sediment location was undertaken, with PFAS detected in 28 water samples and 1 sediment sample. The detection of PFAS in many of the samples was anticipated given the targeted sampling design (primarily sampling areas where PFAS had previously been identified).
- Reported concentrations of PFAS in surface water generally decreased between May 2022 and May 2023, however remained relatively consistent with or slightly above concentrations reported in January 2020 and March 2021.
- The increase in PFAS concentrations since 2020/2021 is considered likely to have been primarily through the increased rainfall and subsequent increase in surface water flux transporting PFAS from source areas.
- PFAS concentrations in surface water generally decreased with increased distance from source areas.
- Reported concentrations of PFAS in groundwater marginally decreased between January 2020 and May 2022, and further decreased between May 2022 and May 2023.

- Reported PFAS concentrations were all below the adopted upper trigger values (UTVs)[1]. A number of point-of-use sample locations reported PFAS concentrations below the lower trigger values (LTVs)[2]. The locations with concentrations below the lower trigger values may be removed from the monitoring program following the initial PFAS OMP implementation period.
- Concentrations in water used for watering cattle in Mission Creek remain elevated over LTVs protective of this use, indicating that management is required (consistent with previous results). Concentrations in other creeks are below the UTVs protective of stock water indicating that risks continue to be low and acceptable, and additional management of this pathway outside of Mission Creek is not required.
- Reported PFAS concentrations exceeded the human health drinking water quality guideline in 19 surface water and groundwater samples along Mission Creek, Watermill Creek and from groundwater bores. These surface water and groundwater locations are not known to be a source of water for human consumption.
- Senversa believes the selected management options are appropriate for the purpose of managing current risks, however further management options for cattle access to PFAS Mission Creek and the use of airport bore water require further consideration. The current management options for public water use also require consideration, as water concentrations in public facilities such as the Airport terminal, electrical shed, waste transfer facility, council works depot and fire station were reported below the guidance values. Therefore it is possible to recommence use of the reticulated supply at these facilities.

Additional and ongoing management controls carried forward from the PFAS OMP Year 2 monitoring report are outlined below:

Table 1-1: PFAS Risk Management Actions Summary

Risk Identification	Do Existing Management Measures Mitigate Risks?	Recommended Additional or Ongoing Controls
1. Home consumption or public consumption of cattle, chicken eggs or other animal products where the animal drinks water sourced from Mission Creek.	**Yes** Advice provided to continue not using water for chicken watering.	The findings from this monitoring round confirm the previous recommendations for further management of the use of water from Mission Creek for watering cattle: • Restrictions on cattle or other animal access to PFAS impacted water sources requires further consideration, with PFAS concentrations during this monitoring event remaining consistent with those measured in 2022, and above those measured in earlier sampling (2020 and 2021), following which it was assessed that management was required. • Alternatively, measures to manage human exposure (e.g. livestock product consumption advice) could be considered. For chickens at ID013, PFAS was <LOR in the currently used water supply (ID013_BORE). Continued monitoring of this water supply is required, Previous advice to livestock farmers and vegetable farmers remains unchanged and use of water from Mission Creek (ID013_SW01) for watering chickens should not be recommenced.

[1] Thresholds established to assess if additional management is required beyond that already underway or recommended.
[2] Thresholds established to assess if current management measures can be reduced.

Risk Identification	Do Existing Management Measures Mitigate Risks?	Recommended Additional or Ongoing Controls
2. Use of surface water or groundwater water for any extractive use (other than livestock watering) from the Mission Creek Catchment.	**Yes** There are no current unacceptable exposures identified; and advice has been provided not to use water for drinking / domestic use.	Continued monitoring to establish that produce irrigation risks at ID013 and ID016 remain acceptable. Future controls on changing water use required.
3. Use of groundwater from or nearby the Airport for any extractive use.	**Yes** There are no current extractive uses of water identified, with the exception of uses assessed to be associated with low and acceptable risks. The Airport Bore appears to have been successfully disconnected from extractive uses, with the possible exception of the Airport truck fill. This fill point was locked at the time of sampling, as previously recommended.	Potential treatment of extracted bore water proposed to increase potential uses, including the filtration system previously installed at the fire station.
4. Drinking or washing water at public facilities formerly supplied by the Airport Bore including: the fire station, other on-Airport buildings, hospital, council works depot and public toilets.	**Yes** Sampling undertaken at public facilities including the Airport terminal, electrical shed, waste transfer centre, council works depot and fire station indicate that replacement of PFAS impacted reticulated water systems has been successful in reducing PFAS concentrations to levels below the guidance values. This means it is possible to recommence use of the reticulated water supply at these facilities, as it is safe to use the water, including for sensitive uses such as drinking and eating.	Continued controls are required such that PFAS impacted water (e.g., Airport Bore) is not used to supply drinking water while above HBGV. This includes the lock on the Douglas Drive fill point. PFAS was previously identified in taps from public toilets across the island. Resampling of these taps was not completed as part of this monitoring round. Where PFAS is present in water in public toilets, the potential for exposure (e.g. during hand washing) will be relatively low given the frequency and duration of exposure, and the limited potential for PFAS absorption through the skin. Signage is understood to be at place at toilet facilities across the island to indicate the water should not be drunk. This signage should be maintained to manage potential exposures to PFAS.
5. Use of surface water or groundwater for drinking water or domestic use from the Upper Watermill Creek Catchment.	**Yes** No current use of water for drinking water or domestic use identified, and advice has been provided not to use water for drinking / domestic use.	Continued ongoing monitoring of PFAS concentrations in Watermill Creek, with a view to revising advice if concentrations decrease below the guidance value in the future.
6. Exposures to freshwater aquatic ecosystems.	**Pending source management**	Continued ongoing monitoring of PFAS concentrations, with a view to future ecological risk revision if ecosystem health is identified to be improving.
7. Exposures to marine aquatic ecosystems and recreational marine water use in Emily Bay.	**Yes** No detections of PFAS within Emily Bay in 2023.	Continued ongoing monitoring of PFAS concentrations in Watermill Creek, with a view to revising advice if concentrations decrease below the guidance value in the future.

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List of Acronyms

Acronym	Definition
AFFF	Aqueous Film Forming Foam
ALS	Australian Laboratory Services
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand Guidelines
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BoM	Bureau of Meteorology
COC	Chain of Custody
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEH	Department of the Environment and Heritage
DITCRD	The Department for Infrastructure, Transport, Cities and Regional Development
DITRDCA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
DO	Dissolved Oxygen
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DSI	Detailed Site Investigation
EC	Electric Conductivity
ESLs	Ecological Screening Levels
FSANZ	Food Standards Australia New Zealand
ha	Hectare
HBGV	Health-Based Guidance Value
HEPA	Heads of Environment Protection Authority
HHERA	Human Health and Ecological Risk Assessment
HSLs	Health-based Screening Level
KAVHA	Kingston and Arthurs Vale Historic Area

Acronym	Definition
km	Kilometre
LOR	Limit of Reporting
LTV	Lower Trigger Values
m	Metre
mg/kg	Milligram per Kilogram
mg/L	Milligram per Litre
mm	Millimetre
mV	Millivolts
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NIRC	Norfolk Island Regional Council
NM	Not Measured
NSW	New South Wales
OMP	Ongoing Monitoring Plan
PFAS	Per- and Poly-Fluoroalkyl Substances
PFHxS	Perfluorohexane Sulfonate
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PMP	PFAS Management Plan
POET	Point of Entry Treatment
PSI	Preliminary Site Investigation
QAQC	Quality Assurance and Quality Control
SAQP	Sampling and Analysis Quality Plan

Acronym	Definition
TOC	Total Organic Carbon
µg/L	Micro Gram per Litre
µS/cm	Micro Siemens per Centimetre
UTV	Upper Trigger Values
WTC	Water Transfer Centre

1.0 Introduction

Senversa Pty Ltd (Senversa) has been engaged by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA), to implement the Norfolk Island Airport perfluoroalkyl and polyfluoroalkyl substances (PFAS) Ongoing Monitoring Plan (OMP). The draft OMP (Senversa, 2021d) establishes the ongoing monitoring actions required to assess the nature and extent of PFAS at the Norfolk Island Airport (the site) and surrounding catchments to ensure suitable management actions can be employed. The site location and surrounding catchments are indicated on **Figure 1.**

This report details the results of the PFAS OMP Year 2 monitoring event, undertaken in May 2023.

1.1 Background

Norfolk Island Airport PFAS investigations were initiated after a CSIRO-led assessment of water resources identified elevated levels of PFAS in the Mission Creek water catchment in December 2019[3]. In January 2020, Senversa commenced a Preliminary Site Investigation (PSI) which found that legacy aqueous film-forming foam (AFFF) containing PFAS was used on Norfolk Island from the early 1980s until 2015 to supress liquid fuel fires and for fire training activities, and confirmed the presence of PFAS in the Mission Creek catchment, together with some other areas of the island (at lower concentrations). These findings were confirmed in a Detailed Site Investigation (DSI) and potentially unacceptable risks were quantitatively assessed in a Human Health and Ecological Risk Assessment (HHERA).

Based on the results of the DSI and the HHERA, risks were assessed as low and acceptable for many of the ways in which people might be exposed to PFAS in the environment, including drinking water. Due to the presence of PFAS in the environment, a PFAS Management Plan (PMP) was prepared to manage some uses of water. The strategy includes actions to manage PFAS sources on the Airport (aimed at reducing the migration of PFAS from the Airport over the longer term) and specific management actions to manage people's exposure to PFAS, including:

- Managing the use of water from Mission Creek for watering cattle or chickens.
- Continued management of water use for drinking water / domestic use more broadly.

The PFAS Ongoing Monitoring Plan (OMP) was developed to support the implementation of the PMP by assessing changing conditions on-island to determine if the current management actions remain appropriate to manage risks. A Sampling and Analysis Quality Plan (SAQP) was prepared to guide the field works proposed to be undertaken during completion of the PFAS OMP Year 2 monitoring event.

Key reports are listed below:

- Senversa, 2021a. Preliminary Site Investigation into Per- and Polyfluoroalkyl Substances (PFAS), Norfolk Island Airport, revision 2, dated 3 February 2021.
- Senversa, 2021b. Detailed Site Investigation into Per- and Polyfluoroalkyl Substances (PFAS), Norfolk Island Airport, revision 5, dated 12 November 2021.
- Senversa, 2021c. Human Health and Ecological Risk Assessment (PFAS), Norfolk Island Airport, revision 3, dated 12 November 2021.
- Senversa 2021d. *Ongoing Monitoring Plan, Norfolk Island Airport,* revision 0, dated 24 November 2021.

[3] Commonwealth Scientific and Industrial Research Organisation (2020). *Norfolk Island Water Resource Assessment Hydrology Report. A summary report from the CSIRO Norfolk Island Water Resource Assessment, CSIRO, Australia.*

- Senversa 2021e. *PFAS Management Plan, Norfolk Island Airport,* revision 1, dated 10 December 2021.
- Senversa, 2022a. *PFAS Sampling and Analysis Quality Plan – Year 1 Ongoing Monitoring*, revision 0, dated 3 May 2022.
- Senversa 2022b. *PFAS Ongoing Monitoring Plan - Year 1 Monitoring Report, Norfolk Island Airport*, revision 1, dated 14 October 2022.

1.2 Objectives

The overall objective of the PFAS OMP is to establish the ongoing monitoring required to assess:

- Trends in PFAS concentrations in the environment.
- The effectiveness of the selected management options in managing current risks.
- Whether changing conditions exist which may result in changes in the risk profile (and therefore changes to the required management actions).

The objective of the Year 2 monitoring event was to meet the requirements of the PFAS OMP for the second annual monitoring event and to assess temporal variations in PFAS concentrations.

Information from the monitoring program will be used on an ongoing basis to identify whether the currently selected management actions should change. Future changes to the management actions could be:

- **Additional** required actions (for instance where additional water uses are identified, or if PFAS concentrations in the environment increase).
- **Reduced** required actions (for instance where lower PFAS concentrations in the environment mean that previously established management actions are no longer necessary to manage risks).

1.3 Scope of Works

To achieve the above objectives, Senversa completed the following scope of work:

- Water sampling of tanks and taps on-site (Airport terminal, waste treatment facility, maintenance shed, council works depot, fire station, airport reservoir and Airport Bore).
- Sampling of surface water along Mission Creek, Watermill Creek and the end of Cascade Creek and Headstone Creek.
- Sampling of surface water within Emily Bay.
- Sampling of sediment associated with proposed Airport drainage upgrade works.
- Preparation of this PFAS OMP Year 2 Monitoring Report.

2.0 Background

2.1 Site Details

Site identifying details are summarised below.

Table 2-1: Site Details

Item	Relevant Site Information
Site Location	The site location is indicated on **Figure 1.**
Site Area	~120 hectares (ha).
Site Use	The site layout is indicated on **Figure 2**. The site is primarily used for aviation purposes with approximately one freight and six commercial flights arriving weekly. Medivac planes arrive/depart the Airport for medical transport services (when required). Key site features include: • Operational Airport with two runways. • Aircraft and Airport operational infrastructure in the northeast portion of the site, including terminals, storage and cargo facilities. • Maintenance facilities in the mid-eastern portion of the site. • Fire station in the mid-eastern portion of the site, south of the maintenance facilities. • Waste management centre and Bureau of Meteorology (BoM) facility in the northern portion of the site. • Wastewater treatment plant in the central northern portion of the site. • The fire training facility.
Site Zoning	• Site: light industry land use. • Surrounding land: rural and rural residential land use.

2.2 Environmental Setting

The environmental setting is summarised below in **Table 2-2**. Further environmental setting details are outlined in the DSI (Senversa, 2021b).

Table 2-2: Environmental Setting

Item	Description
Surrounding Land Uses	• **North**: Mission Creek is located to the immediate north-west of the site followed by St Barnabas Chapel, rural properties and Headstone Reserve. The Norfolk Island National Park is located approximately 2 kilometres (km) to the north of the site. • **East**: Northeast of the site is the township of Burnt Pine, consisting of mixed land use. The land to the immediate east consists of rural and rural residential land. • **South**: Rural residential properties, Point Ross and Bumboras Reserves followed by the South Pacific Ocean approximately 400 metres (m) from the most southern point of the site. • **West**: Rural residential properties, Rocky Point and 100 Acres Reserve followed by the South Pacific Ocean approximately 400 m from the most western point of the site.
Climate	Norfolk Island is classified as a sub-tropical climate which is primarily affected by high-pressure systems which fluctuate over the island annually. The mean maximum temperatures on the island range from 18°C in winter to 25°C in summer with a high average relative humidity of 73% to 81% (BoM, 2022). Norfolk Island's median annual rainfall is 1,288 mm with the highest rainfall between May to August and monthly means of approximately 125 to 143 mm. The driest month is typically November with an average rainfall of 74 mm (BoM, 2022). Rainfall on the island between 2016 and early 2020 was below average and little to no rain fell on the island between October 2019 and January 2020 (BoM, 2022). Above average rainfall was recorded from January to May 2023 preceding the Year 2 monitoring event.
Topography	The Airport site is generally flat, between 95 and 115 m above sea level (Geoscience Australia, 2020). The surrounding island undulates rapidly with several water catchment zones creating steep valleys and low-lying creeks.
On-Site Drainage Network	On-site stormwater in the north-east of site drains into a low-lying area on the boundary of the site into a stormwater drainage pipe which runs perpendicular to and under the road leading to the waste treatment centre. This stormwater drainage is understood to discharge into Mission Creek. Across the Airport in general, stormwater is expected to run towards the site boundary, away from the runways.
Hydrology	Creeks are largely ephemeral, flowing only during rainfall events. Water catchment zones are shown on **Figure 1**. Mission Creek, Headstone Creek, Watermill / Town Creek and Rocky Point Creek are considered down-gradient of the Airport, with the Mission Creek Catchment considered the most vulnerable to PFAS impacts migrating from the Airport due to historical Fire Training activities undertaken on that side of the Airport which used AFFF containing PFAS. All creeks discharge to the South Pacific Ocean.
Geology and Soils	Norfolk Island is the erosional remnant of Pliocene aged volcanic centres located on a north trending continental ridge between New Zealand and North Caledonia (Abell, R S & Falkland A C, 1991). The island consists of the former shield volcano (Mt Pitt) and horizontal basalt flows. The prominent soil type found at and surrounding the site is the Rooty Hill Clay.
Acid Sulphate Soils	Peaty acid sulfate soils are present in the lower landscape portion of the island, with the largest known area located in the lower portion of the Mission Creek Catchment.
Hydrogeology	The following hydrostratigraphic sequence is recorded (Abell, 1993): • Weathered volcanic mantle: Major aquifer on the island, porous but clayey. The upper water table on Norfolk sits within the weathered mantle. • Basaltic lavas: Heterogeneous water-bearing systems, dominated by water movement through fractures, joints and bedding. • Vertical movement of groundwater through fractures in the basalt likely form localised, semi-confined aquifers within tuff beds and fragmented layers. The heterogeneous nature of basaltic aquifers results in a complex groundwater flow regime. In general, groundwater flow follows, to a subdued degree, topographic features, discharging to surface water bodies and further towards the coastline.
Terrestrial Environments	Limited on-site flora and fauna are present due to the highly modified nature of the Airport environment. Prior to European settlement, Norfolk Island was dominated by subtropical rainforest and native flora of which over 30% is endemic (CSIRO, 2020). A large proportion of the island has been cleared for farmland used for grazing or cropping, with intact native communities being largely restricted to the 6.5 km^2 Norfolk Island National Park centred around Mount Bates and Mount Pitt.

2.3 Confirmed and Potential PFAS Source Areas

The PSI and DSI identified 17 confirmed or potential PFAS source areas, indicated on **Figure 2-1** below and appended **Figure 2**.

The identified sources included six potential PFAS primary source areas within the Airport. These are assessed as the most significant potential sources which may have contributed to the elevated PFAS concentrations identified within the Mission Creek catchment. All six sources were associated with the training, storage and maintenance of fire trucks that historically used PFAS containing AFFF.

Figure 2-1: PFAS Source Areas

2.4 Water Sources and Use

2.4.1 Groundwater Use

Council provided survey data indicates that there are 228 active groundwater bores, 38 dry bores and 10 “contaminated” bores across the island. Other sources indicate approximately 450 bores exist across the island (Abell, 1993). It is understood that not all bores on the island are registered with the Norfolk Island Regional Council or surveyed for elevation or location. Groundwater is known to be extracted for stock watering (chickens and cows) on Norfolk Island, however there is no evidence to suggest that groundwater is extracted for recreational purposes (e.g., to fill a swimming pool).

On the Airport, there is one known groundwater well that was not in use at the time of the investigation. Immediately off-site, a second ‘Airport Bore’ has previously been used to pump water into a large concrete holding tank on site adjacent to the current environmental office at the airport. This water was previously used across the site and accessed by the public for off-site use via a fill point near the waste management centre access track just off Douglas Drive. During previous investigations, there was also anecdotal evidence of this bore being used to supply off-site public buildings in times of low rainfall including the hospital and council works depot (through use of a water carter).

New rainwater tanks installed on the Airport have replaced the reliance on water from the Airport Bore and provide an alternate, unimpacted water source for the Airport terminal buildings and the fire station taps. During the Year 2 monitoring event, Senversa were informed that the Airport Bore is no longer connected to the concrete tank and the fill point previously used by the public had been locked. Senversa were informed that the airport and all other services that previously used the Airport Bore are now connected to rainwater tanks. A summary of the current Airport water usage is provided in **Section 5.3.4.**

Long-term, it is understood that the Norfolk Island Regional Council (NIRC) plans to continue the implementation of a rainwater tank program to reduce groundwater reliance.

2.4.2 Potable Drinking and Stock Water Use

Bore water is not widely consumed in times of high rainfall. In times of drought, when tank water is not readily available, bore water may be extracted for drinking water purposes (NIRC, 2018).

Water carting from groundwater bores was undertaken across the island both prior to and during January 2020, and in February 2020 a temporary desalination plant was commissioned by the Australian Government and Army on Norfolk Island to provide an alternate water supply.

Bore water is known to be extracted for stock watering (cows) on at least two properties in the Mission Creek catchment. Water extracted from Watermill Creek is also understood to be used for livestock watering (cattle and piggeries) between the Airport and the Duck Dam.

Residents have access to water from two public standpipes: one by the Watermill Dam (Duck Dam), which is sourced from a hillside spring; and a second adjacent Headstone Creek (Headstone Dam). This water is understood to be used for non-potable uses (potentially including stock watering).

Senversa and DITRDCA have met with the property owners in the Mission Creek catchment and provided advice on how to minimise PFAS risk for livestock (Senversa, 2021c).

2.4.3 Irrigated Water Use

Irrigated water is understood to not be used on-site, however grass on-site may be affected by rainfall runoff over impacted soils and over areas of historical AFFF use.

Additionally, water use during fire training and to flush out fire trucks is likely to have contributed to PFAS impacts and to surface runoff both where these activities occurred over areas of historical AFFF use, and also when the water used for these contained PFAS as it was sourced from the airport bore (the use of water from the airport bore for the fire station has now ceased). It is understood that flush outs of the fire trucks occurred up to three times a week and historically took place in the unsealed area to the south of the former fire station, with runoff towards Mission Creek. Flush outs undertaken at the current fire station would run off towards Watermill Creek. The fire station reportedly uses approximately 15,000 L per day (once every fortnight) for live fire training.

Large-scale annual training drills historically took place in the vacant land behind St Barnabas Chapel, located approximately 250 m northwest of the western extent of the east-west runway.

Irrigation water derived from bores is used across the island for small commercial and private residential gardens. CSIRO (2020) estimated approximately 10.8 ha of cultivated land is used for commercial food production, up to 75% of which may be irrigated. An additional 5 ha of land is estimated to be used for medium to large scale vegetable gardens. It is unknown to what extent these gardens are irrigated. The source of irrigation water is unknown however is expected to be predominantly bore water or pumped from surface water bodies, based on anecdotal evidence provided during the DSI investigation and sampling works.

It is understood that water is not widely used for irrigation of grassed paddocks (i.e., for livestock grazing) on the island.

3.0 Sampling and Analysis Approach

3.1 Monitoring Conducted

Sampling locations are indicated on **Figure 1**.

Australian Laboratory Services Pty Ltd (ALS) was the primary analytical laboratory and Envirolab was the secondary laboratory for all samples. Both laboratories are National Association of Testing Authorities (NATA) accredited for the analyses conducted. Water and sediment samples were analysed for the extended PFAS suite of 28 analytes.

Laboratory results and field water quality observations were uploaded to the Esdat[4] database. Analytical results reported for private property water sources were provided to the landowners in writing.

Table 3-1: PFAS OMP Year 2 Sampling Location Summary

Sample Purpose	Location	Number Of Locations	Sample IDs	Sampling Media
Creek Sampling	Mission Creek	12	WWII_DAM, MC_OMP01 to MC_OMP11	Surface water and sediment sampling (where no water was present).
	Watermill Creek	5	WC_OMP01 to WC_OMP05	
	Watermill Creek Airport Drainage	2	WC_OMP06 WC_OMP07 (sediment only)	
	Cascade Creek	1	COCKPIT_SW01	
	Headstone Creek	1	PWS_HEAD_DAM	
Bay Sampling	Emily Bay	4	EB_OMP01 EB_OMP02 EB_OMP03 EB_OMP04	Surface water.
Irrigation Water	Mission Creek	2	ID013_BORE[3] ID016_BORE[2]	Point of use water sampling.
Stock Water	Mission Creek	2[1]	ID014_BORE ID015_BORE[2] *(MC_OMP08[1])* *(MC_OMP10[1])*	

[4] Environmental data management software.

Sample Purpose	Location	Number Of Locations	Sample IDs	Sampling Media
Managed Water Supplies	On-Airport	15	AIRPORT_BORE[2] AIRPORT_RESERVOIR FRE_TAP1 FRE_TAP2 FRE_TANK1 A_TAP1 A_TAP4 A_TAP10 to A_TAP17	
	Off-Airport	11	WASTE_TAP1 WASTE_TAP2 WATSE_TAP3 WASTE_TAP4 WASTE_TAP5 WASTE_TAP6 DEPOT_TAP DEPOT_TANK1 DEPOT_TANK2 DEPOT_TANK3 ELEC_TAP1	
Total Primary Samples		**Water: 54** **Sediment: 1**		

Table notes:
1. There are 5 samples relevant for stock watering, however only two unique samples (ID014_BORE and ID015_BORE, used for cattle watering) not also collected for another purpose. MC_OMP08 and MC_OMP10 (creek locations with possible cattle access in the absence of management) are included in the total sample numbers for creek sampling.
2. Groundwater location.
3. ID013_SW01 pump was no longer operational. ID013_BORE was analysed in lieu, a newly restarted bore used for irrigation.

3.2 Sampling and Analysis Quality Plan

The SAQP details the data quality objectives (DQOs), data quality indicators (DQIs) and assessment methodology of the monitoring, included in **Appendix A**.

Deviations from the SAQP are summarised in the table below.

Table 3-2: Summary of Deviations from the SAQP

Sample Purpose	Location
Additional Samples Collected	AIRPORT_RESERVOIR water sample was collected from the Airport Reservoir that supplies the Airport with rainwater.
	A_TAP10 to A_TAP17 water samples were collected from each cluster of taps within the Airport to confirm whether the pipe network now supplied by rainwater tanks has been sufficiently flushed following disconnection of the Airport Bore. Samples comprised two drinking fountains, one tap located outside the Airport control room, each set of bathrooms within the airport, and the cargo office kitchen tap.
	EB_OMP01 to EB_OMP04 water samples were collected in Emily Bay to confirm risks to human and ecological health are low and acceptable following detections of PFAS in 2022 in sample WC_OMP05 discharging into the bay.
	ELEC_TAP1 water sample was collected from the electricity shed kitchen tap to confirm whether the pipe network now supplied by rainwater tanks has been sufficiently flushed following disconnection of the Airport Bore.

Sample Purpose	Location
	FRE_TANK1 water sample was collected from the western POET wastewater tank to confirm whether this water has been effectively treated and is suitable for future use. It is noted that the second POET wastewater tank to the east (FRE_TANK2) appeared to be dry at the time of the monitoring.
	WASTE_TAP1 to WASTE_TAP6 water samples were collected from each of the taps within the waste transfer centre to confirm whether the pipe network now supplied by rainwater tanks has been sufficiently flushed following disconnection of the Airport Bore.
	WC_OMP07 sediment sample was collected within a stormwater culvert directing water away from the airport to the east into Watermill Creek. This location was dry at the time of sampling. WC_OMP06 water sample was collected from the Watermill Creek tributary downstream of WC_OMP07. These samples were collected to confirm concentrations of PFAS migrating in stormwater runoff from this side of the airport and associated with proposed stormwater upgrade works. NIRC advised that at the time of the monitoring the drainage upgrade works had not yet been implemented.
Alternate Sample Location	ID013_BORE was sampled in lieu of ID013_SW01, as the property owner advised that the ID013_SW01 pump had stopped working and water from ID013_BORE was being used instead for fruit tree and garden irrigation. ID013_BORE had previously been disused due to high salinity.

3.3 Decision Framework

3.3.1 Trigger Values

The analytical results collected as part of the monitoring program have been used to assess whether the currently selected management action should change. A decision framework has been developed to define the conditions under which further assessment of the appropriateness of the current management measures is required. This decision framework includes trigger values:

- **Upper Trigger Values (UTVs)** are defined for use where risks are currently assessed to be low and acceptable. Where concentrations previously found to be associated with low and acceptable risks increase to be above the UTVs, review of the risk profile is required to assess if additional management is required.
- **Lower Trigger Values (LTVs)** are defined for use where exposures currently require management. Where concentrations previously found to be associated with potentially elevated risks decrease to be below the LTVs, review of the risk profile is required to assess if management measures can be reduced.

Table 3-3: Upper Trigger Values

Sampling Medium	Upper Trigger Value (µg/L)			Rationale
	PFOS	PFHxS	PFHxS+PFOS	
Mission Creek Water Used for Irrigation	4.2	2.5	-	The risk to consumers of irrigated produce associated with the previously measured range in concentrations at ID013 (1.4 - 2.8 µg/L Perfluorooctane sulfonate (PFOS); 1.4 - 1.5 µg/L Perfluorohexane sulfonate (PFHxS)) is assessed to be low and acceptable. Given the conservatism in the assessment, small variations above the previously measured range are considered unlikely to alter the risk profile. Trigger values approximately 50% above the upper end of the assessed range are adopted as indicative of a requirement to assess whether the potential risks have increased, and if further management is required. The triggers can be applied at property ID016, where water is used for irrigation.

Sampling Medium	Upper Trigger Value (µg/L)			Rationale
	PFOS	PFHxS	PFHxS+PFOS	
Surface Water from Other Creeks	0.5	1.3	-	Outside of Mission Creek, surface water concentrations of up to 0.29 µg/L PFOS and 0.85 µg/L PFHxS have previously been measured. The HHERA assessed risks to consumers of produce irrigated with this water and risks to consumers of livestock products where this water is used for stock watering, as low and acceptable. Given the conservatism in the assessment, small variations above the currently measured range are considered unlikely to alter the risk profile. Trigger values approximately 50% above the upper end of the assessed range are adopted as indicative of a requirement to assess whether the potential risks have increased, and if further management is required. It is noted that the adopted trigger values are more stringent than the majority of the conservative screening levels for stock water and irrigation pathways, and within 50% of the most stringent values. Given the conservatism in the HHERA screening levels, it is assessed that provided concentrations remain below the triggers, risks will remain low and acceptable, regardless of water usage for irrigation or stock watering.
Surface Water from Cascade Creek / Headstone Creek	-	-	0.07	PFAS concentrations previously measured in Cascade Creek and Headstone Creek were below the health-based guidance values (HBGV) for drinking water, and no management measures are currently in place for this water. The drinking water HBGV is selected as the UTV. If concentrations increase above this level, further assessment of the requirement for management of water use is required.

Table 3-4: Lower Trigger Values

Sampling Medium	Lower Trigger Value (µg/L)			Rationale
	PFOS	PFHxS	PFHxS+PFOS	
Reticulated water supplies at public facilities **Surface water from Mission Creek** **Surface water from Watermill Creek** **Groundwater at Airport (Airport Bore)**	-	-	0.07	The drinking water HBGV has been selected as the LTV. Where concentrations are below this level, ongoing management of water use (including for sensitive use as drinking/domestic water) is unlikely to be required.
Mission Creek water used for cattle stock watering prior to management	0.33	1.2	-	The conservative beef cattle stock watering screening levels adopted in the HHERA are adopted as the LTV; if concentrations remain consistently below these values, ongoing management is unlikely to be required.
Mission Creek water used for chicken stock watering prior to management	0.9	1.3	-	The conservative chicken stock watering screening levels adopted in the HHERA are adopted as the LTV; if concentrations remain consistently below these values, ongoing management is unlikely to be required.

3.3.2 Additional Screening Criteria

Results have also been screened against the criteria adopted in the DSI, sourced from the PFAS National Environmental Management Plan (NEMP) 2.0 (Heads of Environment Protection Authority [HEPA], 2020). Further information on the adopted criteria is provided in the DSI.

Table 3-5: Additional Screening Criteria

Land/Water Use	Adopted Screening Criteria		
	PFOA[1]	PFOS	PFHxS+PFOS
SEDIMENT			
Human health • Sensitive use. • Agricultural use. • Recreation / open space use.	0.1 mg/kg (sensitive and agriculture). 10 mg/kg (recreation).	-	0.01 mg/kg (sensitive and agriculture). 1 mg/kg (recreation / open space).
Human health • Commercial use • Industrial use	50 mg/kg.	-	20 mg/kg.
Maintenance of Ecosystems.	10 mg/kg (direct toxicity)	0.01 mg/kg (secondary poisoning / bioaccumulation) 1 mg/kg (direct toxicity).	-
Production of Food, Fibre and Flora.	10 mg/kg (direct toxicity).	0.01 mg/kg (secondary poisoning / bioaccumulation) 1 mg/kg (direct toxicity).	-
Aesthetics.	PFAS are not considered to be relevant indicators for this land use.		
Buildings and Structures	PFAS are not considered to be relevant indicators for this land use. However, PFAS is reported to adsorb and desorb from permeable materials such as concrete, potentially representing source of PFAS that should be considered in the conduct of the works.		
SURFACE WATER AND GROUNDWATER			
Aquatic Ecosystems	19 µg/L (99% protection) 220 µg/L (95% protection) 632 µg/L (90% protection)	0.00023 µg/L (99% protection) 0.13 µg/L (95% protection) 2 µg/L (90% protection)	-
Primary and/or Secondary Contact Recreation	10 µg/L	-	2 µg/L
Aesthetic Enjoyment	To be assessed based on observations of odour and/or visual amenity impact (noting that aesthetic impacts have not been noted for PFAS impacted water during site investigations).		
Cultural And Spiritual Values (Indigenous and/or Non-Indigenous)	No specific guidelines available, considered that criteria for other land uses will also be protective of this use.		
Drinking (Potable) Water	0.56 µg/L	-	0.07 µg/L
Agriculture (Stock Watering)	0.56 µg/L	-	0.07 µg/L

Land/Water Use	Adopted Screening Criteria		
	PFOA[1]	PFOS	PFHxS+PFOS
Irrigation	Relevant screening levels for this land use are not available. Site-specific risk assessment and or direct sampling of irrigated produce (as undertaken within this DSI) is recommended for irrigated pastures and/or crops where PFAS are detected, and water is used for irrigation.		
Aquaculture **Human Consumption of Fish, Crustacea and Molluscs**	As the Creeks on Norfolk Island are largely ephemeral with water flowing only during rainfall events, this land use is not considered relevant to this investigation. Furthermore, there was no evidence of human consumption of freshwater Fish, Crustacea, and Molluscs from water bodies or within the Mission Creek Catchment.		
Industrial and Commercial Use	No generic screening criteria for these uses are available, however, criteria for other land uses relevant to human and animal health (including potable water supply, primary contact recreation and stock watering) are considered relevant and will be considered in assessing impacts to this land use.		

Table Notes:
1. PFOA- perfluorooctanoic acid.

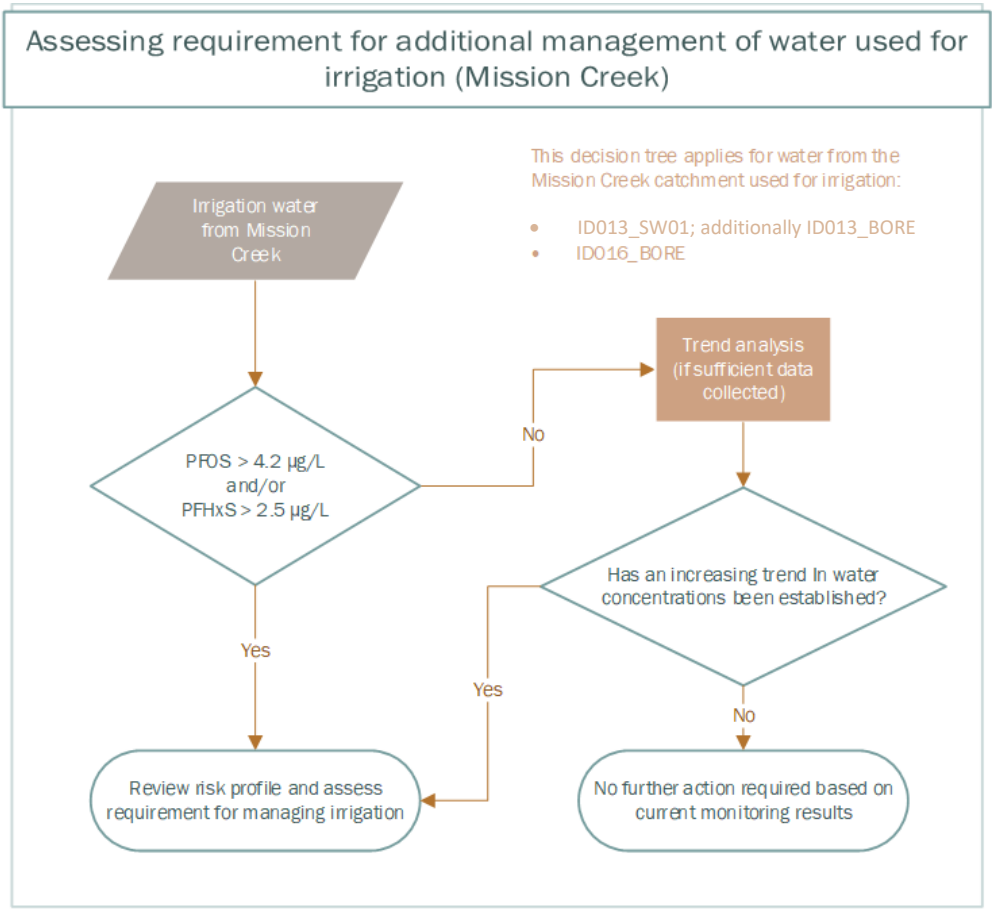
3.3.3 Decision Trees

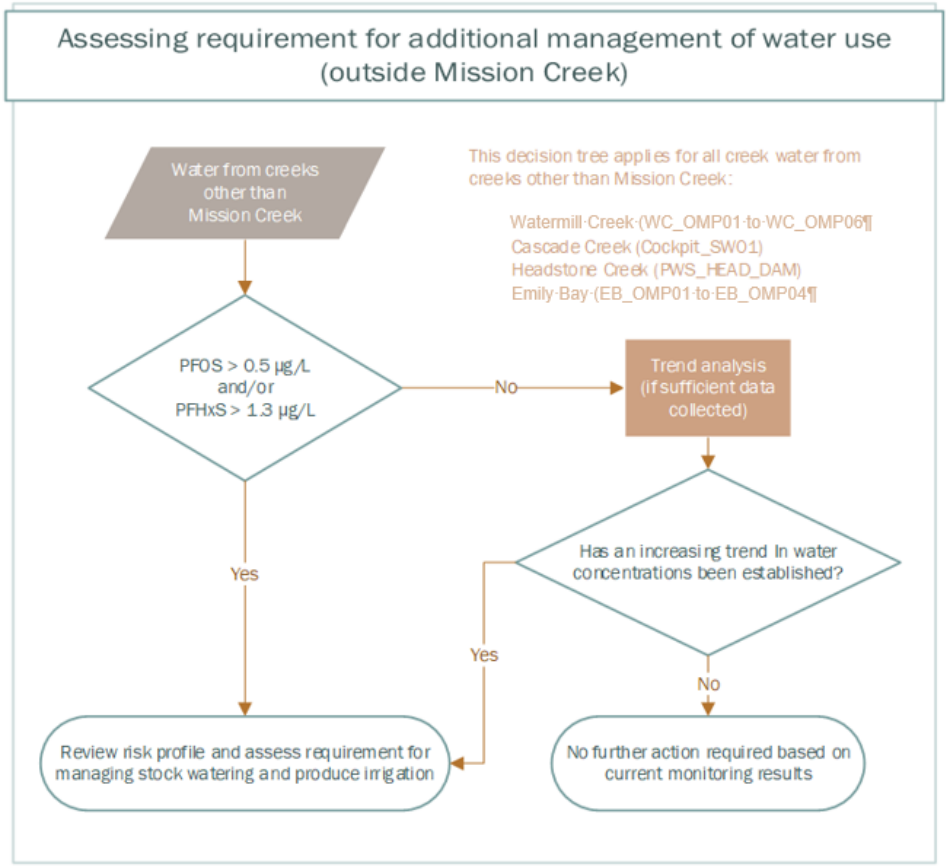
The flowcharts ("decision trees") presented on the following pages detail the decision framework process for the different samples collected in the PFAS OMP.

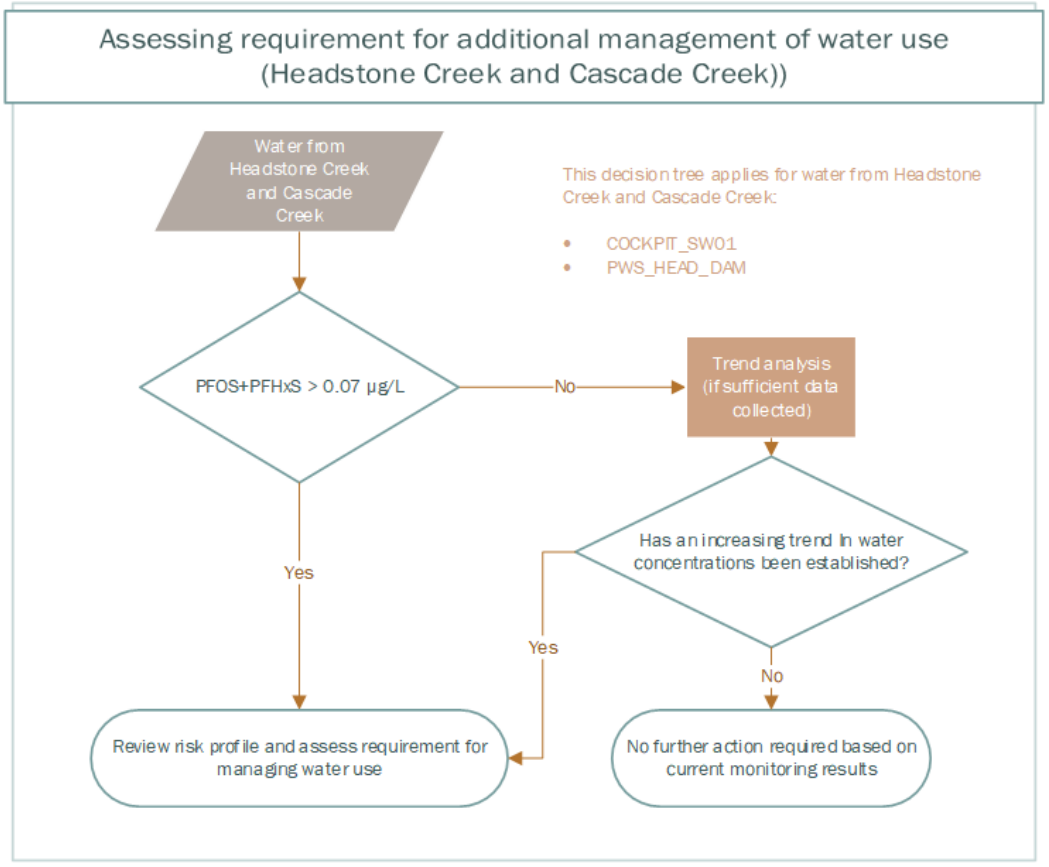
Separate decision trees have been presented for each water use and actions to take in the case that either:

- **The UTVs are exceeded,** requiring an assessment of the requirement for additional management of risks currently assessed to be low and acceptable; or
- **The LTVs are not met,** requiring an assessment of whether current management is still required.

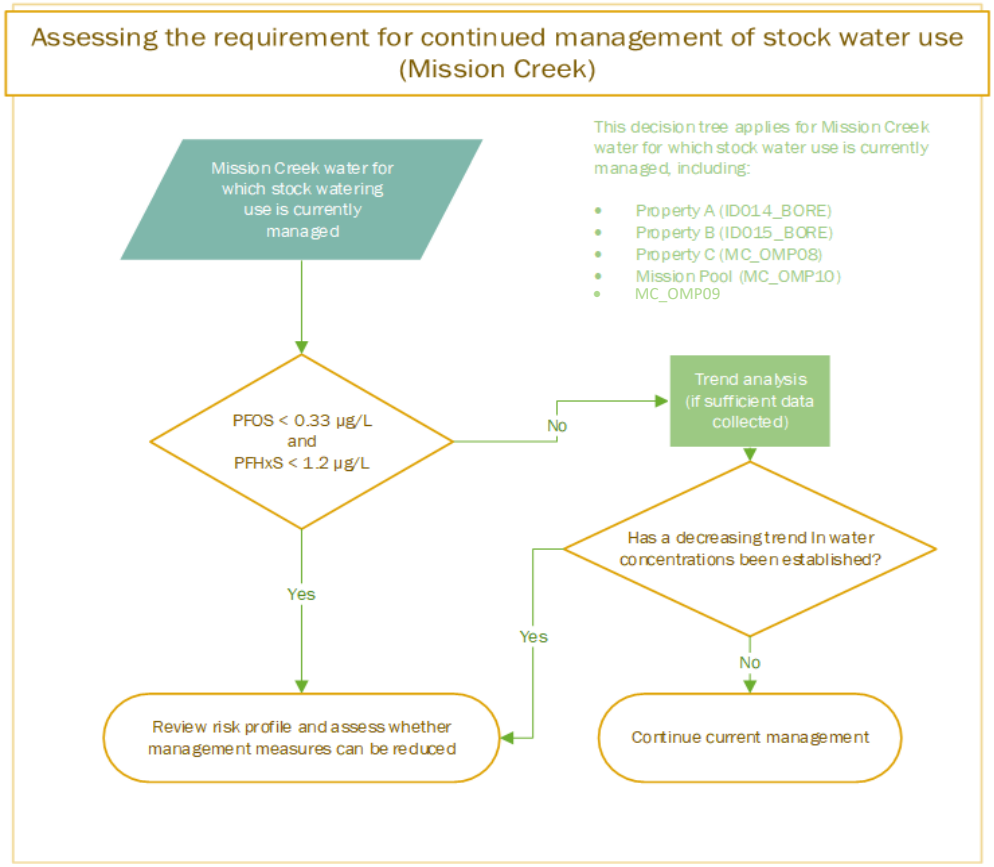
3.3.3.1 Decision Trees: Use of UTVs for Exposures Currently Assessed to be Low and Acceptable

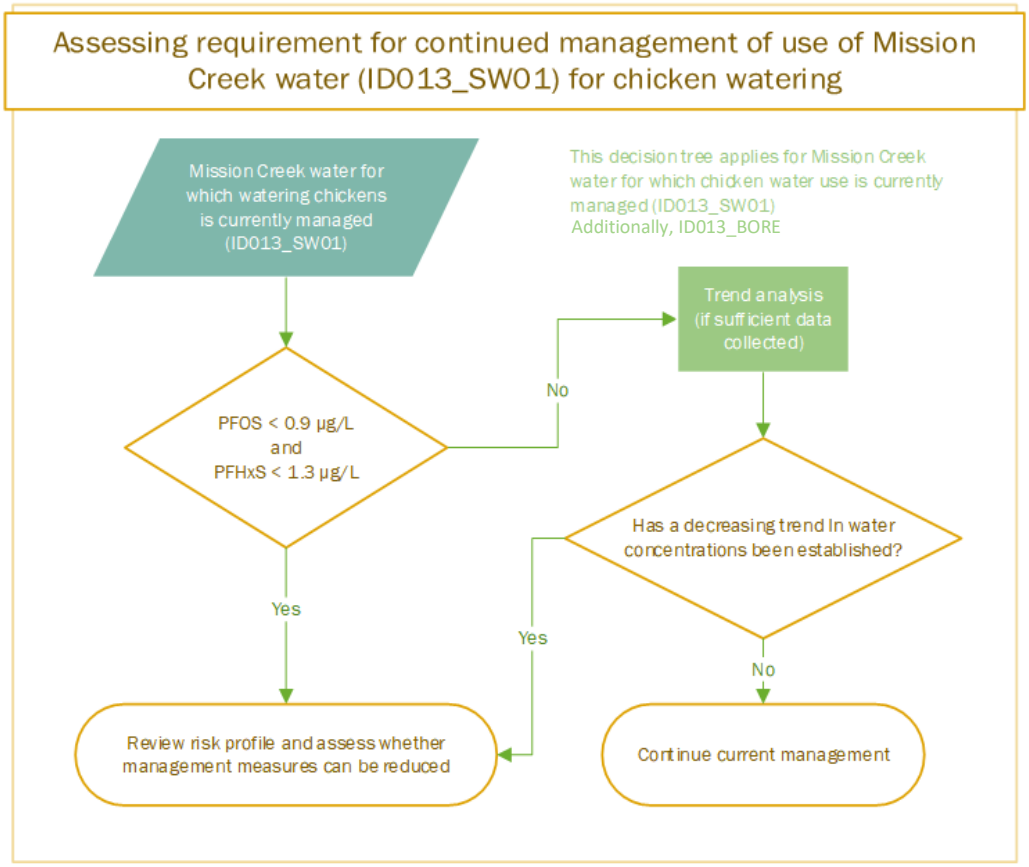



Assessing requirement for additional management of water use (outside Mission Creek)
Water from creeks other than Mission Creek
This decision tree applies for all creek water from creeks other than Mission Creek:
Watermill Creek (WC_OMP01 to WC_OMP06
Cascade Creek (Cockpit_SW01)
Headstone Creek (PWS_HEAD_DAM)
Emily Bay (EB_OMP01 to EB_OMP04
PFOS > 0.5 µg/L and/or PFHxS > 1.3 µg/L
No
Trend analysis (if sufficient data collected)
Has an increasing trend in water concentrations been established?
Yes
Yes
No
Review risk profile and assess requirement for managing stock watering and produce irrigation
No further action required based on current monitoring results

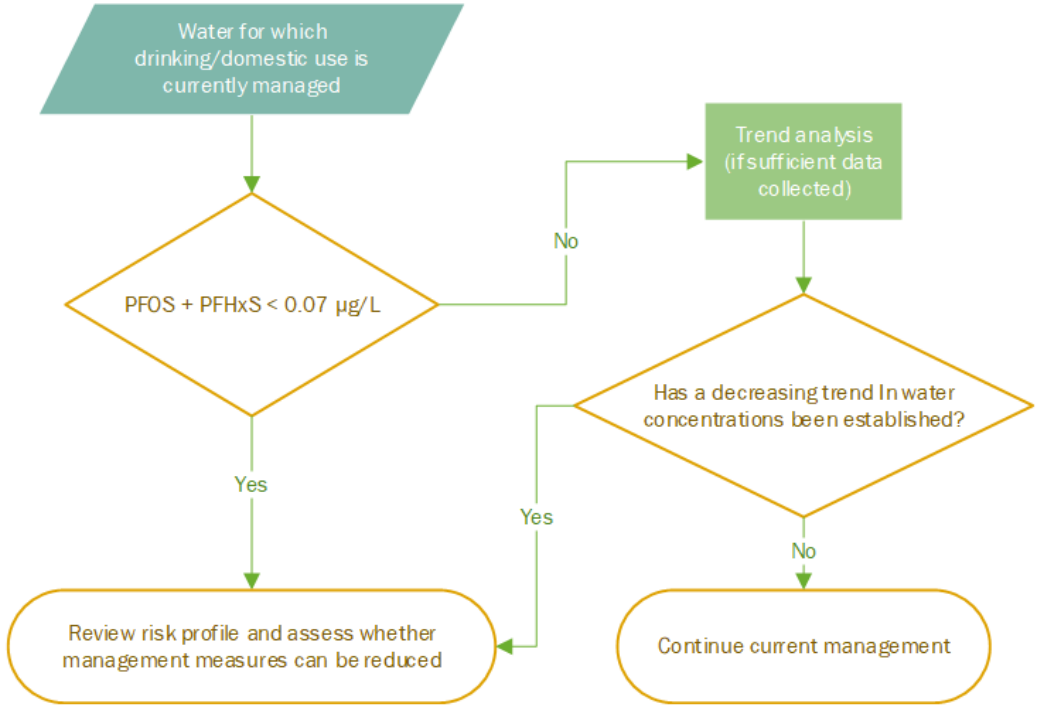

Assessing requirement for additional management of water use (Headstone Creek and Cascade Creek))
Water from Headstone Creek and Cascade Creek
This decision tree applies for water from Headstone Creek and Cascade Creek:
COCKPIT_SW01
PWS_HEAD_DAM
PFOS+PFHxS > 0.07 µg/L
No
Trend analysis (if sufficient data collected)
Has an increasing trend in water concentrations been established?
Yes
Yes
No
Review risk profile and assess requirement for managing water use
No further action required based on current monitoring results

3.3.3.2 Decision Trees: Use of LTVs for Exposures Which Currently Require Management





Assessing requirement for continued management of drinking/domestic water use



This decision tree applies for all water for which drinking/domestic water use is currently managed, including:

- Water Supplies at public facilities
  - A_TAP1, A_Tap4, A_Tap10 to A_Tap17
  - DEPOT_TANK1, DEPOT_TANK2, DEPOT_TANK3, DEPOT_TAP
  - ELEC_TAP1, AIRPORT_RESERVOIR
  - FRE_TAP1, FRE_TAP2
  - WASTE_TAP1 TO WASTE_TAP6
- Surface Water Samples from Mission Creek
  - MC_OMP01 to MC_OMP11, WWII_DAM.
- Surface Water Samples from Watermill Creek
  - WC_OMP01 to WC_OMP06.
- Groundwater at the Airport
  - AIRPORT_BORE
- Public water use from Headstone Creek
  - *PWS_HEAD_DAM*

4.0 Results

4.1 Surface and Groundwater Investigation

4.1.1 Rainfall Conditions

Rainfall conditions and the presence of surface water varied significantly between the PSI sampling in January 2020, the DSI sampling in March 2021, the Year 1 monitoring event in May 2022 and the Year 2 monitoring event in 2023. **Figure 4-1** below displays the total monthly rainfall between 2018 to 2023 and rainfall residual, indicating a prolonged period of below average rainfall between 2018 and January 2022 when rainfall was around 1000 mm per year. Over 900 mm of rainfall was recorded from January to May 2022, indicating an above average rainfall immediately prior to the Year 1 monitoring event. Since the Year 1 monitoring event, an above average rainfall has been recorded from May 2022 to May 2023, prior to the Year 2 monitoring event.

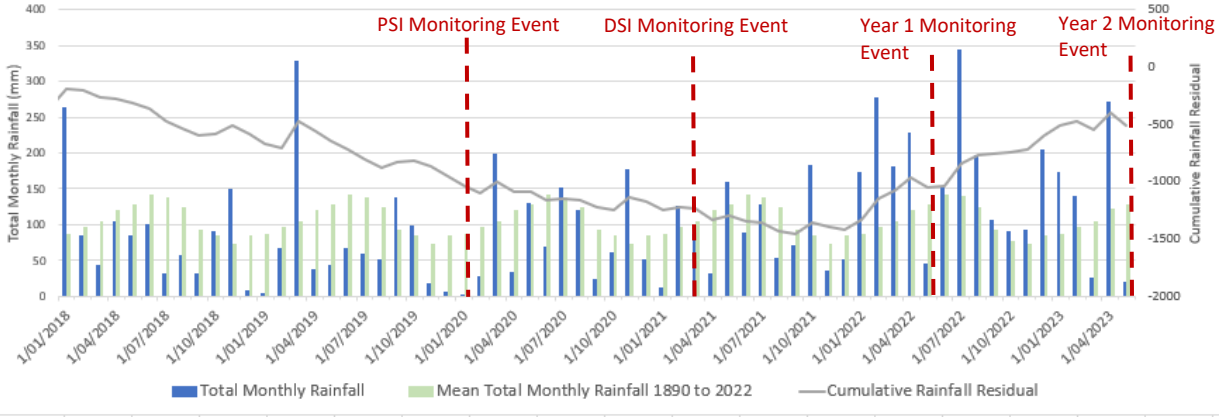


Figure 4-1: Total Monthly Rainfall

4.1.2 Surface Water and Groundwater Field Observations

Water was present at all sampling locations during the monitoring event, with the exception of stormwater culvert location WC_OMP07, where a sediment sample was collected. Surface water and groundwater field observations are presented in **Appendix C** and summarised in **Table 4-1** below.

During the Year 2 monitoring event, the pump supplying location ID013_SW01 was broken and ID013_BORE was sampled in lieu. The ID013_SW01 upper and lower trigger values have been considered for ID013_BORE.

Table 4-1: Summary of Surface Water Field Observations

Sample location		Mission Creek[1]	Watermill Creek[2]	Headstone Creek[3]	Cascade Creek[4]	Emily Bay[5]	Ground-Water[6]	Public Taps And Tanks[7]	Treated Wastewater Tank[8]
Dissolved Oxygen (DO) [mg/L]	Min	1.07	4.93	-	-	6.77	6.20	1.82	-
	Max	7.33	8.63	-	-	21.70	6.90	7.42	-
	Median	**6.17**	**7.21**	**4.00**	**9.19**	**7.16**	**6.43**	**5.59**	**6.28**
Electrical Conductivity (EC) [µS/cm]	Min	351.3	361.3	-	-	46602	139.4	6.6	-
	Max	689.0	650.0	-	-	47763	570.0	349.2	-
	Median	**505.5**	**391.5**	**431.5**	**377.7**	**47173**	**430.0**	**5.6**	**105.1**
pH	Min	4.80	6.38	-	-	8.13	5.34	4.73	-
	Max	7.33	8.80	-	-	8.17	6.76	8.37	-
	Median	**7.03**	**6.72**	**6.73**	**7.47**	**8.17**	**5.80**	**6.24**	**7.17**
Redox Potential [mV]	Min	24.9	120.5	-	-	186.1	18.3	83.4	-
	Max	217.8	156.0	-	-	201.2	166.3	222.2	-
	Median	**93.5**	**142.3**	**130.0**	**179.1**	**193.2**	**114.0**	**173.6**	**123.3**
Temperature [°C]	Min	17.2	17.1	-	-	21.8	19.7	14.0	-
	Max	21.0	20.5	-	-	22.1	20.7	26.4	-
	Median	**18.7**	**18.1**	**18.1**	**17.4**	**21.9**	**20.5**	**20.9**	**19.8**

Table notes:
1. Mission Creek: MC_OMP01 to 11, WW11_DAM, ID014_BORE, ID016_BORE
2. Watermill Creek: WC_OMP01 to 4.
3. Headstone Creek: PWS_HEAD_DAM.
4. Cascade Creek: Cockpit_SW01.
5. Emily Bay: WC_OMP05, EB_OMP01 to 04.
6. Groundwater: AIRPORT_BORE, ID013_BORE, ID015_BORE.
7. Public taps and tanks: A_TAP1, A_TAP4, A_TAP10 to 17, WASTE_TAP01 to 06, DEPOT_TANK1 to 3, DEPOT_TAP, FRE_TAP1, FRE_TAP2, ELEC_TAP1.
8. POET treated wastewater tank: FRE_TANK01.

Recorded surface water field parameters were generally consistent with the previous monitoring event in May 2022. Surface water generally displayed aerobic conditions and an EC within the expected range for fresh water. The pH was neutral to slightly acidic and moderate to strongly oxidizing conditions were recorded.

Groundwater parameters were generally consistent with the previous monitoring event in March 2022. Groundwater generally displayed aerobic conditions and low salinity (EC between 139 and 570 [µS/cm]). The pH was neutral to slightly acidic (4.80 to 6.69) and strongly oxidizing conditions were recorded.

4.1.3 Surface Water and Groundwater Laboratory Results

Surface water and groundwater analytical results have been compared against the adopted upper and lower trigger values to assess whether the currently selected management actions should change. Results are presented in appended **Tables 1** to **6** and summarised in **Table 4-2** and **Table 4-3** below. Water concentrations are mapped on appended **Figures 3** and **4.**

Laboratory results have also been compared against the additional screening criteria, presented in **Table 7** (OMP Year 2) and **Table 9** (all data). Laboratory certificates of analysis are provided in **Appendix D**.

Table 4-2: Water UTV Results

Sampling Medium	Upper Trigger Value (µg/L)			Number of Samples	Number of Detections	Number Above UTV
	PFOS	PFHxS	PFHxS+PFOS			
Mission Creek Water Used for Irrigation: ID013_BORE, ID016_BORE	4.2	2.5	-	2	PFOS: 0 PFHxS: 1 PFHxS+PFOS: 1	**0**
Surface Water from Other Creeks: WC_OMP01 to 06, Cockpit_SW01, PWS_HEAD_DAM, EB_OMP01 to 04	0.5	1.3	-	12	PFOS: 4 PFHxS: 6 PFHxS+PFOS: 6	**0**
Surface Water from Cascade Creek / Headstone Creek: Cockpit_SW01, PWS_HEAD_DAM	-	-	0.07	2	PFOS: 0 PFHxS: 0 PFHxS+PFOS: 0	**0**

Table 4-3: Water LTV Results

Sampling Medium	Lower Trigger Value (µg/L)			Number of Samples	Number of Detections	Number Below LTV
	PFOS	PFHxS	PFHxS+PFOS			
Reticulated Water Supplies at Public Facilities: A_TAP1, A_TAP4, A_TAP10 to 17, AIRPORT_RESERVOIR, FRE_TAP1, FRE_TAP2, DEPOT_TAP, DEPOT_TANK1 to 3, WASTE_TAP1 to 6, ELEC_TAP1. **Water from POET Wastewater Tank:** FRE_TANK1 **Surface Water from Mission Creek:** MC_OMP01 to 11, WW11_DAM **Surface Water from Watermill Creek:** WC_OMP01 to 06 **Groundwater at Airport:** AIRPORT_BORE, **Public Use Water from Headstone Creek:** PWS_HEAD_DAM	-	-	0.07	45	PFOS: 23 PFHxS: 19 PFHxS+PFOS: 25	**28**
Mission Creek Water Used for Cattle Stock Watering Prior to Management: ID014_BORE, ID015_BORE, MC_OMP08 to 10.	0.33	1.2	-	5	PFOS: 5 PFHxS: 5 PFHxS+PFOS: 5	**1**
Mission Creek Water Used for Chicken Stock Watering Prior to Management: ID013_BORE	0.9	1.3	-	1	PFOS: 0 PFHxS: 0 PFHxS+PFOS: 0	**1**

4.2 Sediment Investigation

4.2.1 Sediment Field Observations

Sediment was collected from one sample location (WC_OMP07) in May 2023 as there was no water present. The sample collected was comprised of brown clayey silt and no odours or staining were observed.

4.2.2 Sediment Laboratory Results

Sediment analytical results have been compared against the adopted screening criteria, presented in **Table 8** (OMP Year 2) and mapped in **Figures 5** and **6**. Laboratory certificates of analysis are provided in **Appendix D.**

Exceedances of the adopted screening criteria are summarised in **Table 4-4** below.

Table 4-4: Summary of Sediment Screening Criteria Exceedances

Analyte	Adopted Screening Criteria (mg/Kg)				Number of Samples	Detectable Concentration (mg/Kg)	Number of Detections	Number of Exceedances
	Ecological[1]	Ecological[2]	Human Health[3]	Human Health[4]				
PFOA	10	-	0.1	50	1	<0.0002	0	**0**
PFOS	1	0.01	-	-	1	0.0036	1	**0**
PFHxS+PFOS	-	-	0.01	20	1	0.0038	1	**0**

Table notes:
1. Ecological – direct toxicity to terrestrial organisms (direct exposure)
2. Ecological – secondary poisoning / bioaccumulation to terrestrial organisms (indirect exposure)
3. Human Health – residential land use
4. Human Health – commercial / industrial land use

4.3 Quality Assurance and Quality Control

The data quality assurance and quality control (QAQC) procedures adopted by Senversa provide a consistent approach to evaluation of whether the data quality objectives required by the project have been achieved. The process focuses on assessment of the useability of the data in terms of accuracy and reliability in forming conclusions on the condition of the element of the environment being investigated.

The methodology and results of the QAQC assessment are presented in **Appendix B.**

While a small number of results were outside specified acceptance criteria, these were not considered to significantly impact the quality or representativeness of the data, and the majority of results indicated that the precision and accuracy of the data was within acceptable limits. The results are therefore considered to be representative of chemical concentrations in the environmental media sampled at the time of sampling, and suitable to be used for their intended purpose in forming conclusions relating to the contamination status of water and sediment.

5.0 Findings

5.1 Nature and Extent of PFAS in Creek Water

5.1.1 Mission Creek

Surface water samples from the Mission Creek catchment showed the highest concentrations at locations closest to source zones at the Airport (World War II Dam and MC_OMP01) and decreased with distance from the Airport, consistent with the results from 2022 sampling. MC_OMP02 was the exception, which reported low levels of PFAS. PFAS concentrations along Mission Creek with distance from the Airport are shown on **Figure 5-1** below.

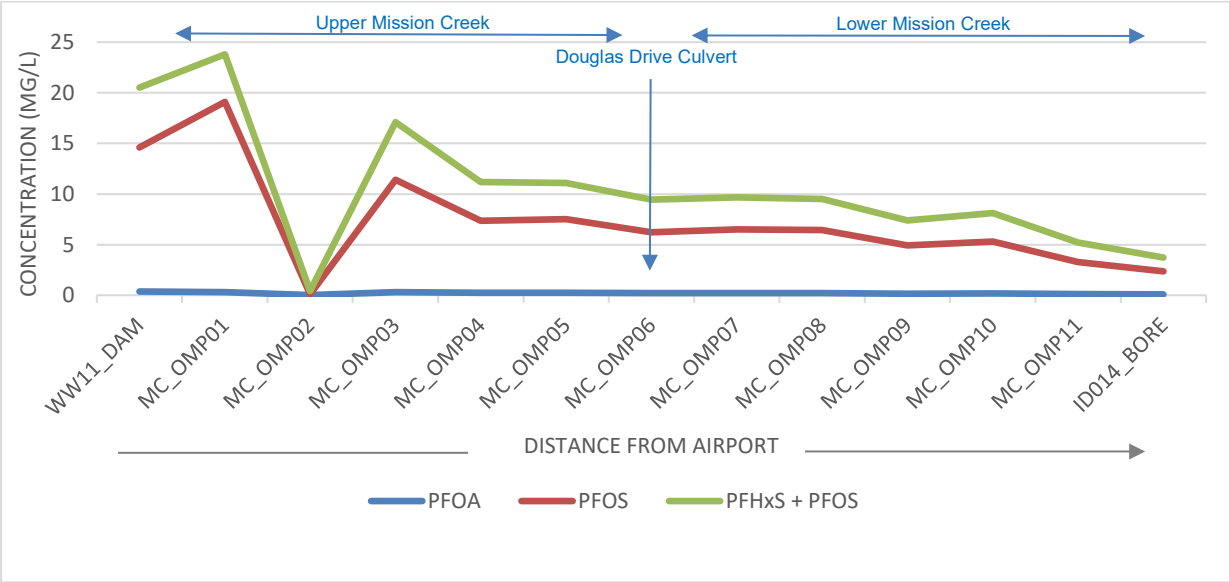


Figure 5-1: Surface Water PFAS Concentrations in Mission Creek

A significant drop in PFAS concentrations was reported in MC_OMP02, which was collected from the upper Mission Creek catchment just before the creek confluence, and therefore not directly downstream of WW11_DAM and MC_OMP01. This is consistent with the DSI results (MC_SW25) and the Year 1 monitoring results. As noted in these reports, these results indicate that the highest PFAS impacts are likely to be from the northern tributary (sampled by WWII_DAM and MC_OMP01) and hence from Airport sources in the northern portion of the Airport.

5.1.1.1 Mission Creek Trends

Mission Creek PFHxS+PFOS concentrations from 2020 to 2023 are plotted on **Figure 5-2** below.

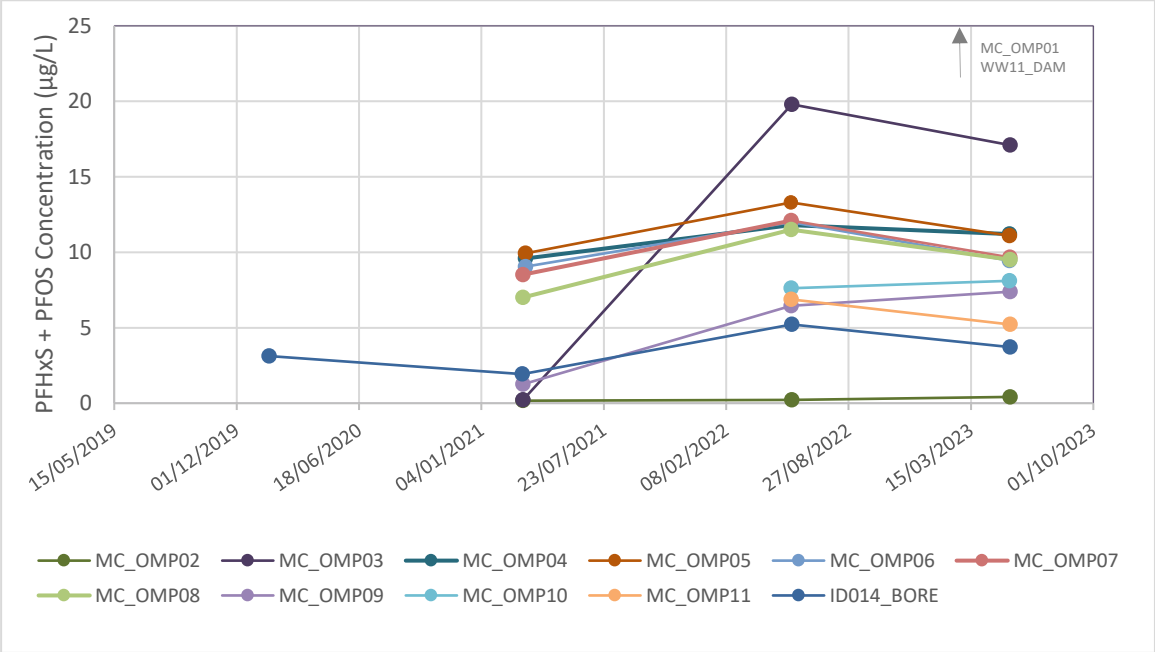


Figure 5-2: Mission Creek PFHxS+PFOS Concentration Trends

Reported concentrations increased in most Mission Creek locations between the 2021 and 2022 monitoring events, with the exception of MC_OMP01 where concentrations decreased marginally. The reported concentrations decreased from 2022 to 2023, with the exception of MC_OMP02, MC_OMP09 and MC_OMP10 concentrations, which marginally increased. All increases in concentration in 2023 were within the same order of magnitude as 2022 results.

The largest increase was observed at MC_OMP09 where the concentration of PFHxS + PFOS increased from 6.46 to 7.39 µg/L, remaining above the adopted human health drinking water criterion of 0.07µg/L and recreational use criterion of 2 µg/L. It is noted that the PFHxS + PFOS concentration remains below the screening level developed in the HHERA to protect creek users (e.g. farmers or recreational users) who may come in contact with creek waters (70 µg/L). As such, the risk to creek users associated with this measured concentration remains low.

As discussed in **Section 4.1.1**, a significant influx of rainwater was recorded in the months prior to the 2022 monitoring event, and it is considered likely that this surface water influx caused an increase in PFAS transport along Mission Creek from the source areas. PFAS are highly soluble and subsequently mobile in aqueous environments, and an increase in creek PFAS concentrations downgradient of source areas following a rain event is not unexpected. In addition to the increased PFAS flux likely occurring from source areas, an increase in the creek channel connectivity was noted at MC_OMP03, where previous sampling during the DSI noted limited connectivity of the tributaries in this area and a lower-than-expected result.

Since the May 2022, there has been consistently above average monthly rainfall prior to the Year 2 monitoring event in May 2023. The overall decrease in PFAS concentrations between these two events may be an indication of reducing PFAS load in the source areas, flushed through by the consistent rainfall. However, insufficient data are available to confirm a temporal trend in PFAS concentrations.

May 2023 reported PFAS concentrations in Mission Creek remained below the UTVs and above the LTVs, and no change to current management actions is required based on assessment against these trigger levels.

5.1.2 Watermill Creek

Within the Watermill Creek catchment, the highest PFAS concentration in surface water (WC_OMP01, PFHxS+PFOS: 0.67 µg/L) was identified downstream of the council works depot, consistent with the previous monitoring event. This concentration remained above the adopted human health drinking water criterion of 0.07 µg/L, but below the criteria for recreational use (2 µg/L) and the protection of creek users (70 µg/L). PFAS concentrations decreased with distance from the Airport, as indicated on **Figure 5-3** below.

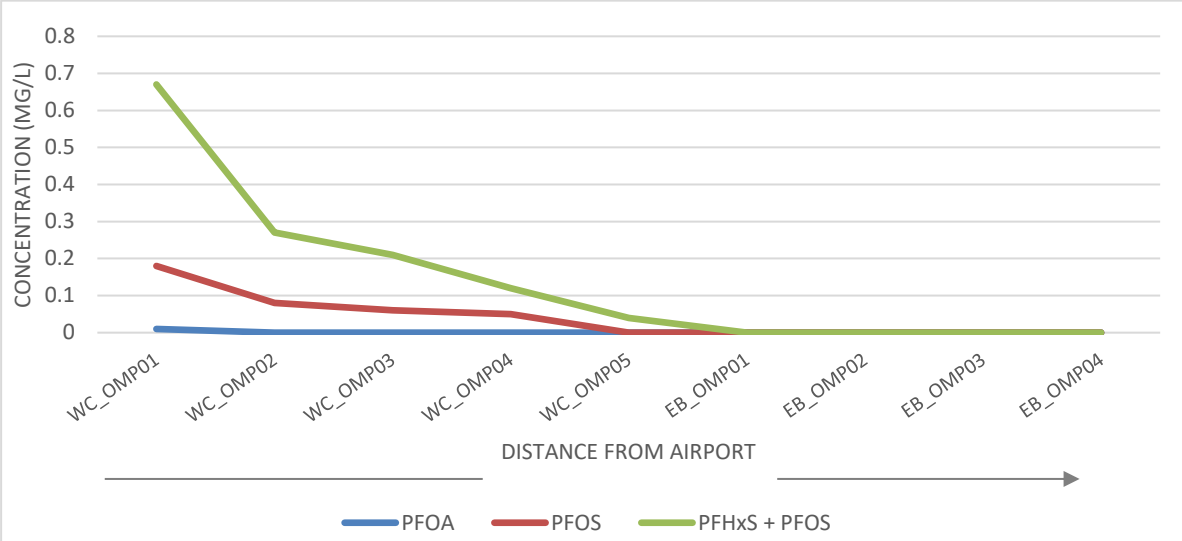


Figure 5-3: Surface Water PFAS Concentrations in Watermill Creek

5.1.2.1 Watermill Creek Trends

Watermill Creek PFHxS+PFOS concentrations from 2020 to 2023 are plotted on **Figure 5-4** below.

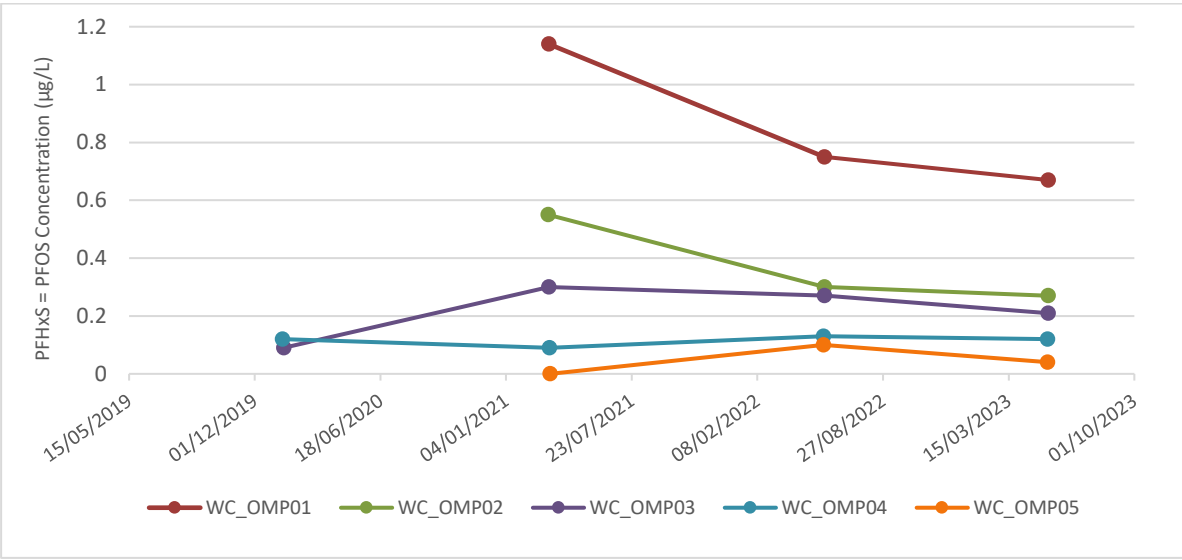


Figure 5-4: Watermill Creek PFHxS+PFOS Concentration Trends

Reported PFAS concentrations decreased in all Watermill Creek locations between 2022 and 2023. PFAS concentrations were previously reported below the limit of reporting (LOR) at WC_OMP05 in Emily Bay and in 2022 increased to 0.1 µg/L PFHxS+PFOS, above the drinking water guideline value (0.07 µg/L), and 0.04 µg/L PFOS, above the 99% ecological protection guideline value (0.00023 µg/L). Water was observed flowing from the Watermill Creek culvert into the bay during the 2022 monitoring event, where previously this had been dry. It was considered likely that the increased surface water flow was the cause of the increase in PFAS concentrations in the bay.

Concentrations remained below the recreational water use screening criteria (2 µg/L PFHxS+PFOS and 10 µg/L PFOA) and therefore did not preclude recreational water use including swimming within Emily Bay.

May 2023 PFAS concentrations reported at WC_OMP05 had reduced to 0.04 µg/L PFHxS+PFOS, below the UTV. May 2023 reported PFAS concentrations in the broader Watermill Creek remained below the UTVs (indicating that no additional management measures are required) and generally above the LTVs (indicating that current management measures (around the use of water for drinking / domestic use) should continue. Specifically, as concentrations remain below the UTVs this indicates that the risks from other water uses (including stock watering and produce irrigation) remain low and acceptable.

No change to current management actions is required based on assessment of the Year 2 monitoring results against these trigger values.

5.1.3 Emily Bay

In 2022, PFAS was detected in Watermill Creek near the point of discharge into Emily Bay (WC_OMP05). On this basis, the Year 2 monitoring included sampling of water from Emily Bay to confirm risks to human and ecological health are low and acceptable.

Four surface water samples were collected within Emily Bay during the Year 2 monitoring event in May 2023 to delineate potential PFAS impacts. PFAS concentrations were reported below the LOR in all Emily Bay samples in 2023. No further management actions are required based on this assessment.

5.1.4 Cascade Creek and Headstone Creek

Cockpit_SW01 PFAS concentrations in 2023 were reported below the LOR, sampled from Cascade Creek after the confluence of Broken Bridge / Cascade Creek. This is a reduction from low-level PFOS reported from 2020 to 2022.

PSW_HEAD_DAM PFAS concentrations were also reported below the LOR, sampled from the end of Headstone Creek. This is a reduction from low level PFOS previously reported in 2020 and is consistent with the Year 1 monitoring event in 2022.

May 2023 PFAS concentrations reported in both Cascade and Headstone Creeks were below the UTVs and no change to current management actions is required based on assessment against these trigger values.

5.2 Nature and Extent of PFAS in Groundwater

Reported concentrations of PFHxS+PFOS and PFOS in groundwater collected from the Airport Bore in May 2023 were approximately 44 to 42% lower than the concentrations measured in March 2021. A comparison is shown in **Table 5-1**.

Table 5-1 Comparison of PFAS Concentrations in Groundwater Between 2020 and 2023

	Jan 2020	Mar 2021	May 2022	May 2023
PFOA (µg/L)				
Airport Bore	0.57	0.73	0.5	0.37
ID015_Bore	0.02	0.01	<LOR	<LOR
ID016_Bore[1]	NM	<LOR	<LOR	<LOR

	Jan 2020	Mar 2021	May 2022	May 2023
PFOS (µg/L)				
Airport Bore	33.1	22.5*	16.9	13.1
ID015_Bore	0.46	0.15	0.17	0.03
ID016_Bore[1]	NM	<LOR	<LOR	<LOR
PFHxS+PFOS (µg/L)				
Airport Bore	44.5	34.7*	24.5	19.3
ID015_Bore	1.09	0.45	0.36	0.06
ID016_Bore[1]	NM	0.14	0.02	0.29

Table notes:
* Duplicate value adopted.
NM- Not measured.
1. Groundwater or surface water.

Consistent with the DSI, the concentration reduction is considered likely to have been primarily through 'flushing', driven by the increase in rainfall (i.e., dilution driven) and therefore may increase in future periods of lower rainfall.

The DSI also considered it likely that Mission Creek acts as a gaining creek (groundwater predominantly discharges to the creek) in the upper sections near the Airport and then losing creek (groundwater is predominately recharged by the creek) in the middle to lower sections of the creek (in particular around Mission Pool). This conclusion does not fully explain the stable to decreasing PFAS concentrations in ID015_BORE, which would be expected to display an increase in PFAS concentrations consistent with the increases observed in Mission Creek surface water, relative to 2021 concentrations. This may be due to a delay in the groundwater recharge or limited creek connectivity with ID015_BORE.

5.3 Nature and Extent of PFAS in Point of Use Water

5.3.1 Water Used for Irrigation

During the 2020 and 2021 monitoring events, PFAS was identified in a private bore ID013_SW01 (pumped from Mission Creek) used for fruit and vegetable produce irrigation. PFAS was also detected in private bore ID016_BORE during 2020 and 2021 monitoring, which is also used for fruit and vegetable irrigation. It is unclear whether ID016_BORE water is sourced from groundwater or Mission Creek surface water, however these sources are considered broadly analogous in this lower section of the creek.

Reported PFAS concentrations decreased in ID013_SW01 between Jan 2020 and March 2021 and increased back above January 2020 levels during the May 2022 monitoring event. In May 2023, the pump for ID013_SW01 was broken, and this water supply was no longer in use for irrigation. ID013_BORE was sampled in lieu; a recently reactivated groundwater bore utilised for irrigation. Consistent with the previous result in 2020, 2023 PFAS concentrations in ID013_BORE were reported below the LOR.

Reported PFAS concentrations decreased in ID016_BORE between March 2021 and May 2022 to below the drinking water screening criteria. In May 2023, the concentration of PFHxS+PFOS increased to above the 2021 concentrations and above the drinking water screening criteria. A comparison of the reported concentrations is shown below in **Table 5-2**.

Table 5-2: Comparison of PFAS Concentrations in Irrigation Water Between 2020 and 2023

Sample ID	Jan 2020	Mar 2021	May 2022	May 2023
PFOA (µg/L)				
ID013_SW01	0.07	0.05	0.14	NM
ID013_BORE	<LOR	NM	NM	<LOR
ID016_BORE	NM	<LOR	<LOR	<LOR
PFOS (µg/L)				
ID013_SW01	2.78	1.38	2.99	NM
ID013_BORE	<LOR	NM	NM	<LOR
ID016_BORE	NM	<LOR	<LOR	<LOR
PFHxS+PFOS (µg/L)				
ID013_SW01	4.5	2.84	5.33	NM
ID_013_BORE	<LOR	NM	NM	<LOR
ID016_BORE	NM	0.14	0.02	0.29

Table notes:
NM- Not measured.

May 2023 reported PFAS concentrations in water used for irrigation were below the UTVs for irrigation pathways. No change to current management actions is required based on the current monitoring results.

Water from other creeks may also be used for irrigation. The concentrations in other creeks also remain below the UTVs protective of this use. As such, the risks are assessed to remain low and acceptable, and further management is not required.

5.3.2 Water Used for Chicken Watering

During the 2020 and 2021 monitoring events, PFAS was identified in a private bore ID013_SW01 (pumped from Mission Creek) used for the watering of chickens. During the May 2022 monitoring event, it was advised that water from Mission Creek is no longer used for chicken watering at this property. In May 2023, Senversa was informed that the pump at ID013_SW01 was no longer working, and the water had not been used for chicken watering for some time.

Reported PFAS concentrations decreased in ID013_SW01 between Jan 2020 and March 2021 and increased back above January 2020 levels during the May 2022 monitoring event. In May 2023, ID013_BORE was sampled as a replacement location for ID013_SW01. Reported PFAS concentrations in ID013_BORE were below the LOR in January 2020 and remained below LOR in May 2023. A comparison of the reported concentrations is shown below in **Table 5-3**.

Table 5-3: Comparison of PFAS Concentrations in Chicken Drinking Water Between 2020 and 2022

Sample ID	Jan 2020	Mar 2021	May 2022	May 2023
PFOA (µg/L)				
ID013_SW01	0.07	0.05	0.14	NM
ID013_BORE	<LOR	NM	NM	<LOR
PFOS (µg/L)				
ID013_SW01	2.78	1.38	2.99	NM
ID013_BORE	<LOR	NM	NM	<LOR
PFHxS+PFOS (µg/L)				
ID013_SW01	4.5	2.84	5.33	NM
ID013_BORE	<LOR	NM	NM	<LOR

Table notes:
NM- Not measured.

Concentrations in ID013_SW01 remained above the LTVs for chicken watering in May 2022, consistent with previous monitoring rounds, although it is noted that the concentrations had increased in 2022. This sample was not collected in 2023, however ID013_BORE concentrations were reported below the LOR, and therefore based on the results from the 2023 sampling round, the water from ID013_BORE can be safely used for chicken drinking water. No change to the current management actions is required based on the current monitoring results.

The risk assessment completed as part of the HHERA (based on the previously measured concentrations) indicated that management measures are required to manage the potential exposures of consumers of chicken eggs where chickens drink the water from ID013_SW01. **The requirement for management remains unchanged based on the currently measured concentrations in water pumped from Mission Creek**.

As the landholder indicated in May 2022 and May 2023 that this water is no longer used for chicken watering, this pathway is currently managed via the use of rain. Continued management is required, as indicated in **Table 6-1.**

5.3.3 Water Used for Cattle Stock Watering

There are several properties in the Mission Creek catchment where water impacted by PFAS is known to be used, or is potentially used, for watering cattle. Additionally, there are properties in the Watermill / Town Creek catchment where surface water impacted by PFAS is potentially used for watering cattle and pigs.

Concentrations of PFHxS+PFOS in water used or potentially used for stock watering in the Mission Creek catchment generally increased between March 2021 and May 2023, with the exception of ID015_BORE. Mission Creek catchment stock watering PFHxS+PFOS concentration trends are indicated on **Figure 5-5** below.

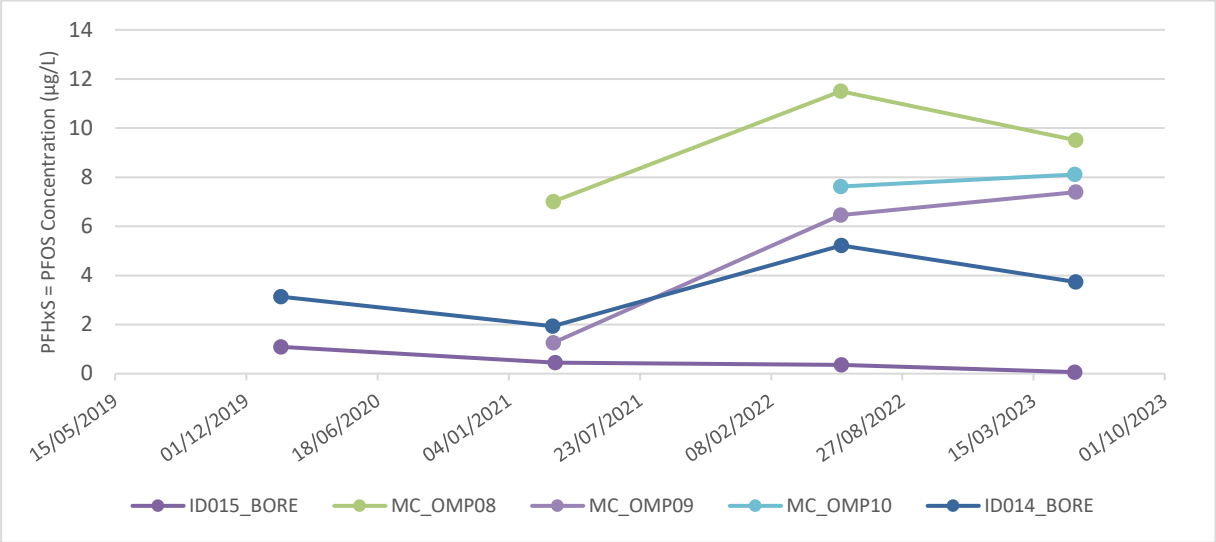


Figure 5-5: Mission Creek Catchment Stock Watering PFHxS+PFOS Concentration Trends

May 2023 reported PFAS concentrations in water used for stock watering were above the LTVs, with the exception of ID015_BORE which was below the LTV for PFOS and for PFHxS. This is broadly consistent with previous monitoring rounds, where PFAS concentrations in Mission Creek water potentially used for cattle stock watering have generally exceeded the LTVs.

The risk assessment completed as part of the HHERA (based on the previously measured concentrations from 2021) indicated that management measures are required to manage the potential exposures of home consumers or public consumers of cattle products where the cattle have access to Mission Creek water for drinking. **The requirement for management remains unchanged based on the currently measured concentrations**, however the following are noted:

- Increased PFAS concentrations (except ID015_BORE): Because management was assessed to be required based on the data from monitoring rounds, no UTVs have been adopted for water used for stock watering (i.e., because management is required, no UTV is needed because an increase in concentrations will not result in a change in the requirement for management). Notwithstanding this, the concentrations remain general similar to 2022 and significantly higher than in 2021. The continued measurement of concentrations above those measured in 2021 may indicate an increased PFAS exposure potential for consumers of cattle products, emphasising the requirement for management for both home consumers and public consumers.
- ID015_BORE: Concentrations were above the LTVs in 2020, but below the LTVs in 2021, 2022 and 2023. Monitoring of this bore should continue; where concentrations are found to remain consistently below the LTVs, the requirement for continued management of the use of this water can be reviewed. There is considered to be insufficient data at this stage to remove the requirements for management of this water source.

In conclusion, management measures are required for a pathway of cattle stock watering where cattle have access to Mission Creek water. This conclusion is unchanged from the HHERA. Potential management approaches to be considered are detailed in **Section 6.2**.

Water from Watermill Creek is also understood to be used for stock water (cattle and potentially pigs). The HHERA assessed the risks from the use of water from Watermill Creek for stock water to be low and acceptable, and that management measures for this use were therefore not required. Concentrations remain below the UTVs protective of this use. As such, the risks are assessed to remain low and acceptable, and further management is not required.

5.3.4 Water Used for Drinking and Other Uses

Water from the Airport Bore is pumped into a large concrete holding tank, previously utilised across the site and potentially accessed by the public for off-site use via a fill point on Douglas Drive. Senversa was informed that in 2023, supply from the holding tank was sealed, and it is understood that no further water is used from the Airport Bore. The fill point on Douglas Drive was observed to be locked.

Rainwater tanks had been installed on site which supply the Airport reservoir; an enclosed structure adjacent the Airport Bore concrete holding tank. It is understood that the reservoir water is currently used within the airport terminal. Rainwater tanks were also reported to be in use at the fire station, electricity shed and waste transfer centre.

Known historical and current uses of the Airport Bore water and a comparison of January 2020 to May 2023 PFAS concentrations are presented below.

Table 5-4: Comparison of PFAS Concentrations in Drinking Water Between 2020 And 2023

Area / Sample Location	Historical Water Source	PFHxS+ PFOS		Current Water Source	PFHxS+ PFOS	Description
		Jan 2020 (µg/L)	May 2022 (µg/L)		May 2023 (µg/L)	
Airport Bore Tank (AIRPORT_BORE)	Airport Bore	44.5	24.5	Airport Bore	19.3	Historically used as a holding tank before water was pumped to the fire station and terminal. Now disused.
Airport Reservoir	Rainwater Tanks	NM	NM	Rainwater Tanks	<LOR	Covered reservoir adjacent the Airport Bore holding tank. Current airport terminal water source.
Airport Terminal Bathrooms (A_TAP1)	Airport Bore	0.02[1]	22	Rainwater Tanks/ Reservoir	0.06	Airport Bore water no longer connected. Currently connected to new Airport rainwater tanks.
Former Fire Station - mechanic shed adjacent Airport terminal and Gate 1 (A_TAP4)	Airport Bore	0.11[1]	22.3	Rainwater Tanks/ Reservoir	<LOR	Airport Bore water no longer connected. Currently connected to new Airport rainwater tanks.
Various Taps around the Airport Terminal (A_TAP10 to A_TAP17	Airport Bore	NM	NM	Rainwater Tanks/ Reservoir	Maximum 0.03	Samples from bathroom taps, drinking water fountains and outside tap.
Current Fire Station kitchen (FRE_TAP1)	Airport Bore	8.63	<LOR	Rainwater Tanks	<LOR	Fire station kitchen tap.
Fire Hydrants on Airport (FRE_TAP2)	Airport Bore	22.3	<LOR	Rainwater Tanks	<LOR	-
Waste Transfer Centre Taps (WASTE_TAP1 to WASTE_TAP6)	Airport Bore	NM	0.01	Rainwater Tanks	Maximum 0.01	Taps in kitchen and bathrooms at the Waste management facility.
Council Works Depot (DEPOT_TANK1 to 3)	Airport Bore	9.01	<LOR	Rainwater Tanks	<LOR	-
Council Works Depot Taps (DEPOT_TAP1)	Airport Bore	8.79	<LOR	Rainwater Tanks	<LOR	Council works depot kitchen tap.
Douglas Drive Fill Point (AIRPORT_TRUCKFILL)	Airport Bore	NM	21.3	Airport Bore	NM	Airport Bore water was publicly accessible until 2020 and carted for various uses including supplying the public toilets across the island. While the tap was reported to be locked during the DSI, no lock was present during the May 2022 monitoring event. Lock was observed in May 2023.

Table Notes: 1. March 2021. 2: NM: Not measured

May 2023 reported PFAS concentrations in the point of use taps and tanks were below the LTVs, and the current management action to supply an alternative water source is no longer considered required based assessment against these trigger values and HBGV. The results of this monitoring round indicates that water from the rainwater tanks / reservoir can be safely used, including for sensitive uses such as drinking and cooking.

5.4 Nature and Extent of PFAS in Sediment

In May 2022, both sediment and water samples were collected from each sampling location, as only one round of sediment monitoring data was available for most locations at the time of the investigation. During May 2023, all locations had abundant water to sample except for WC_OMP07, where a sediment sample was collected instead.

The PFAS concentrations in sample WC_OMP07 were reported below both the HBGV and ESLs, and the reported PFHxS and PFOS concentration was 0.0038 mg/kg.

6.0 Conceptual Site Model

6.1 Conceptual Site Model Summary

A conceptual summary of the linkages between the main PFAS Source Areas, pathways and identified receptors is provided below, with further information provided in the DSI report (Senversa, 2021b). No changes to the source areas, pathways or potential receptors were identified as a result of the May 2023 monitoring.

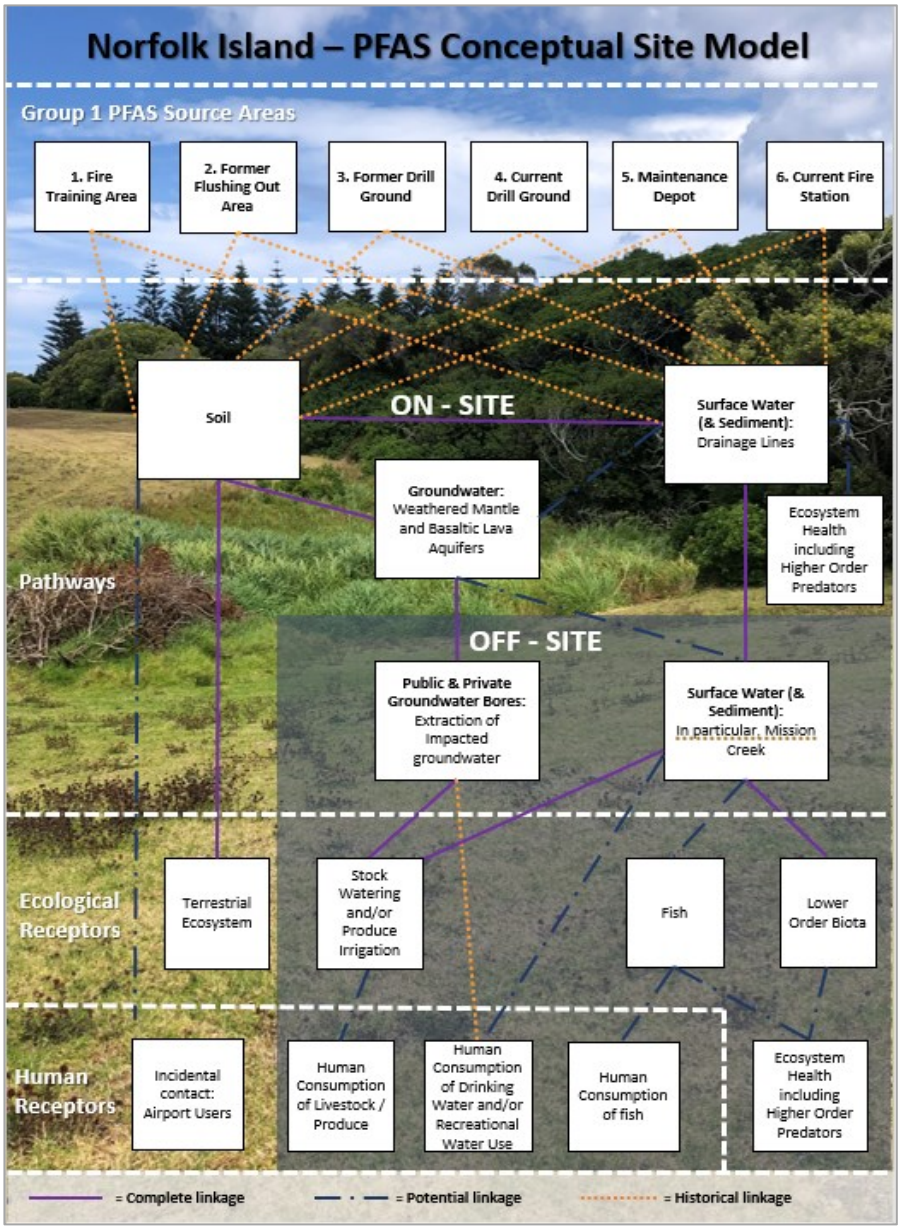


Figure 6-1: PFAS Conceptual Site Model Flow Chart

6.2 Assessment of Management Actions

Following the identification of PFAS in groundwater in late 2019, DITRDCA have worked with NIRC to undertake a number of management actions aimed at reducing the potential for exposure to the identified PFAS within the on-island environment both on-Airport and off-Airport, focussing on managing the exposure to PFAS identified in water used (or potentially used) for drinking water or domestic water supply.

Use of Legacy AFFF for training ceased in 2015 and emergency use was anticipated to cease in early 2022.Lecacy AFFF foams are no longer used, and a fluorine free foam has since been introduced. The fire trucks have been cleaned and tested for PFAS and are now reported free Legacy AFFF. Source management options are currently being assessed. Additional management actions already in place and recommended as a result of the May 2023 monitoring results are summarised in **Table 6-1** below.

A future reduction in monitoring may be warranted at locations where the LTVs were not met. This will be determined following the initial three-year implementation period of the PFAS OMP.

Table 6-1: PFAS Management Actions

Risk Identification	Do Existing Management Measures Mitigate Risks?	Recommended Additional or Ongoing Controls
1. Home consumption or public consumption of cattle, chicken eggs or other animal products where the animal drinks water sourced from Mission Creek.	**Yes** Advice provided to continue not using water for chicken watering.	The findings from this monitoring round confirm the previous recommendations for further management of the use of water from Mission Creek for watering cattle: • Restrictions on cattle or other animal access to PFAS impacted water sources requires further consideration, with PFAS concentrations during this monitoring event remaining consistent with those measured in 2022, and above those measured in earlier sampling (2020 and 2021), following which it was assessed that management was required. • Alternatively, measures to manage human exposure (e.g. livestock product consumption advice) could be considered. For chickens at ID013, PFAS was <LOR in the currently used water supply (ID013_BORE). Continued monitoring of this water supply is required, Previous advice to livestock farmers and vegetable farmers remains unchanged and use of water from Mission Creek (ID013_SW01) for watering chickens should not be recommenced.
2. Use of surface water or groundwater water for any extractive use (other than livestock watering) from the Mission Creek Catchment.	**Yes** There are no current unacceptable exposures identified; and advice has been provided not to use water for drinking / domestic use.	Continued monitoring to establish that produce irrigation risks at ID013 and ID016 remain acceptable. Future controls on changing water use required.
3. Use of groundwater from or nearby the Airport for any extractive use.	**Yes** There are no current extractive uses of water identified, with the exception of uses assessed to be associated with low and acceptable risks. The Airport Bore appears to have been successfully disconnected from extractive uses, with the possible exception of the Airport truck fill. This fill point was locked at the time of sampling, as previously recommended.	Potential treatment of extracted bore water proposed to increase potential uses, including the filtration system previously installed at the fire station.

Risk Identification	Do Existing Management Measures Mitigate Risks?	Recommended Additional or Ongoing Controls
4. Drinking or washing water at public facilities formerly supplied by the Airport Bore including: the fire station, other on-Airport buildings, hospital, council works depot and public toilets.	**Yes** Sampling undertaken at public facilities including the Airport terminal, electrical shed, waste transfer centre, council works depot and fire station indicate that replacement of PFAS impacted reticulated water systems has been successful in reducing PFAS concentrations to levels below the guidance values. This means it is possible to recommence use of the reticulated water supply at these facilities, as it is safe to use the water, including for sensitive uses such as drinking and eating.	Continued controls are required such that PFAS impacted water (e.g., Airport Bore) is not used to supply drinking water while above HBGV. This includes the lock on the Douglas Drive fill point. PFAS was previously identified in taps from public toilets across the island. Resampling of these taps was not completed as part of this monitoring round. Where PFAS is present in water in public toilets, the potential for exposure (e.g. during hand washing) will be relatively low given the frequency and duration of exposure, and the limited potential for PFAS absorption through the skin. Signage is understood to be at place at toilet facilities across the island to indicate the water should not be drunk. This signage should be maintained to manage potential exposures to PFAS.
5. Use of surface water or groundwater for drinking water or domestic use from the Upper Watermill Creek Catchment.	**Yes** No current use of water for drinking water or domestic use identified, and advice has been provided not to use water for drinking / domestic use.	Continued ongoing monitoring of PFAS concentrations in Watermill Creek, with a view to revising advice if concentrations decrease below the guidance value in the future.
6. Exposures to freshwater aquatic ecosystems.	**Pending source management**	Continued ongoing monitoring of PFAS concentrations, with a view to future ecological risk revision if ecosystem health is identified to be improving.
7. Exposures to marine aquatic ecosystems and recreational marine water use in Emily Bay.	**Yes** No detections of PFAS within Emily Bay in 2023.	Continued ongoing monitoring of PFAS concentrations in Watermill Creek, with a view to revising advice if concentrations decrease below the guidance value in the future.

7.0 Conclusions

Senversa undertook the PFAS OMP Year 2 monitoring event from 16 to 19 May 2023 in general accordance with the SAQP. The following findings were made addressing the objectives outlined in **Section 1.2**:

Objective 1: Trends in PFAS concentrations in the environment

- Reported concentrations of PFAS in surface water generally decreased between May 2022 and May 2023, however remained relatively consistent or slightly above concentrations reported in January 2020 and March 2021.
- The increase in PFAS concentrations is considered likely to have been primarily through the increased rainfall and subsequent increase in surface water flux transporting PFAS from source areas.
- PFAS concentrations in surface water generally decreased with increased distance from source areas.
- Concentrations of PFAS in groundwater generally decreased between January 2020 and May 2023.

Objective 2: The Effectiveness of the Selected Management Options in Managing Current Risks

Reported PFAS concentrations were below the UTVs at all sample locations. A number of point of use sample locations reported PFAS concentrations below the LTVs, however it is proposed that these locations be sampled for the initial three-year OMP implementation period to confirm variability.

Senversa believes the selected management options are appropriate for the purpose of managing current risks, however the following changes in management options could be considered either now or at the completion of the Year 3 monitoring event.

- Stock watering: Reported PFAS concentrations in extracted bore and surface water in the Mission Creek catchment continued to exceed the adopted stock watering screening criteria. Management options to restrict cattle access to PFAS Mission Creek or human consumption of cattle watered within the Mission Creek catchment require further consideration.
- Airport Bore water use: DITRDCA propose to install a POET filtration system on the Airport Bore to ensure this valuable resource can continue to provide water to the community for non-potable uses.
- Public water use: Sampling undertaken at public facilities including the Airport terminal, electrical shed, waste transfer centre, council works depot and fire station indicate that replacement of PFAS impacted reticulated water systems has been successful. As water concentrations were reported below the guidance values, it is possible to recommence use of the reticulated supply at these facilities.

A future reduction in monitoring may be warranted at locations where the LTVs were not met in future sampling events. This will be determined following the initial three-year implementation period of the PFAS OMP.

Objective 3: Has the Change in Conditions Resulted in a Change in the Risk Profile

The change in PFAS concentrations have not resulted in a potentially unacceptable change to the risk profile being identified and therefore no change in management controls are required. Following completion of the Year 3 sampling and confirmation of three year trends, the risk profile for receptors and the monitoring scope going forward will be re-assessed.

PFAS OMP Year 3 Monitoring Event – Next Steps

The next PFAS OMP monitoring event is scheduled for early 2024. No updates to the 2022 SAQP are recommended. Ongoing sampling of Emily Bay is not considered warranted based on the May 2023 results.

It is recommended that taps from public toilets across the island be resampled in the next PFAS OMP monitoring event. This is based on the fact that previously, PFAS was identified in these taps. Senversa understands that signage is at place at toilet facilities across the island to indicate the water should not be drunk. This signage should be maintained to manage potential exposures to PFAS. Prior to the next scheduled monitoring event, the draft Norfolk Island PFAS Management Plan should be assessed to aid in the decision-making process on the future management of PFAS on Norfolk Island. Future management options on Norfolk Island should conform with the draft PFAS Management Plan to align with best practices across the Island.

8.0 Principles and Limitations of Investigation

The following principles are an integral part of site contamination assessment practices and are intended to be referred to in resolving any ambiguity or exercising such discretion as is accorded the user or site assessor.

Area	Field Observations and Analytical Results
Elimination of Uncertainty	Some uncertainty is inherent in all site investigations. Furthermore, any sample, either surface or subsurface, taken for chemical testing may or may not be representative of a larger population or area. Professional judgment and interpretation are inherent in the process, and even when exercised in accordance with objective scientific principles, uncertainty is inevitable. Additional assessment beyond that which was reasonably undertaken may reduce the uncertainty.
Failure to Detect	Even when site investigation work is executed competently and in accordance with the appropriate Australian guidance, such as the National Environmental Protection (Assessment of Site Contamination) Amendment Measure ('the NEPM'), it must be recognised that certain conditions present especially difficult target analyte detection problems. Such conditions may include, but are not limited to, complex geological settings, unusual or generally poorly understood behaviour and fate characteristics of certain substances, complex, discontinuous, random, or heterogeneous distributions of existing target analytes, physical impediments to investigation imposed by the location of services, structures and other man-made objects, and the inherent limitations of assessment technologies.
Limitations of Information	The effectiveness of any site investigation may be compromised by limitations or defects in the information used to define the objectives and scope of the investigation, including inability to obtain information concerning historic site uses or prior site assessment activities despite the efforts of the user and assessor to obtain such information. Information received during preparation of this report from third parties or anecdotal sources, such as the sources of PFAS identified, was not able to be independently verified by Defence records.
Chemical Analysis Error	Chemical testing methods have inherent uncertainties and limitations. Senversa routinely seeks to require the laboratory to report any potential or actual problems experienced, or non-routine events which may have occurred during the testing, so that such problems can be considered in evaluating the data.
Level of Assessment	The investigation herein should not be considered to be an exhaustive assessment of environmental conditions on a property. There is a point at which the effort of information obtained and the time required to obtain it outweigh the benefit of the information gained and, in the context of private transactions and contractual responsibilities, may become a material detriment to the orderly conduct of business. If the presence of target analytes is confirmed on a property, the extent of further assessment is a function of the degree of confidence required and the degree of uncertainty acceptable in relation to the objectives of the assessment.
Comparison with Subsequent Inquiry	The justification and adequacy of the investigation findings in light of the findings of a subsequent inquiry should be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made.
Data Useability	Investigation data generally only represent the site conditions at the time the data were generated. Therefore, the usability of data collected as part of this investigation may have a finite lifetime depending on the application and use being made of the data. In all respects, a future reader of this report should evaluate whether previously generated data are appropriate for any subsequent use beyond the original purpose for which they were collected, or are otherwise subject to lifetime limits imposed by other laws, regulations or regulatory policies.
Nature of Advice	The investigation works herein are intended to develop and present sound, scientifically valid data concerning actual site conditions. Senversa does not seek or purport to provide legal or business advice.

9.0 References

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Figures

Figure 1: Ongoing Monitoring Plan Locations

Figure 2: Site Layout and PFAS Source Areas

Figure 3: Surface Water Concentrations Sum of PFHxS & PFOS

Figure 4: Surface Water Concentrations PFOS

Figure 5: Sediment Concentrations Sum of PFHxS & PFOS

Figure 6: Sediment Concentrations PFOS

N

Mt Pitt

ID013_SW01
ID013_BORE
ID015_BORE
MC_OMP11
MC_OMP10
MC_OMP09
ID014_BORE
MC_OMP08
MC_OMP07
ID016_BORE
MC_OMP06
MC_OMP05
MC_OMP04
MC_OMP01
MC_OMP03
MC_OMP02
WW11_DAM
ELEC_TAP1
PWS_HEAD_DAM
Headstone Creek
WC_OMP01
WC_OMP06
WC_OMP07
WC_OMP02
FRE_TANK2
FRE_TANK1
WC_OMP03
FRE_TAP2
FRE_TAP1
Rocky Point Creek
Rocky Point Creek
WC_OMP04_DUCKDAM
Broken Bridge Creek
Broken Bridge Creek
Cockpit_SW01
DEPOT_TANK1
DEPOT_TANK2
DEPOT_TAP
DEPOT_TANK3
Stockyard Creek
Town Creek
Watermill Creek
WC_OMP05
EB_OMP01
EB_OMP02
Emily Bay
EB_OMP03
EB_OMP04

Maxar

Legend

- National Park
- Kingston and Arthurs Vale Historic Area (KAVHA)
- Mission Creek
- Town Creek / Watermill Creek
- Mountain Peak
- Pump
- Stock Water (cow)
- Stock Water (vegetables and chicken)
- Surface Water (Cascade and Headstone Creeks)
- Surface Water (Mission Creek)
- Surface Water (Watermill Creek)
- Surface Water (Emily Bay)
- Tap Water
- Waterways
- Approximate Airport Boundary

Details:

Data Sources:
Aerial imagery: Esri maps
Vector Datasets: Open Street Maps

Created: S. Koroblitsas
PM: C. Sandiford
Approved: x
Date: 15/06/2023
Revision: 0

0 500 1,000 1,500 Metres

Datum/Projection:GDA 1994 MGA Zone 55 Scale: (A3) 1:25,000

Figure No: 1

Title: Ongoing Monitoring Plan Locations

Project: OMP Year 2 Monitoring Report (2023)

Location: Norfolk Island International Airport

Client: Department for Infrastructure, Transport, Regional Development and Communications

Path: S:\101_Jobs\1.NSW_Jobs\S17776_DITCRD_NORFOLK_DSI\C17776_031_Year 2 Sampling.aprx

Last Edited by: Stefanos.Koroblitsas

Path: S:\01_Jobs\1 NSW Jobs\S17776 DITCRD NORFOLK DSI\C17776 031 Year 2 Sampling.aprx

senversa

Legend:

PFAS Source Areas (Potential and Confirmed)
- Group 1 Source Area
- Group 2 Source Area

- WWII Dam
- Airport Bore
- Waterways
- Approximate Airport Boundary

Details:

Data Sources:
Aerial imagery: Nearmap Pty Ltd
Vector Datasets: Open Street Maps

Created:	S. Koroblitsas
PM:	M. Agnew
Approved:	C. Sandiford
Date:	15/06/2023
Revision:	0

0 100 200 300 400 500 Metres

Datum/Projection:WGS 1984 Web Mercator Auxiliary Sphere Scale: 1:7,500 (A3)

Figure No: 2

Title: Site Layout and PFAS Source Areas

Project: OMP Year 2 Monitoring Report (2023)

Location: Norfolk Island International Airport

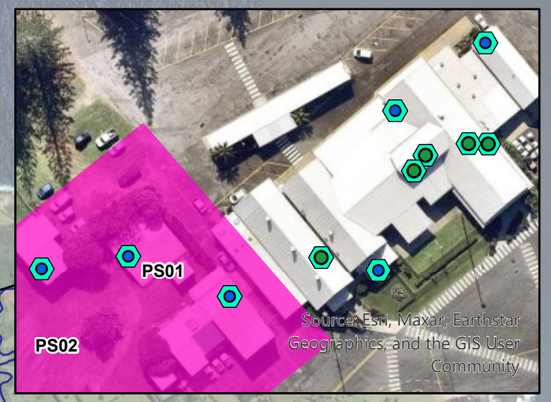
Client: Department for Infrastructure, Transport, Regional Development and Communications

Last Edited by: Stefanos.Koroblitsas

N

Broken Bridge Creek
Cascade Creek
Stockyard Creek
Lower Mission Creek
Upper Mission Creek (north)
Upper Mission Creek (south)
Headstone Creek
Town Creek
Rocky Point Creek
Watermill Creek

PS01
PS02
PS03
PS04
PS05
PS06
PS07
PS08
PS09
PS10
PS11
PS12
PS13
PS14
PS15
PS16



Maxar

senversa

Legend:

Sum of PFHxS and PFOS (µg/L) 2023 Results
- <LOR
- >LOR - 0.07
- 0.07 - 0.7
- 0.7 - 2
- >2
- Below LTV
- Approximate Airport Boundary

Approximate Extent of Surface Water Catchments
- Headstone Creek
- Mission Creek
- Mt Pitt / Broken Bridge Creek
- Town Creek / Watermill Creek

PFAS Source Areas (Potential and Confirmed)
- Group 1 Source Area
- Group 2 Source Area
- Group 3 Source Area
- Group 4 Source Area
- Waterways

Details:

Data Sources:
Aerial imagery: Nearmap Pty Ltd
Vector Datasets: Open Street Maps

Created: S. Koroblitsas
PM: M. Agnew
Approved: C. Sandiford
Date: 15/06/2023
Revision: 0

0 500 1,000 1,500 Metres

Datum/Projection:WGS 1984 Web Mercator Auxiliary Sphere Scale:1:25,000(A3)

Figure No: 3

Title: **Surface Water Concentrations – PFOS and PFHxS**

Project: OMP Year 2 Monitoring Report (2023)

Location: Norfolk Island International Airport

Client: Department for Infrastructure, Transport, Regional Development and Communications

N

PS01
PS02
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

PS01
PS02
PS03
PS04
PS05
PS06
PS07
PS08
PS09
PS10
PS11
PS12
PS13
PS14
PS15
PS16

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Broken Bridge Creek
Cascade Creek
Lower Mission Creek
Upper Mission Creek (north)
Upper Mission Creek (south)
Headstone Creek
Stockyard Creek
Town Creek
Rocky Point Creek
Town Creek
Watermill Creek

Maxar

Path: S:\01_Jobs\1.NSW_Jobs\S17776_DITCRD_NORFOLK_DSI\C17776_031_Year 2 Sampling.aprx

senversa

Legend:

PFOS (µg/L) 2023 Results
- <LOR
- >LOR - 0.13
- 0.13 - 2.0
- >2.0
- Below LTV
- Approximate Airport Boundary

Approximate Extent of Surface Water Catchments
- Headstone Creek
- Mission Creek
- Mt Pitt / Broken Bridge Creek
- Town Creek / Watermill Creek

PFAS Source Areas (Potential and Confirmed)
- Group 1 Source Area
- Group 2 Source Area
- Group 3 Source Area
- Group 4 Source Area
- Waterways

Details:

Data Sources:
Aerial imagery: Nearmap Pty Ltd
Vector Datasets: Open Street Maps

Created: S. Koroblitsas
PM: M. Agnew
Approved: C. Sandiford
Date: 15/06/2023
Revision: 0

0 500 1,000 1,500 Metres

Datum/Projection:WGS 1984 Web Mercator Auxiliary Sphere Scale:1:25,000(A3)

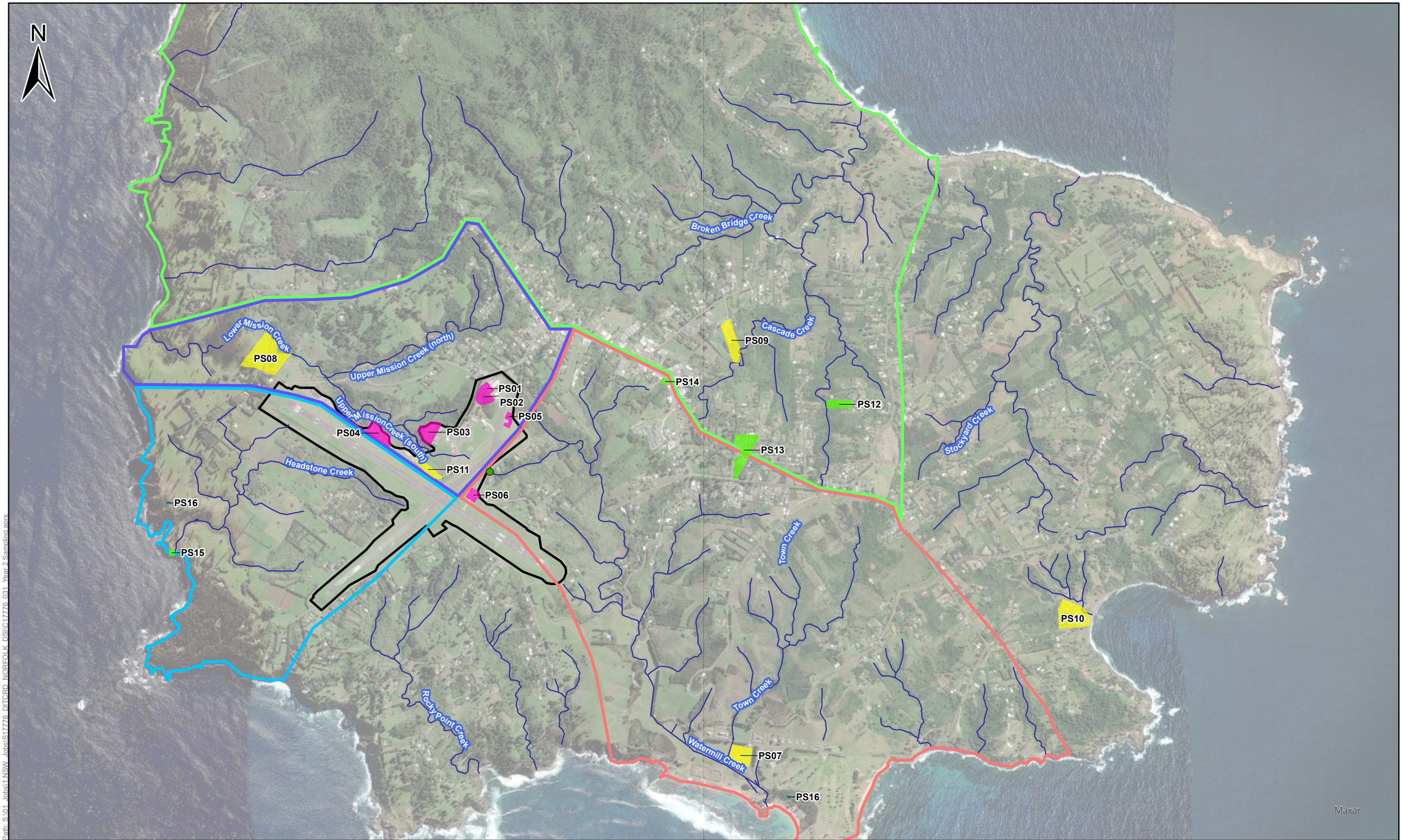
Figure No: 4

Title: **Surface Water Concentrations - PFOS**

Project: OMP Year 2 Monitoring Report (2023)

Location: Norfolk Island International Airport

Client: Department for Infrastructure, Transport, Regional Development and Communications



Path: S:\01_Jobs\1 NSW_Jobs\S17776_DITCRD_NORFOLK_DSI\C17776_031_Year 2 Sampling.aprx

senversa

Legend:

Sum of PFHxS and PFOS (mg/kg) 2023 Results
- <LOR
- >LOR - 0.01
- 0.01 - 20
- >20

Approximate Extent of Surface Water Catchments
- Headstone Creek
- Mission Creek
- Mt Pitt / Broken Bridge Creek
- Town Creek / Watermill Creek
- Approximate Airport Boundary

PFAS Source Areas (Potential and Confirmed)
- Group 1 Source Area
- Group 2 Source Area
- Group 3 Source Area
- Group 4 Source Area
- Waterways

Details:

Data Sources:
Aerial imagery: Nearmap Pty Ltd
Vector Datasets: Open Street Maps

Created: S. Koroblitsas
PM: M. Agnew
Approved: C. Sandiford
Date: 15/06/2023
Revision: 0

0 500 1,000 1,500 Metres

Datum/Projection:WGS 1984 Web Mercator Auxiliary Sphere Scale: 1:25,000(A3)

Figure No: 5

Title: Sediment Concentrations PFOS and PFHxS - Human Health Guidelines

Project: OMP Year 1 Monitoring Report

Location: Norfolk Island International Airport

Client: Department for Infrastructure, Transport, Regional Development and Communications

Last Edited by: Stefanos.Koroblitsas

N

Lower Mission Creek
Upper Mission Creek (north)
Upper Mission Creek (South)
Headstone Creek
Broken Bridge Creek
Cascade Creek
Stockyard Creek
Town Creek
Town Creek
Watermill Creek
Rocky Point Creek

PS01
PS02
PS03
PS04
PS05
PS06
PS07
PS08
PS09
PS10
PS11
PS12
PS13
PS14
PS15
PS16
PS16

Maxar

Path: S:\01_Jobs\1 NSW_Jobs\S17776_DITCRD_NORFOLK_DSI\C17776_031_Year 2 Sampling.aprx

senversa

Legend:

PFOS (mg/kg) 2023 Results
- <LOR
- <LOR - 0.01
- 0.01 - 1
- >1
- Approximate Airport Boundary

Approximate Extent of Surface Water Catchments
- Headstone Creek
- Mission Creek
- Mt Pitt / Broken Bridge Creek
- Town Creek / Watermill Creek

PFAS Source Areas (Potential and Confirmed)
- Group 1 Source Area
- Group 2 Source Area
- Group 3 Source Area
- Group 4 Source Area
- Waterways

Details:

Data Sources:
Aerial imagery: Nearmap Pty Ltd
Vector Datasets: Open Street Maps

Created:	S. Koroblitsas
PM:	M. Agnew
Approved:	C. Sandiford
Date:	15/06/2023
Revision:	0

0 500 1,000 1,500 Metres

Datum/Projection:WGS 1984 Web Mercator Auxiliary Sphere Scale: 1:25,000(A3)

Figure No: 6

Title: **Sediment Concentrations PFOS - Ecological Guidelines**

Project: OMP Year 2 Monitoring Report (2023)

Location: Norfolk Island International Airport

Client: Department for Infrastructure, Transport, Regional Development and Communications

Last Edited by: Stefanos.Koroblitsas

Tables

Table 1: Upper Trigger Values: Mission Creek Irrigation Water

Table 2: Upper Trigger Values: Other Creeks Water

Table 3: Upper Trigger Values: Cascade and Headstone Creeks Water

Table 4: Lower Trigger Values: Public Water Use

Table 5: Lower Trigger Values: Cattle Stock Watering

Table 6: Lower Trigger Values Chicken Watering

Table 7: OMP Year 2 Water Analytical Results

Table 8: OMP Year 2 Sediment Analytical Results

Table 9: Historical Water Analytical Results

Table 1: Upper Trigger Value Mission Creek Irrigation
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

			Location Code	ID013_BORE	ID016_BORE
			Field ID	ID013_BORE	IDO16_BORE
			Date	18/05/2023	18/05/2023
			Sample Type	Normal	Normal
			Lab Report No.	ES2317553	ES2317550
	Unit	LOR	Upper Trigger Value - Mission Creek		
(n:2) Fluorotelomer Sulfonic Acids					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05		<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05		<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05		<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05		<0.05	<0.05
Perfluoroalkane Carboxylic Acids					
Perfluorohexanoic acid (PFHxA)	µg/L	0.02		<0.02	0.05
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02		<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02		<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02		<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05		<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02		<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1		<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02		<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02		<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02		<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01		<0.01	<0.01
Perfluoroalkane Sulfonic Acids					
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	4.2[#1]	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02		<0.02	0.06
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	2.5[#1]	<0.01	0.29
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02		<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02		<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02		<0.02	0.08
Sum of PFHxS and PFOS	µg/L	0.01		<0.01	0.29
Perfluoroalkyl Sulfonamides					
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02		<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02		<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02
PFAS					
Sum of PFAS	µg/L	0.01		<0.01	0.48

Comments
#1 Mission Creek water used for irrigation

Table 2: Upper Trigger Value Other Creeks
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

			Location Code	Cockpit_SW01	EB_OMP01	EB_OMP02	EB_OMP03	EB_OMP04	PWS_HEAD_DAM	WC_OMP01	WC_OMP02	WC_OMP03	WC_OMP04_DUCKDAM	WC_OMP05	WC_OMP06
			Field ID	COCKPIT_SW01	EB_OMP01	EB_OMP02	EB_OMP03	EB_OMP04	PWS_HEAD_DAM	WC_OMP01	WC_OMP02	WC_OMP03	WC_OMP04_OUCKDAM	WC_OMP05	WC_OMP06
			Date	16/05/2023	16/05/2023	16/05/2023	16/05/2023	16/05/2023	16/05/2023	17/05/2023	17/05/2023	17/05/2023	16/05/2023	16/05/2023	17/05/2023
			Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
			Lab Report No.	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
	Unit	LOR	Upper Trigger Value - Other Creeks												
(n:2) Fluorotelomer Sulfonic Acids															
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids															
Perfluorohexanoic acid (PFHxA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	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
Perfluoroalkane Sulfonic Acids															
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	0.5[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.18	0.08	0.06	0.05	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.09	0.03	0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	1.3[#1]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.49	0.19	0.15	0.07	0.04	0.03
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	0.03	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.67	0.27	0.21	0.12	0.04	0.03
Perfluoroalkyl Sulfonamides															
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS															
Sum of PFAS	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.94	0.35	0.23	0.12	0.04	0.03

Comments
#1 Surface water from other creeks.

Table 3: Upper Trigger Value Cascade and Headstone Creek
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

			Location Code	Cockpit_SW01	PWS_HEAD_DAM
			Field ID	COCKPIT_SW01	PWS_HEAD_DAM
			Date	16/05/2023	16/05/2023
			Sample Type	Normal	Normal
			Lab Report No.	ES2317554	ES2317554
	Unit	LOR	Upper Trigger Value - Cascade and Headstone Creek		
(n:2) Fluorotelomer Sulfonic Acids					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05		<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05		<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05		<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05		<0.05	<0.05
Perfluoroalkane Carboxylic Acids					
Perfluorohexanoic acid (PFHxA)	µg/L	0.02		<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02		<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02		<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02		<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05		<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02		<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1		<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02		<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02		<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02		<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01		<0.01	<0.01
Perfluoroalkane Sulfonic Acids					
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01		<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02		<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01		<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02		<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02		<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02		<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01	0.07[#1]	<0.01	<0.01
Perfluoroalkyl Sulfonamides					
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02		<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02		<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02
PFAS					
Sum of PFAS	µg/L	0.01		<0.01	<0.01

Comments
#1 Surface water from Cascade Creek / Headstone Creek

Table 4: Lower trigger Value Public Waters
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

	Unit	LOR	Lower Trigger Value - Public	Location Code	A_TAP1	A_TAP4	A_TAP10	A_TAP11	A_TAP12	A_TAP13	A_TAP14	A_TAP15	A_TAP16	A_TAP17	AIRPORT_BORE	AIRPORT_RESERVOIR	DEPOT_TANK1	DEPOT_TANK2	DEPOT_TANK 3
				Field ID	A_TAP1	A_TAP 4	A_TAP 10	A_TAP11	A_TAP12	A_TAP 13	A_TAP14	A_TAP15	A_TAP16	A_TAP17	AIRPORT_BORE	AIRPORT_RESERVOIR	DEPOT_TANK 1	DEPOT_TANK 2	DEPOT_TANK 3
				Date	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	16/05/2023	16/05/2023	16/05/2023
				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
				Lab Report No.	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
(n:2) Fluorotelomer Sulfonic Acids																			
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																			
Perfluorohexanoic acid (PFHxA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.68	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.20	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.17	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.37	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																			
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01			0.06	<0.01	<0.01	<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01	13.1	<0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.83	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	6.21	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.46	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.65	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01	0.07[#1]		0.06	<0.01	<0.01	<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01	19.3	<0.01	<0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides																			
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																			
Sum of PFAS	µg/L	0.01			0.06	<0.01	<0.01	<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01	22.8	<0.01	<0.01	<0.01	<0.01

Comments

#1 Reticulated water supplies at public facilities (Risk ID 4)
Surface water from Mission Creek (Risk ID 2)
Surface water from Watermill Creek (Risk ID 5)
Groundwater at airport (airport bore) (Risk ID 3)

Table 4: Lower trigger Value Public Waters
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

	Unit	LOR	Lower Trigger Value - Public	Location Code	DEPOT_TAP	ELEC_TAP1	FRE_TANK1	FRE_TAP1	FRE_TAP2	WW11_DAM	MC_OMP01	MC_OMP02	MC_OMP03	MC_OMP04	MC_OMP05	MC_OMP06	MC_OMP07	MC_OMP08	MC_OMP09	MC_OMP10	MC_OMP11
				Field ID	DEPOT_TAP	ELEC_TAP1	FRE_TANK 1	FRE_TAP1	FRE_TAP2	WW11_DAM	MC_OMP01	MC_OMP02	MC_OMP03	MC_OMP04	MC_OMP05	MC_OMP06	MC_OMP07	MC_OMP08	MC_OMP09	MC_OMP10	MC_OMP11
				Date	16/05/2023	19/05/2023	19/05/2023	18/05/2023	18/05/2023	16/05/2023	16/05/2023	18/05/2023	18/05/2023	17/05/2023	17/05/2023	17/05/2023	18/05/2023	18/05/2023	18/05/2023	17/05/2023	18/05/2023
				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
				Lab Report No.	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
(n:2) Fluorotelomer Sulfonic Acids																					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																					
Perfluorohexanoic acid (PFHxA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	0.71	0.45	0.09	0.69	0.54	0.51	0.49	0.49	0.49	0.39	0.41	0.30
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	0.21	0.13	0.24	0.22	0.23	0.21	0.20	0.20	0.20	0.15	0.16	0.11
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	0.15	0.10	0.03	0.16	0.12	0.11	0.10	0.10	0.10	0.08	0.09	0.06
Perfluorobutanoic acid (PFBA)	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	0.37	0.31	0.02	0.31	0.23	0.23	0.20	0.21	0.20	0.16	0.17	0.11
Perfluoroalkane Sulfonic Acids																					
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	14.6	19.1	0.10	11.4	7.37	7.53	6.23	6.50	6.44	4.94	5.32	3.29
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	0.87	0.60	0.06	0.73	0.49	0.45	0.45	0.43	0.42	0.34	0.38	0.26
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	5.87	4.73	0.32	5.68	3.78	3.54	3.22	3.16	3.07	2.45	2.79	1.93
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	0.53	0.55	<0.02	0.39	0.25	0.24	0.22	0.24	0.23	0.17	0.19	0.14
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	0.59	0.40	0.07	0.70	0.50	0.46	0.40	0.43	0.43	0.36	0.33	0.27
Sum of PFHxS and PFOS	µg/L	0.01	0.07[#1]		<0.01	<0.01	<0.01	<0.01	<0.01	20.5	23.8	0.42	17.1	11.2	11.1	9.45	9.66	9.51	7.39	8.11	5.22
Perfluoroalkyl Sulfonamides																					
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																					
Sum of PFAS	µg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	24.0	26.4	1.03	20.4	13.6	13.4	11.6	11.9	11.7	9.04	9.84	6.47

Comments

#1 Reticulated water supplies at public facilities (Risk ID 4)
Surface water from Mission Creek (Risk ID 2)
Surface water from Watermill Creek (Risk ID 5)
Groundwater at airport (airport bore) (Risk ID 3)

Table 4: Lower trigger Value Public Waters
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

	Unit	LOR	Lower Trigger Value - Public												
Location Code				PWS_HEAD_DAM	WASTE_TAP1	WASTE_TAP2	WASTE_TAP3	WASTE_TAP4	WASTE_TAP5	WASTE_TAP6	WC_OMP01	WC_OMP02	WC_OMP03	WC_OMP04_DUCKDAM	WC_OMP05	WC_OMP06
Field ID				PWS_HEAD_DAM	WASTE_TAP 1	WASTE TAP 2	WASTE_TAP3	WASTE_TAP4	WASTE_TAP5	WASTE_TAP6	WC_OMP01	WC_OMP02	WC_OMP03	WC_OMP04_OUCKDAM	WC_OMP05	WC_OMP06
Date				16/05/2023	16/05/2023	16/05/2023	19/05/2023	19/05/2023	19/05/2023	19/05/2023	17/05/2023	17/05/2023	17/05/2023	16/05/2023	16/05/2023	17/05/2023
Sample Type				Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.				ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
(n:2) Fluorotelomer Sulfonic Acids																
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																
Perfluorohexanoic acid (PFHxA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	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
Perfluoroalkane Sulfonic Acids																
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.18	0.08	0.06	0.05	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.09	0.03	0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.49	0.19	0.15	0.07	0.04	0.03
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	0.03	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01	0.07[#1]	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.67	0.27	0.21	0.12	0.04	0.03
Perfluoroalkyl Sulfonamides																
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																
Sum of PFAS	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	0.94	0.35	0.23	0.12	0.04	0.03

Comments

#1 Reticulated water supplies at public facilities (Risk ID 4)
Surface water from Mission Creek (Risk ID 2)
Surface water from Watermill Creek (Risk ID 5)
Groundwater at airport (airport bore) (Risk ID 3)

Table 5: Lower Trigger Levels - Stock
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

			Location Code	ID014_BORE	ID015_BORE	MC_OMP08	MC_OMP09	MC_OMP10
			Field ID	IDO14_BORE	ID015_BORE	MC_OMP08	MC_OMP09	MC_OMP10
			Date	18/05/2023	17/05/2023	18/05/2023	18/05/2023	17/05/2023
			Sample Type	Normal	Normal	Normal	Normal	Normal
			Lab Report No.	ES2317551	ES2317549	ES2317554	ES2317554	ES2317554
	Unit	LOR	Lower Trigger Value - Stock Watering					
(n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids								
Perfluorohexanoic acid (PFHxA)	µg/L	0.02		0.20	<0.02	0.49	0.39	0.41
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02		0.08	<0.02	0.20	0.15	0.16
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02		0.04	<0.02	0.10	0.08	0.09
Perfluorobutanoic acid (PFBA)	µg/L	0.1		<0.1	<0.1	0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01		0.08	<0.01	0.20	0.16	0.17
Perfluoroalkane Sulfonic Acids								
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	0.33[#1]	2.37	0.03	6.44	4.94	5.32
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02		0.19	<0.02	0.42	0.34	0.38
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	1.2[#1]	1.36	0.03	3.07	2.45	2.79
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02		0.09	<0.02	0.23	0.17	0.19
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02		0.15	<0.02	0.43	0.36	0.33
Sum of PFHxS and PFOS	µg/L	0.01		3.73	0.06	9.51	7.39	8.11
Perfluoroalkyl Sulfonamides								
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02
PFAS								
Sum of PFAS	µg/L	0.01		4.56	0.06	11.7	9.04	9.84

Comments

#1 Surface water - Mission Creek water (used to water stock on e.g. properties A, B, C prior to management) (Risk ID 1)

Table 6: Lower Trigger Level- ID013 Chicken Watering
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

			Location Code	ID013_BORE
			Field ID	ID013_BORE
			Date	18/05/2023
			Sample Type	Normal
			Lab Report No.	ES2317553
	Unit	LOR	Lower Trigger Value - ID013	
(n:2) Fluorotelomer Sulfonic Acids				
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05		<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05		<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05		<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05		<0.05
Perfluoroalkane Carboxylic Acids				
Perfluorohexanoic acid (PFHxA)	µg/L	0.02		<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02		<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02		<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02		<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05		<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02		<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1		<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02		<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02		<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02		<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01		<0.01
Perfluoroalkane Sulfonic Acids				
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	0.9[#1]	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02		<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	1.3[#1]	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02		<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02		<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02		<0.02
Sum of PFHxS and PFOS	µg/L	0.01		<0.01
Perfluoroalkyl Sulfonamides				
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02		<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02		<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02
PFAS				
Sum of PFAS	µg/L	0.01		<0.01

Comments
#1 Mission Creek water on property ID013 (used to water chickens prior to management) (Risk ID 1)

Table 7: 2023 Water Analytical Results
DITRDCA, Norfolk, DSI

senversa

								Airport									
Location Code								A_TAP1	A_TAP4	A_TAP10	A_TAP11	A_TAP12	A_TAP13	A_TAP14	A_TAP15	A_TAP16	A_TAP17
Field ID								A_TAP1	A_TAP 4	A_TAP 10	A_TAP11	A_TAP12	A_TAP 13	A_TAP14	A_TAP15	A_TAP16	A_TAP17
Date								17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023
Sample Type								Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.								ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering										
(n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																		
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																		
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.06	<0.01	<0.01	<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.06	<0.01	<0.01	<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01
Perfluoroalkyl Sulfonamides																		
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																		
Sum of PFAS	µg/L	0.01							0.06	<0.01	<0.01	<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 7: 2023 Water Analytical Results
DITRDCA, Norfolk, DSI

									Airport		Waste Transfer Centre					
Location Code									AIRPORT_BORE	AIRPORT_RESERVOIR	WASTE_TAP1	WASTE_TAP2	WASTE_TAP3	WASTE_TAP4	WASTE_TAP5	WASTE_TAP6
Field ID									AIRPORT_BORE	AIRPORT_RESERVOIR	WASTE_TAP 1	WASTE TAP 2	WASTE_TAP3	WASTE_TAP4	WASTE_TAP5	WASTE_TAP6
Date									17/05/2023	17/05/2023	16/05/2023	16/05/2023	19/05/2023	19/05/2023	19/05/2023	19/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering								
(n:2) Fluorotelomer Sulfonic Acids																
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							0.68	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.20	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							0.17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	0.37	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	13.1	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							0.83	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	6.21	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							0.46	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	0.65	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	*19.3*	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides																
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																
Sum of PFAS	µg/L	0.01							22.8	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 7: 2023 Water Analytical Results
DITRDCA, Norfolk, DSI

									Depot				Shed	Fire Station				ID013	ID014
Location Code									DEPOT_TANK1	DEPOT_TANK2	DEPOT_TANK 3	DEPOT_TAP	ELEC_TAP1	FRE_TANK1	FRE_TAP1	FRE_TAP2	ID013_BORE	ID014_BORE
Field ID									DEPOT_TANK 1	DEPOT_TANK 2	DEPOT_TANK 3	DEPOT_TAP	ELEC_TAP1	FRE_TANK 1	FRE_TAP1	FRE_TAP2	ID013_BORE	IDO14_BORE
Date									16/05/2023	16/05/2023	16/05/2023	16/05/2023	19/05/2023	19/05/2023	18/05/2023	18/05/2023	18/05/2023	18/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317553	ES2317551
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering										
(n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																		
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.20
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.08
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10* [#1]	0.56[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.08
Perfluoroalkane Sulfonic Acids																		
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.37
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.19
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.36
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.09
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.15
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2* [#1]	0.07[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	*3.73*
Perfluoroalkyl Sulfonamides																		
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																		
Sum of PFAS	µg/L	0.01							<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	4.56

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 7: 2023 Water Analytical Results
DITRDCA, Norfolk, DSI

									ID015	ID016	Mission Creek							
Location Code									ID015_BORE	ID016_BORE	WW11_DAM	MC_OMP01	MC_OMP02	MC_OMP03	MC_OMP04	MC_OMP05	MC_OMP06	MC_OMP07
Field ID									ID015_BORE	IDO16_BORE	WW11_DAM	MC_DMP01	MC_OMP02	MCOMP03	MC_OMP04	MC_OMP05	MC_OMP06	MC_OMP07
Date									17/05/2023	18/05/2023	16/05/2023	16/05/2023	18/05/2023	18/05/2023	17/05/2023	17/05/2023	17/05/2023	18/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2317549	ES2317550	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering										
(n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																		
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	0.05	0.71	0.45	0.09	0.69	0.54	0.51	0.49	0.49
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	0.21	0.13	0.24	0.22	0.23	0.21	0.20	0.20
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	0.15	0.10	0.03	0.16	0.12	0.11	0.10	0.10
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	0.1	<0.1	0.1	0.1	0.1	0.1	0.1	0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	<0.01	0.37	0.31	0.02	0.31	0.23	0.23	0.20	0.21
Perfluoroalkane Sulfonic Acids																		
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.03	<0.01	**14.6**	**19.1**	0.10	**11.4**	**7.37**	**7.53**	**6.23**	**6.50**
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	0.06	0.87	0.60	0.06	0.73	0.49	0.45	0.45	0.43
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	0.03	0.29	5.87	4.73	0.32	5.68	3.78	3.54	3.22	3.16
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	0.53	0.55	<0.02	0.39	0.25	0.24	0.22	0.24
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	0.08	0.59	0.40	0.07	0.70	0.50	0.46	0.40	0.43
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.06	0.29	*20.5*	*23.8*	0.42	*17.1*	*11.2*	*11.1*	*9.45*	*9.66*
Perfluoroalkyl Sulfonamides																		
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																		
Sum of PFAS	µg/L	0.01							0.06	0.48	24.0	26.4	1.03	20.4	13.6	13.4	11.6	11.9

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 7: 2023 Water Analytical Results
DITRDCA, Norfolk, DSI

senversa

									Mission Creek				Cockpit Creek	Headstone Creek	Watermilll Creek		
Location Code									MC_OMP08	MC_OMP09	MC_OMP10	MC_OMP11	Cockpit_SW01	PWS_HEAD_DAM	WC_OMP01	WC_OMP02	WC_OMP03
Field ID									MC_OMP08	MC_OMP09	MC_OMP10	MC_OMP11	COCKPIT_SW01	PWS_HEAD_DAM	WC_OMP01	WC_OMP02	WC_OMP03
Date									18/05/2023	18/05/2023	17/05/2023	18/05/2023	16/05/2023	16/05/2023	17/05/2023	17/05/2023	17/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering									
(n:2) Fluorotelomer Sulfonic Acids																	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																	
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							0.49	0.39	0.41	0.30	<0.02	<0.02	0.07	0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.20	0.15	0.16	0.11	<0.02	<0.02	0.03	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							0.10	0.08	0.09	0.06	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	0.20	0.16	0.17	0.11	<0.01	<0.01	0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																	
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	**6.44**	**4.94**	**5.32**	**3.29**	<0.01	<0.01	0.18	0.08	0.06
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							0.42	0.34	0.38	0.26	<0.02	<0.02	0.09	0.03	0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	3.07	2.45	2.79	1.93	<0.01	<0.01	0.49	0.19	0.15
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							0.23	0.17	0.19	0.14	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	0.43	0.36	0.33	0.27	<0.02	<0.02	0.07	0.03	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	*9.51*	*7.39*	*8.11*	*5.22*	<0.01	<0.01	0.67	0.27	0.21
Perfluoroalkyl Sulfonamides																	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																	
Sum of PFAS	µg/L	0.01							11.7	9.04	9.84	6.47	<0.01	<0.01	0.94	0.35	0.23

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 7: 2023 Water Analytical Results
DITRDCA, Norfolk, DSI

									Watermill Creek			Emily Bay			
								Location Code	WC_OMP04_DUCKDAM	WC_OMP05	WC_OMP06	EB_OMP01	EB_OMP02	EB_OMP03	EB_OMP04
								Field ID	WC_OMP04_OUCKDAM	WC_OMP05	WC_OMP06	EB_OMP01	EB_OMP02	EB_OMP03	EB_OMP04
								Date	16/05/2023	16/05/2023	17/05/2023	16/05/2023	16/05/2023	16/05/2023	16/05/2023
								Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal
								Lab Report No.	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering							
(n:2) Fluorotelomer Sulfonic Acids															
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids															
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids															
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	0.07	0.04	0.03	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.12	0.04	0.03	<0.01	<0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides															
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS															
Sum of PFAS	µg/L	0.01							0.12	0.04	0.03	<0.01	<0.01	<0.01	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 8: 2023 Sediment Analytical Results
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

						Location Code	WC_OMP07
						Field ID	WC_OMP07
						Date	18/05/2023
						Sample Type	Normal
						Lab Report No.	ES2317554
	Unit	LOR	PFAS NEMP 2.0: Ecological, direct exposure	PFAS NEMP 2.0: Ecological, indirect exposure	PFAS NEMP 2.0: Health, Industrial/commercial (HIL D)	**PFAS NEMP 2.0: Health, Residential with garden/accessible soil (HIL A)**	
(n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005					<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FtS)	mg/kg	0.0005					<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005					<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005					<0.0005
Perfluoroalkane Carboxylic Acids							
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002					<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002					<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002					<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002					<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005					<0.0005
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002					<0.0002
Perfluorobutanoic acid (PFBA)	mg/kg	0.001					<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002					<0.0002
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002					<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002					<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	10[#1]		50[#1]	**0.1**[#1]	<0.0002
Perfluoroalkane Sulfonic Acids							
Perfluorooctanesulfonic acid (PFOS)	mg/kg	0.0002	1[#1]	0.01[#1]			0.0036
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002					<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002					0.0002
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002					<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002					<0.0002
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002					<0.0002
Sum of PFHxS and PFOS	mg/kg	0.0002			20[#1]	**0.01**[#1]	0.0038
Perfluoroalkyl Sulfonamides							
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005					<0.0005
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	mg/kg	0.0002					<0.0002
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	mg/kg	0.0002					<0.0002
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005					<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005					<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	mg/kg	0.0005					<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002					<0.0002
PFAS							
Sum of PFAS	mg/kg	0.0002					0.0038

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Airport									
Location Code									A_TAP1	A_TAP1	A_TAP1	A_TAP2	A_TAP3	A_TAP4	A_TAP4	A_TAP4	A_TAP5	A_TAP10
Field ID									A_TAP1	A_TAP1	A_TAP1	A_TAP2	A_TAP3	A_TAP4	A_TAP4	A_TAP 4	A_TAP5	A_TAP 10
Date									09/03/2021	24/05/2022	17/05/2023	09/03/2021	16/03/2021	16/03/2021	24/05/2022	17/05/2023	16/03/2021	17/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2111278	ES2218760-AC	ES2317554	ES2111278	ES2111280	ES2111280	ES2218760-AC	ES2317554	ES2111280	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering										
(n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																		
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	0.90	<0.02	<0.02	<0.02	<0.02	0.97	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	0.23	<0.02	<0.02	<0.02	<0.02	0.25	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	0.19	<0.02	<0.02	<0.02	<0.02	0.21	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	0.45	<0.01	<0.01	<0.01	<0.01	0.49	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																		
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.02	14.8	0.06	0.01	<0.01	0.08	15.2	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	0.94	<0.02	<0.02	<0.02	<0.02	1.06	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.02	7.15	<0.01	<0.02	<0.02	0.03	7.06	<0.01	0.04	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	0.51	<0.02	<0.02	<0.02	<0.02	0.56	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	0.75	<0.02	<0.02	<0.02	<0.02	0.81	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.02	*22.0*	0.06	0.01	<0.01	0.11	*22.3*	<0.01	0.04	<0.01
Perfluoroalkyl Sulfonamides																		
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																		
Sum of PFAS	µg/L	0.01							0.02	26.0	0.06	0.01	<0.01	0.11	26.8	<0.01	0.04	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Airport						
Location Code									A_TAP11	A_TAP12	A_TAP13	A_TAP14	A_TAP15	A_TAP16	A_TAP17
Field ID									A_TAP11	A_TAP12	A_TAP 13	A_TAP14	A_TAP15	A_TAP16	A_TAP17
Date									17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering							
(n:2) Fluorotelomer Sulfonic Acids															
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids															
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10* [#1]	0.56[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids															
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2* [#1]	0.07[#2]	<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01
Perfluoroalkyl Sulfonamides															
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS															
Sum of PFAS	µg/L	0.01							<0.01	0.02	<0.01	0.02	0.03	0.03	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

										Airport				
Location Code									AIRPORT_BORE	AIRPORT_BORE	AIRPORT_BORE	AIRPORT_BORE	AIRPORT_RESERVOIR	AIRPORT_TRUCKFILL
Field ID									PWS_AIRPORT_BORE	AIRPORT_BORE	AIRPORT_BORE	AIRPORT_BORE	AIRPORT_RESERVOIR	AIRPORT_TRUCKFILL
Date									14/01/2020	09/03/2021	25/05/2022	17/05/2023	17/05/2023	25/05/2022
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2002626	ES2111278	ES2218760-AC	ES2317554	ES2317554	ES2218760-AC
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering						
(n:2) Fluorotelomer Sulfonic Acids														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids														
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							1.35	1.32	0.96	0.68	<0.02	0.99
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.33	0.30	0.24	0.20	<0.02	0.24
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							0.28	0.29	0.22	0.17	<0.02	0.22
Perfluorobutanoic acid (PFBA)	µg/L	0.1							0.2	0.2	0.1	0.1	<0.1	0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	0.57	0.68	0.50	0.37	<0.01	0.46
Perfluoroalkane Sulfonic Acids														
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	33.1	17.2	16.8	13.1	<0.01	14.0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							1.62	1.35	1.16	0.83	<0.02	1.05
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	11.4	7.68	7.67	6.21	<0.01	7.27
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							0.92	0.69	0.63	0.46	<0.02	0.50
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	1.27	1.13	0.88	0.65	<0.02	0.85
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	*44.5*	*24.9*	*24.5*	*19.3*	<0.01	*21.3*
Perfluoroalkyl Sulfonamides														
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS														
Sum of PFAS	µg/L	0.01							51.0	30.8	29.2	22.8	<0.01	25.7

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Cockpit Creek				Depot		
								Location Code	Cockpit_SW01	Cockpit_SW01	Cockpit_SW01	Cockpit_SW01	DEPOT_TANK1	DEPOT_TANK1	DEPOT_TANK1
								Field ID	Cockpit_SW01	COCKPIT_SW01	COCKPIT_SW01	COCKPIT_SW01	DEPOT_TANK1	DEPOT_TANK1	DEPOT_TANK 1
								Date	18/01/2020	17/03/2021	24/05/2022	16/05/2023	21/01/2020	24/05/2022	16/05/2023
								Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal
								Lab Report No.	ES2002808	ES2111280	ES2218760-AC	ES2317554	ES2002819	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering							
(n:2) Fluorotelomer Sulfonic Acids															
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids															
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
Perfluoroalkane Sulfonic Acids															
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.02	0.03	0.01	<0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	0.02	<0.02	0.01	<0.01	<0.02	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.04	0.03	0.02	<0.01	<0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides															
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS															
Sum of PFAS	µg/L	0.01							0.04	0.03	0.02	<0.01	<0.01	0.20	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Depot					
Location Code									DEPOT_TANK2	DEPOT_TANK2	DEPOT_TANK2	DEPOT_TANK3	DEPOT_TANK3	DEPOT_TANK 3
Field ID									DEPOT_TANK2	DEPOT_TANK2	DEPOT_TANK 2	DEPOT_TANK3	DEPOT_TANK3	DEPOT_TANK 3
Date									21/01/2020	24/05/2022	16/05/2023	11/03/2021	24/05/2022	16/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2002819	ES2218760-AC	ES2317554	ES2111278	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering						
(n:2) Fluorotelomer Sulfonic Acids														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids														
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							0.38	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.09	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							0.07	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10* [#1]	0.56[#2]	0.17	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids														
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	5.54	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							0.45	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	3.47	<0.01	<0.01	<0.02	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							0.24	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	0.35	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2* [#1]	0.07[#2]	*9.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides														
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS														
Sum of PFAS	µg/L	0.01							10.8	<0.01	<0.01	<0.01	<0.01	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Depot				Shed
Location Code									DEPOT_TAP	DEPOT_TAP	DEPOT_TAP	DEPOT_TAP	ELEC_TAP1
Field ID									DEPOT_TAP	DEPOT_TAP1	DEPOT_TAP	DEPOT_TAP	ELEC_TAP1
Date									21/01/2020	11/03/2021	24/05/2022	16/05/2023	19/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2002819	ES2111278	ES2218760-AC	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering					
(n:2) Fluorotelomer Sulfonic Acids													
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids													
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							0.37	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.09	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							0.07	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10* [#1]	0.56[#2]	0.16	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids													
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	5.46	<0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							0.42	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	3.33	<0.02	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							0.23	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	0.34	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2* [#1]	0.07[#2]	*8.79*	<0.01	<0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides													
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02
PFAS													
Sum of PFAS	µg/L	0.01							10.5	<0.01	<0.01	<0.01	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Fire Station							
								Location Code	FRE_TANK1	FRE_TAP1	FRE_TAP1	FRE_TAP1	FRE_TAP1	FRE_TAP2	FRE_TAP2	FRE_TAP2
								Field ID	FRE_TANK 1	FRE_TAP1	FRE_TAP1	FRE_TAP1	FRE_TAP1	FRE_TAP2	FRE_TAP2	FRE_TAP2
								Date	19/05/2023	20/01/2020	12/03/2021	24/05/2022	18/05/2023	20/01/2020	24/05/2022	18/05/2023
								Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
								Lab Report No.	ES2317554	ES2002817	ES2111256	ES2218760-AC	ES2317554	ES2002817	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering								
(n:2) Fluorotelomer Sulfonic Acids																
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	0.37	<0.02	<0.02	<0.02	1.07	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	0.09	<0.02	<0.02	<0.02	0.26	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	0.07	<0.02	<0.02	<0.02	0.21	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10* [#1]	0.56[#2]	<0.01	0.16	<0.01	<0.01	<0.01	0.44	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	<0.01	5.49	<0.01	<0.01	<0.01	15.0	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	0.41	<0.02	<0.02	<0.02	1.31	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.01	3.14	<0.02	<0.01	<0.01	7.30	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	0.23	<0.02	<0.02	<0.02	0.74	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	0.31	<0.02	<0.02	<0.02	0.94	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2* [#1]	0.07[#2]	<0.01	*8.63*	<0.01	<0.01	<0.01	*22.3*	<0.01	<0.01
Perfluoroalkyl Sulfonamides																
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																
Sum of PFAS	µg/L	0.01							<0.01	10.3	<0.01	<0.01	<0.01	27.5	<0.01	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									ID013					ID014			
Location Code									ID013_BORE	ID013_BORE	ID013_SW01	ID013_SW01	ID013_SW01	ID014_BORE	ID014_BORE	ID014_BORE	ID014_BORE
Field ID									ID013_BORE	ID013_BORE	ID013_SW01	ID013_SW01	ID013_SW01	ID014_BORE	ID014_BORE	ID014_BORE	IDO14_BORE
Date									22/01/2020	18/05/2023	22/01/2020	11/03/2021	26/05/2022	23/01/2020	12/03/2021	26/05/2022	18/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2002831	ES2317553	ES2002831	ES2111261	ES2218760-AC	ES2002813	ES2111243	ES2218760-AC	ES2317551
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering									
(n:2) Fluorotelomer Sulfonic Acids																	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																	
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	0.14	0.14	0.28	0.15	0.12	0.30	0.20
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	0.03	0.03	0.11	0.04	0.02	0.11	0.08
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	0.03	0.03	0.07	0.02	0.02	0.07	0.04
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	<0.01	0.07	0.05	0.14	0.05	0.04	0.12	0.08
Perfluoroalkane Sulfonic Acids																	
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	<0.01	<0.01	**2.78**	1.38	**2.99**	1.93	0.89	**2.79**	**2.37**
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	0.17	0.18	0.37	0.17	0.14	0.27	0.19
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.02	<0.01	1.72	1.46	2.34	1.20	1.04	2.43	1.36
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	0.14	0.07	0.14	0.08	0.05	0.15	0.09
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	0.14	0.17	0.32	0.16	0.15	0.29	0.15
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	<0.01	<0.01	*4.50*	*2.84*	*5.33*	*3.13*	1.93	*5.22*	*3.73*
Perfluoroalkyl Sulfonamides																	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																	
Sum of PFAS	µg/L	0.01							<0.01	<0.01	5.22	3.51	6.76	3.80	2.47	6.53	4.56

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									ID015				ID016		
Location Code									ID015_BORE	ID015_BORE	ID015_BORE	ID015_BORE	ID016_BORE	ID016_BORE	ID016_BORE
Field ID									ID015_BORE	ID015_BORE	ID015_BORE	ID015_BORE	ID016_BORE	ID016_BORE	IDO16_BORE
Date									23/01/2020	16/03/2021	26/05/2022	17/05/2023	12/03/2021	26/05/2022	18/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2002814	ES2111245	ES2218760-AC	ES2317549	ES2111244	ES2218760-AC	ES2317550
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering							
(n:2) Fluorotelomer Sulfonic Acids															
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids															
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							0.09	0.04	0.03	<0.02	<0.02	<0.02	0.05
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids															
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.46	0.15	0.17	0.03	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							0.10	0.05	0.04	<0.02	0.03	<0.02	0.06
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	0.63	0.30	0.19	0.03	0.14	0.02	0.29
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	0.11	0.06	0.04	<0.02	0.03	<0.02	0.08
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	1.09	0.45	0.36	0.06	0.14	0.02	0.29
Perfluoroalkyl Sulfonamides															
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS															
Sum of PFAS	µg/L	0.01							1.46	0.61	0.47	0.06	0.20	0.02	0.48

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Mission Creek									
								Location Code	WW11_DAM	WW11_DAM	WW11_DAM	WW11_DAM	MC_OMP01	MC_OMP01	MC_OMP01	MC_OMP02	MC_OMP02	MC_OMP02
								Field ID	PWS-WWII_DAM	WW11_DAM	WWII_DAM	WW11_DAM	MC_SW21	MC_OMP01	MC_DMP01	MC_SW24	MC_OMP02	MC_OMP02
								Date	13/01/2020	13/03/2021	25/05/2022	16/05/2023	13/03/2021	26/05/2022	16/05/2023	13/03/2021	26/05/2022	18/05/2023
								Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
								Lab Report No.	ES2002626	ES2111280	ES2218760-AC	ES2317554	ES2111268	ES2218760-AC	ES2317554	ES2111268	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering										
(n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																		
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							2.68	2.21	1.21	0.71	2.05	1.32	0.45	0.03	0.06	0.09
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.65	0.55	0.34	0.21	0.46	0.36	0.13	0.03	0.12	0.24
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							0.51	0.75	0.29	0.15	0.41	0.29	0.10	<0.02	<0.02	0.03
Perfluorobutanoic acid (PFBA)	µg/L	0.1							0.4	0.3	0.2	0.1	0.3	0.2	<0.1	<0.1	<0.1	0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10* [#1]	0.56[#2]	1.13	1.25	0.62	0.37	0.92	0.68	0.31	<0.01	<0.01	0.02
Perfluoroalkane Sulfonic Acids																		
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	44.6	21.0	25.5	14.6	24.0	24.8	19.1	0.03	0.05	0.10
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							2.97	3.00	1.26	0.87	2.49	1.42	0.60	0.03	0.04	0.06
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	22.6	13.6	9.53	5.87	15.9	10.5	4.73	0.14	0.17	0.32
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							2.05	1.65	0.78	0.53	1.42	0.75	0.55	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	2.30	2.42	0.94	0.59	1.69	1.15	0.40	0.04	0.05	0.07
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2* [#1]	0.07[#2]	*67.2*	*34.6*	*35.0*	*20.5*	*39.9*	*35.3*	*23.8*	0.17	0.22	0.42
Perfluoroalkyl Sulfonamides																		
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																		
Sum of PFAS	µg/L	0.01							79.9	46.7	40.7	24.0	49.6	41.5	26.4	0.30	0.49	1.03

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Mission Creek								
Location Code									MC_OMP03	MC_OMP03	MC_OMP03	MC_OMP04	MC_OMP04	MC_OMP04	MC_OMP05	MC_OMP05	MC_OMP05
Field ID									MC_SW25	MC_OMP03	MCOMP03	MC_SW28	MC_OMP04	MC_OMP04	MC_SW27	MC_OMP05	MC_OMP05
Date									13/03/2021	26/05/2022	18/05/2023	17/03/2021	25/05/2022	17/05/2023	17/03/2021	25/05/2022	17/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2111268	ES2218760-AC	ES2317554	ES2111268	ES2218760-AC	ES2317554	ES2111268	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering									
(n:2) Fluorotelomer Sulfonic Acids																	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																	
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							0.04	0.81	0.69	0.70	0.53	0.54	0.64	0.57	0.51
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.05	0.25	0.22	0.17	0.19	0.23	0.16	0.19	0.21
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	0.17	0.16	0.11	0.12	0.12	0.11	0.12	0.11
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	0.34	0.31	0.25	0.22	0.23	0.24	0.24	0.23
Perfluoroalkane Sulfonic Acids																	
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.05	14.0	11.4	5.52	8.14	7.37	5.85	9.64	7.53
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							0.04	0.83	0.73	0.56	0.50	0.49	0.53	0.50	0.45
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	0.17	5.84	5.68	4.07	3.65	3.78	4.08	3.63	3.54
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	0.43	0.39	0.26	0.25	0.25	0.26	0.26	0.24
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	0.04	0.72	0.70	0.50	0.47	0.50	0.60	0.45	0.46
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.22	*19.8*	*17.1*	*9.59*	*11.8*	*11.2*	*9.93*	*13.3*	*11.1*
Perfluoroalkyl Sulfonamides																	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																	
Sum of PFAS	µg/L	0.01							0.39	23.5	20.4	12.2	14.2	13.6	12.6	15.7	13.4

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Mission Creek								
Location Code									MC_OMP06	MC_OMP06	MC_OMP06	MC_OMP07	MC_OMP07	MC_OMP07	MC_OMP08	MC_OMP08	MC_OMP08
Field ID									MC_SW26	MC_OMP06	MC_OMP06	MC_SW11	MC_OMP07	MC_OMP07	MC_SW13	MC_OMP08	MC_OMP08
Date									17/03/2021	25/05/2022	17/05/2023	13/03/2021	25/05/2022	18/05/2023	13/03/2021	25/05/2022	18/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2111268	ES2218760-AC	ES2317554	ES2111268	ES2218760-AC	ES2317554	ES2111268	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering									
(n:2) Fluorotelomer Sulfonic Acids																	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																	
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							0.70	0.58	0.49	0.67	0.60	0.49	0.52	0.57	0.49
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.17	0.20	0.20	0.17	0.20	0.20	0.13	0.19	0.20
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							0.12	0.12	0.10	0.11	0.12	0.10	0.08	0.11	0.10
Perfluorobutanoic acid (PFBA)	µg/L	0.1							0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	0.24	0.24	0.20	0.23	0.22	0.21	0.15	0.21	0.20
Perfluoroalkane Sulfonic Acids																	
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	4.23	7.98	6.23	4.01	8.39	6.50	3.53	7.87	6.44
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							0.64	0.56	0.45	0.58	0.53	0.43	0.45	0.47	0.42
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	4.82	4.02	3.22	4.51	3.72	3.16	3.48	3.66	3.07
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							0.28	0.28	0.22	0.24	0.25	0.24	0.17	0.25	0.23
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	0.74	0.49	0.40	0.52	0.49	0.43	0.48	0.48	0.43
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	*9.05*	*12.0*	*9.45*	*8.52*	*12.1*	*9.66*	*7.01*	*11.5*	*9.51*
Perfluoroalkyl Sulfonamides																	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																	
Sum of PFAS	µg/L	0.01							12.0	14.6	11.6	11.1	14.6	11.9	9.09	13.9	11.7

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Mission Creek						
								Location Code	MC_OMP09	MC_OMP09	MC_OMP09	MC_OMP10	MC_OMP10	MC_OMP11	MC_OMP11
								Field ID	MC_SW04	MC_OMP09	MC_OMP09	MC_OMP10	MC_OMP10	MC_OMP11	MC_OMP11
								Date	13/03/2021	25/05/2022	18/05/2023	25/05/2022	17/05/2023	25/05/2022	18/05/2023
								Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal
								Lab Report No.	ES2111268	ES2218760-AC	ES2317554	ES2218760-AC	ES2317554	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering							
(n:2) Fluorotelomer Sulfonic Acids															
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids															
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							0.40	0.36	0.39	0.49	0.41	0.36	0.30
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							0.14	0.12	0.15	0.15	0.16	0.11	0.11
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							0.02	0.07	0.08	0.10	0.09	0.08	0.06
Perfluorobutanoic acid (PFBA)	µg/L	0.1							0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	0.02	0.13	0.16	0.18	0.17	0.14	0.11
Perfluoroalkane Sulfonic Acids															
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.38	**3.80**	**4.94**	**4.62**	**5.32**	**4.43**	**3.29**
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							0.27	0.35	0.34	0.41	0.38	0.33	0.26
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	0.88	2.66	2.45	3.00	2.79	2.45	1.93
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							0.02	0.16	0.17	0.19	0.19	0.15	0.14
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	0.52	0.37	0.36	0.42	0.33	0.35	0.27
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	1.26	*6.46*	*7.39*	*7.62*	*8.11*	*6.88*	*5.22*
Perfluoroalkyl Sulfonamides															
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS															
Sum of PFAS	µg/L	0.01							2.75	8.02	9.04	9.56	9.84	8.40	6.47

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Headstone Creek				Water Transfer Centre			
								Location Code	PWS_HEAD_DAM	PWS_HEAD_DAM	PWS_HEAD_DAM	PWS_HEAD_DAM	WASTE_TAP1	WASTE_TAP1	WASTE_TAP2	WASTE_TAP3
								Field ID	PWS_HEAD_DAM	PWS_HEAD_DAM	PWS_HEAD_DAM	PWS_HEAD_DAM	WASTE_TAP	WASTE_TAP 1	WASTE TAP 2	WASTE_TAP3
								Date	14/01/2020	16/03/2021	24/05/2022	16/05/2023	25/05/2022	16/05/2023	16/05/2023	19/05/2023
								Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
								Lab Report No.	ES2002626	ES2111280	ES2218760-AC	ES2317554	ES2218760-AC	ES2317554	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering								
(n:2) Fluorotelomer Sulfonic Acids																
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides																
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																
Sum of PFAS	µg/L	0.01							0.02	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Waste Transfer Centre			Watermill Creek					
Location Code									WASTE_TAP4	WASTE_TAP5	WASTE_TAP6	WC_OMP01	WC_OMP01	WC_OMP01	WC_OMP02	WC_OMP02	WC_OMP02
Field ID									WASTE_TAP4	WASTE_TAP5	WASTE_TAP6	TC_SW06	WC_OMP01	WC_OMP01	TC_SW04	WC_OMP02	WC_OMP02
Date									19/05/2023	19/05/2023	19/05/2023	13/03/2021	26/05/2022	17/05/2023	12/03/2021	26/05/2022	17/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2317554	ES2317554	ES2317554	ES2111268	ES2218760-AC	ES2317554	ES2111268	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering									
(n:2) Fluorotelomer Sulfonic Acids																	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																	
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	<0.02	0.12	0.08	0.07	0.05	0.04	0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	0.03	0.03	0.03	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	<0.01	<0.01	0.02	0.01	0.01	0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																	
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.01	<0.01	<0.01	0.29	0.21	0.18	0.15	0.08	0.08
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	<0.02	0.14	0.10	0.09	0.06	0.03	0.03
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.01	<0.01	<0.01	0.85	0.54	0.49	0.40	0.22	0.19
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	<0.02	0.11	0.09	0.07	0.07	0.04	0.03
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.01	<0.01	<0.01	1.14	0.75	0.67	0.55	0.30	0.27
Perfluoroalkyl Sulfonamides																	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																	
Sum of PFAS	µg/L	0.01							0.01	<0.01	<0.01	1.58	1.06	0.94	0.74	0.41	0.35

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Watermill Creek							
								Location Code	WC_OMP03	WC_OMP03	WC_OMP03	WC_OMP03	WC_OMP04_DUCKDAM	WC_OMP04_DUCKDAM	WC_OMP04_DUCKDAM	WC_OMP04_DUCKDAM
								Field ID	TC_SW02	TC_SW02	WC_OMP03	WC_OMP03	PWS_DUCK_DAM	PWS_DUCK_DAM	OMP04_DUCKD	OMP04_OUCKD
								Date	16/01/2020	13/03/2021	26/05/2022	17/05/2023	14/01/2020	14/03/2021	24/05/2022	16/05/2023
								Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
								Lab Report No.	ES2002626	ES2111268	ES2218760-AC	ES2317554	ES2002626	ES2111280	ES2218760-AC	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering								
(n:2) Fluorotelomer Sulfonic Acids																
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	0.03	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10*[#1]	0.56[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	0.03	0.07	0.07	0.06	0.03	0.02	0.03	0.05
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	0.04	0.04	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	0.06	0.23	0.20	0.15	0.09	0.07	0.10	0.07
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	0.06	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2*[#1]	0.07[#2]	0.09	0.30	0.27	0.21	0.12	0.09	0.13	0.12
Perfluoroalkyl Sulfonamides																
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																
Sum of PFAS	µg/L	0.01							0.09	0.43	0.38	0.23	0.12	0.09	0.13	0.12

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Table 9: Historical Water Analytical Results
DITRDCA, Norfolk, OM Year 2

									Watermill Creek				Emily Bay			
Location Code									WC_OMP05	WC_OMP05	WC_OMP05	WC_OMP06	EB_OMP01	EB_OMP02	EB_OMP03	EB_OMP04
Field ID									TC_SW07	WC_OMP05	WC_OMP05	WC_OMP06	EB_OMP01	EB_OMP02	EB_OMP03	EB_OMP04
Date									15/03/2021	24/05/2022	16/05/2023	17/05/2023	16/05/2023	16/05/2023	16/05/2023	16/05/2023
Sample Type									Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab Report No.									ES2111268	ES2218760-AC	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554	ES2317554
	Unit	LOR	**PFAS NEMP 2.0: Ecological, 90% species protection**	PFAS NEMP 2.0: Ecological, 95% species protection	PFAS NEMP 2.0: Ecological, 99% species protection	PFAS NEMP 2.0: Health, Drinking water quality guideline value	*PFAS NEMP 2.0: Health, Recreational water quality guideline value*	Stock Watering								
(n:2) Fluorotelomer Sulfonic Acids																
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																
Perfluorohexanoic acid (PFHxA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	**632**[#1]	220[#1]	19[#1]	0.56[#1]	*10* [#1]	0.56[#2]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids																
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	**2**[#1]	0.13[#1]	0.00023[#1]			0.07[#3]	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01						0.07[#4]	<0.02	0.06	0.04	0.03	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02						6.01[#5]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01				0.07[#1]	*2* [#1]	0.07[#2]	<0.01	0.10	0.04	0.03	<0.01	<0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides																
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05							<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02							<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFAS																
Sum of PFAS	µg/L	0.01							<0.01	0.10	0.04	0.03	<0.01	<0.01	<0.01	<0.01

Comments
#1 PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020
#2 NHMRC (2011) - Health
#3 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFOS)
#4 NHMRC (2011) - Health (value for PFOS+PFHxS also applied to PFHxS)
#5 USEPA Tap Water RSL (TR=1E-06; THQ=0.1)

Appendix A: SAQP

PFAS Sampling and Analysis Quality Plan – Year 1 Ongoing Monitoring

Norfolk Island Airport

3 May 2022

Document Information

PFAS Sampling and Analysis Quality Plan – Year 1 Ongoing Monitoring, Norfolk Island Airport

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0	3 May 2022	Michelle Agnew	Christopher Sandiford	Christopher Sandiford	Draft for review

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Senversa prepared this document in a manner consistent with the level of care and skill ordinarily exercised by members of Senversa's profession practising in the same locality under similar circumstances at the time the services were performed.

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Senversa acknowledges the traditional custodians of the land on which this work was created and pay our respect to Elders past and present.

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Appendix A: Sample Nomenclature

Glossary and Acronyms

Acronym	Definition
ADWG	Australian Drinking Water Guidelines
AFFF	Aqueous Film Forming Foam
ALS	ALS Environmental Ltd
AS	Australian Standard
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand Governments
BoM	Bureau of Meteorology
CoC	Chain of Custody
CSM	Conceptual Site Model
DQO	Data Quality Objective
DO	Dissolved Oxygen
DoH	Australian Government Department of Health
DSI	Detailed Site Investigation
EPA	Environment Protection Authority
EC	Electrical Conductivity
GME	Groundwater Monitoring Event
HBGV	Health Based Guidance Value
HEPA	Heads of EPA
HHERA	Human Health and Ecological Risk Assessment
HHSV	Human Health Screening Values

Acronym	Definition
HSEP	Health, Safety and Environment Management Plan
ID	Identification
LOR	Limit of Reporting
LTV	Lower Threshold Value
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NRMMC	Natural Resource Management Ministerial Council
OMP	Ongoing Monitoring Plan
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
PFHxS	Perfluorohexane Sulfonic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PS	PFAS Source Zone
PSI	Preliminary Site Investigation
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference

Acronym	Definition
SAQP	Sampling and Analysis Quality Plan
SPR	Source Pathway Receptor
SWL	Standing Water Level
SWMS	Safe Work Method Statement
TAT	Turnaround Time
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
UTV	Upper Threshold Value
WHO	World Health Organisation

Unit of Measurement	Definition
L	Litres
Ha	Hectares
m AHD	Metres Australian Height Datum
m	Metres
mm	Millimetres
mV	Millivolts
km	Kilometres
m bgl	Metres below ground level
mg/L	Milligrams per litre
µg/L	Micrograms per litre
mg/kg	Milligrams per kilogram

1.0 Introduction and Objectives

Senversa has been engaged to undertake an investigation of the nature and extent of perfluoroalkyl and polyfluoroalkyl substances (PFAS) at the Norfolk Island Airport (the site) and surrounding land. The site location and layout is shown in **Figure A1**.

In January 2020 Senversa commenced the Preliminary Site Investigation (PSI) which found that legacy aqueous film-forming foam (AFFF) containing PFAS was used on Norfolk Island from the early 1980s until 2015 to supress liquid fuel fires and for fire training activities. These findings were confirmed in further sampling undertaken as a part of the Detailed Site Investigation (DSI) completed in October 2021, with potentially unacceptable risks identified in the DSI quantitatively assessed within the Human Health and Ecological Risk Assessment (HHERA) also completed in October 2021.

To manage some uses of water, Senversa prepared a PFAS Management Plan detailing the strategy for managing risks associated with PFAS impacts on the airport and across the island. This strategy includes an Ongoing PFAS Monitoring Plan (OMP). To guide the field works proposed to be undertaken during completion of the OMP Year 1 Sampling Event, Senversa has prepared this Sampling and Analysis Quality Plan (SAQP).

1.1 Objectives

1.1.1 OMP Objectives

The overall objective of the OMP is to establish the ongoing monitoring actions which are required to assess:

- Trends in PFAS concentrations in the environment.
- The effectiveness of the selected management options in managing current risks.
- Whether changing conditions exist which may result in changes in the risk profile (and therefore changes to the required management actions).

Information from the monitoring program will be used on an ongoing basis to identify whether the currently selected management action should change. Future changes to the management actions could be:

- **Additional** required actions (for instance where additional water uses are identified, or if PFAS concentrations in the environment increase).
- **Reduced** required actions (for instance where lower PFAS concentrations in the environment mean that previously established management actions are no longer necessary to manage risks).

1.1.2 SAQP Objectives

The objective of this SAQP is to detail the data collection tasks required to complete the proposed Year 1 Monitoring Event including the following:

- Describe the current understanding of the nature and extent of PFAS contamination at the site, based on sampling tasks completed on-site.
- Describe the rationale and data quality objectives for the proposed sampling program.
- Specify the proposed investigation locations and strategy.
- Outline the field methodologies for sample collection.
- Specify key analytical considerations.
- Specify the quality assurance and quality control (QA/QC) program.
- Identify assessment criteria.

2.0 Background

2.1 Key Site Information

The following summary of general information for the site and surrounds is considered relevant to the development of this SAQP.

Table 2-1 Key Site Information Summary

Site Element	Relevant Information from Previous Investigations
Location and Size	Norfolk Island is situated in the Pacific Ocean, approximately 1,676 kilometres (km) from Sydney. The site is located in the south-western portion of Norfolk Island. The site occupies approximately 120 hectares (ha). See **Figure 1** for an overview of the site location and layout.
Land Uses	On-site The site is the Norfolk Island International Airport which comprises two runways and associated terminal buildings and carparks. The first runway of the airport was constructed on 25 December 1942 with the assistance of the United States Air Force to assist with war efforts. The airport contains 120 ha of land with 95 ha used for aviation purposes. Off-site The site is surrounded by rural properties and vegetated land to the north, south and west with the township of Burnt Pine to the north-east.
Geology and Soil Conditions	The site area is relatively flat with an elevation of 113 metres (m) above sea level. Soils are predominately derived from weathered Tertiary aged basaltic lava and tuff across the centre of the island, with Quaternary Aged alluvium and calcarenite present around much of the perimeter of the site extending inward from the coast for between 100 m and 500 m.
Hydrogeology	An upper aquifer is located across Norfolk Island in the base of porous alluvium and weathered basaltic rock. The groundwater moves towards sea level through a complex network of fractures and other interconnecting features in the volcanic bedrock (R.S Abell & A.C. Falkland, 1991). Groundwater is generally good quality and is suitable for domestic use. Groundwater type is classified as sodium chloride type with deuterium/oxygen correlation indicating direct groundwater infiltration. More than 450 bores (R.S Abell & A.C. Falkland, 1991) are known to be on the island.

2.2 Regulatory Framework

For the purposes of this investigation the following federal guidance has been adopted:

- National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM), National Environmental Protection Council (NEPC) (2013).
- PFAS National Environmental Management Plan (NEMP) 2.0, Heads of EPAs (HEPA) Australia and New Zealand (2020).
- Health Based Guidance Values for PFAS For Use in Site Investigations in Australia. Australian Government Department of Health (DoH) (2017).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Governments (ANZG) (2018).

Senversa will adopt a QA/QC approach that is based on guidance from the following sources:

- Australian Standard (AS) 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds.
- Schedule B (3) Guideline on Laboratory Analysis of Potentially Contaminated Soils, NEPM.
- United States Environmental Protection Agency (USEPA)- Guidance on Systematic Planning Using the Data Quality Objectives Process EPA QA/G-4.
- USEPA - Guidance on Environmental Data Verification and Data Validation EPA QA/G-8.

3.0 Identified PFAS Impacts

3.1 Norfolk Island Airport Description

Norfolk Island airport is an international airport with access to the airside portion of the airport strictly managed. Other uses of the site include the following:

- Fire Station.
- Bureau of Meteorology (BoM) weather station.
- Council offices.
- Freight forwarding office.
- Former drill ground.
- Waste depot.
- Wastewater treatment plant.

Low level concentrations of PFAS are present across all areas the airport, however concentrations of PFOS and perfluorohexane sulfonate (PFOS+PFHxS) appear to be highest at Source Area 4 (Current Drill Ground). This is where Legacy AFFF was used most recently for training in 2015 as shown on **Figure 3-1** below.

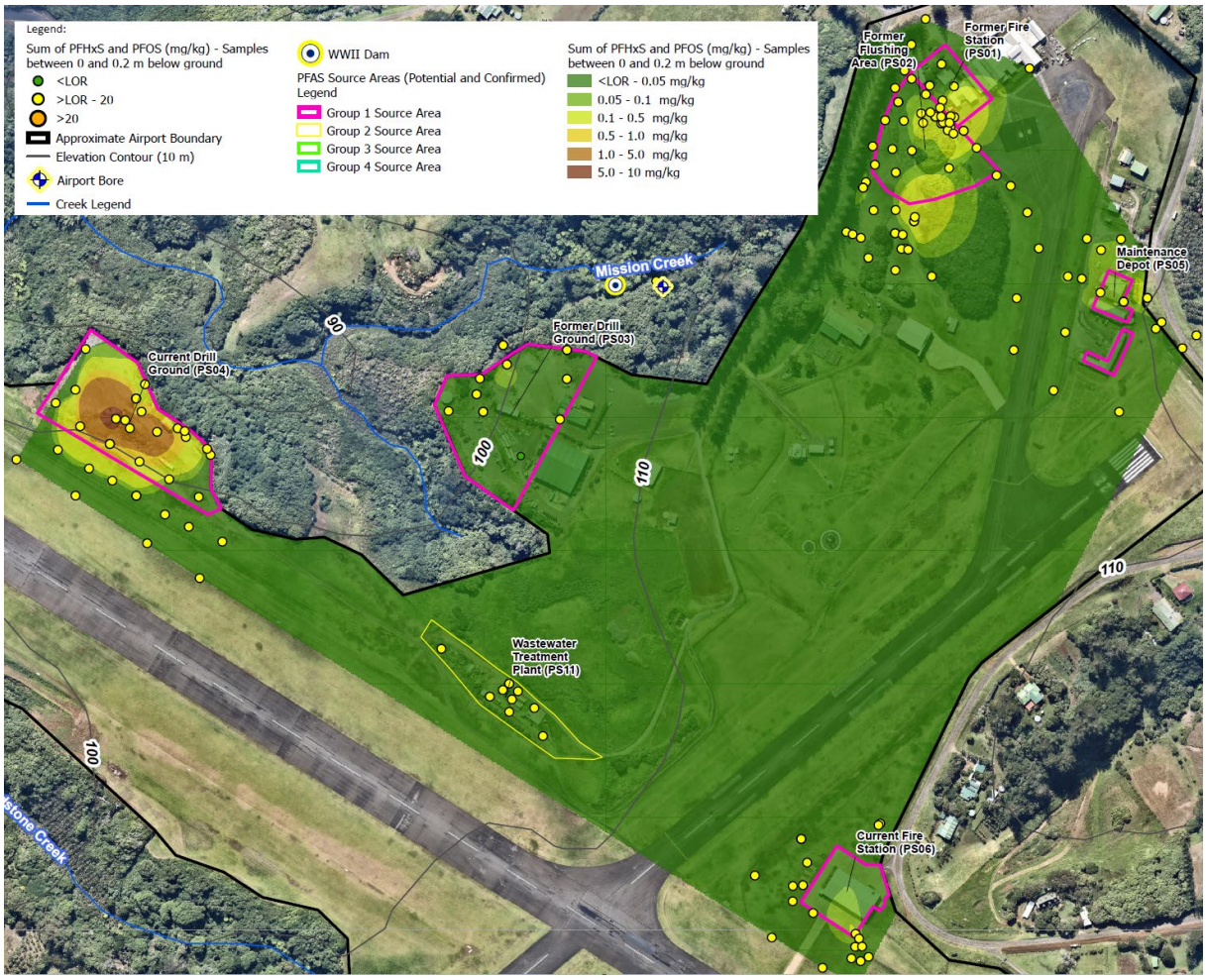

Figure 3-1: Surficial Soil Concentrations of PFOS+PFHxS

3.2 PFAS Impacted Surface Water Catchments

Surface water catchments outside of the airport with PFAS present that require management are Mission Creek and to a lesser degree in Watermill Creek Catchment.

3.2.1 Mission Creek Surface Water Catchment

Surface water samples from the Mission Creek catchment showed the highest concentrations at locations closest to PFAS source zones (PS) PS01 and PS02 at the airport (World War II Dam and MC_SW21). The pathway of PFAS from PS01 and PS02 into Mission Creek is considered to be both groundwater from source zones and surface water run off over PFAS-impacted soils on the airport through drainage lines, which is supported by the concentration in sediment sample MC_SD20.

PFAS concentrations consistently decreased further at each downstream location within Mission Creek (i.e., concentrations decreased with distance away from airport), with the exception of MC_SW25, which reported low levels of PFAS. The decrease in concentrations is shown in **Figure 3-2** below.

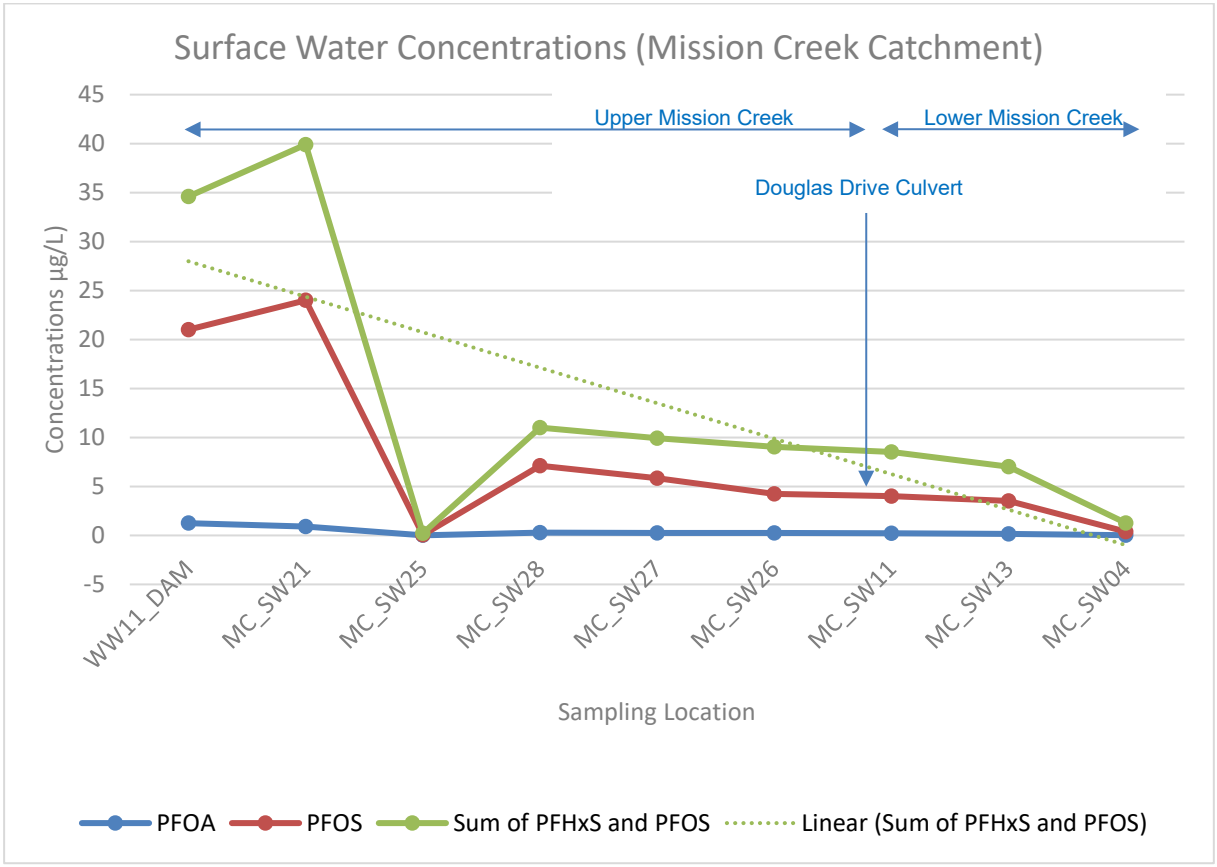

Figure 3-2: Surface Water PFAS Concentrations in Mission Creek

One surface water sample (MC_SW24) was collected from the upper Mission Creek catchment west of the waste depot (source zone PS03) on a separate Mission Creek tributary branch showed significantly lower PFAS concentrations than the tributary downgradient of PS01 and PS02.

A significant drop in PFAS concentrations was reported in MC_SW25, which is just after the confluence of two tributaries in the upper Mission Creek. There was limited evidence of surface water being further impacted down-gradient of PS04 with Mission Creek, adjacent to where Mission Creek sample MC_SW25 was collected.

It is noted MC_SW25 would be expected to receive run off from PS04 but may not receive flows from both tributaries of Mission Creek after the confluence at the exact sampling point. This is due to the creek bed being large and wide (creek bed and low-lying areas covered in substantial reed beds with moisture noted across most of the low-lying area). Additionally, the surface water sample (MC_SW25) may represent the water coming from upstream, rather than from PS04.

This indicates the highest PFAS impacts are likely to be from the northern tributary and hence from airport sources in the northern portion of the airport (PS01 and PS02).

3.2.2 Watermill Creek Catchment

Within the Watermill / Town Creek catchment, the highest PFAS concentration in surface water (TC_SW06 – PFOS+PFHxS: 1.14 micro grams per litre [µg/L]) was identified downstream of the Maintenance Depot (PS05). PFAS concentrations consistently decreased further at each downstream location before being below detection limits at the point of discharge into Emily Bay. The decrease in concentrations is shown in **Figure 3-2** below.

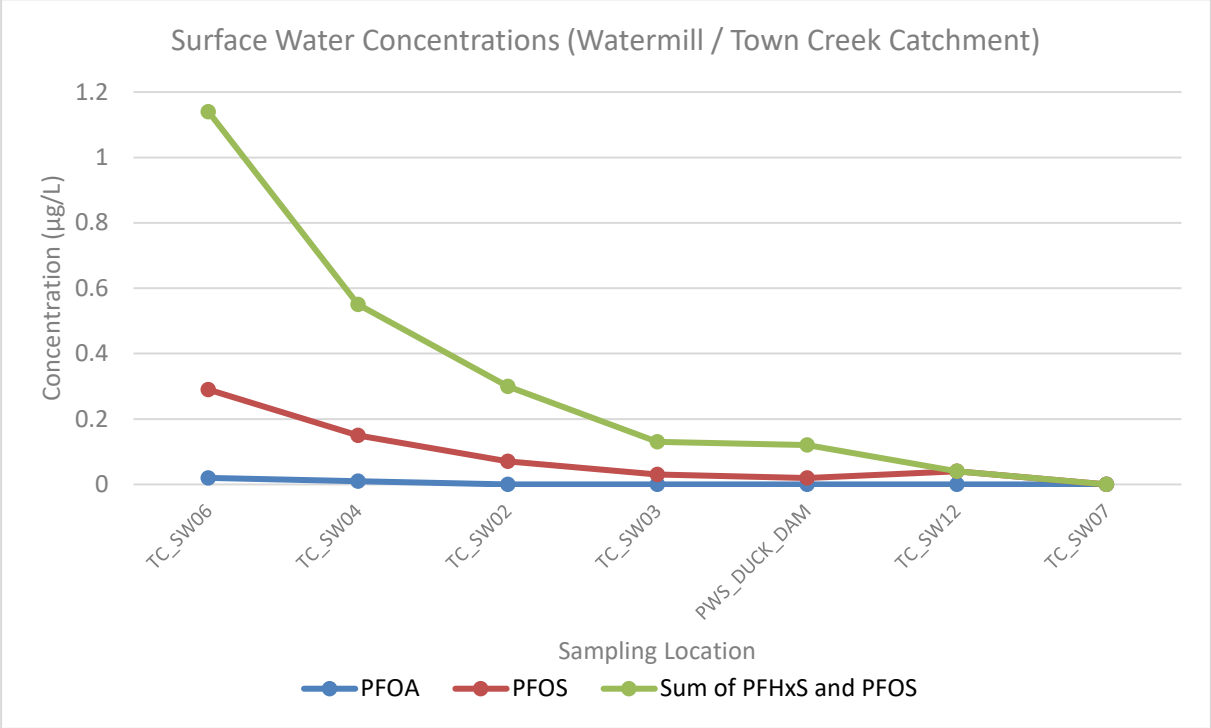

Figure 3-3: Surface Water PFAS Concentrations in Watermill / Town Creek Catchment

Two surface water samples (TC_SW05 and TC_SW13) were collected in the upper reaches of Watermill / Town Creek Catchment but were from different tributaries. TC_SW05 was below adopted criteria (95% levels for this catchment) and was collected on a different tributary to TC_SW06; location is in close proximity to the airport boundary, however it is not downgradient from any identified source zones. TC_SW13 was also collected from a separate upper reach away from the airport (circa 900 m from airport boundary) but is downgradient of source zone PS14 (perfumery). Concentrations of PFAS in TC_SW13 were above criteria, indicating PS14 is a potential source of PFAS

4.0 Investigation Strategy

4.1 Monitoring of surface water and sediment in creeks

4.1.1 Scope and rationale

More data is required to understand the range in concentrations in different creeks over time. Additionally, management actions on the airport may result in a decreasing trend in concentrations in creeks over time. In order to assess trends in PFAS concentrations in creeks on island, ongoing monitoring will be completed in a number of creeks, with the focus on Mission Creek and Watermill Creek which both receive run-off from the airport.

- The highest concentrations have been identified in Mission Creek and multiple sample locations are selected along Mission Creek in order to provide an ongoing understanding of the level and extent of PFAS impacts, and also to help assess which on-airport sources are contributing to the PFAS in Mission Creek. In the lower catchment of Mission Creek (i.e., further downstream) only sediment samples have been collected to-date as water was not present during sampling.
- Concentrations in Watermill Creek are much lower than in Mission Creek and decrease along the length of Watermill Creek (with the highest concentrations measured in the upper part of the catchment). Downstream of Watermill Dam (Duck Dam), concentrations are below the health-based guidance value (HBGV) for drinking water. Ongoing monitoring is required to confirm the extent of impacts within Watermill Creek over time.
- Samples will also be collected from Cascade Creek and Headstone Creek. Low concentrations (below the HBGV for drinking water) have been measured in these creeks to-date. Ongoing monitoring is required to assess changing conditions.

Where practicable, monitoring should be scheduled for times when water is likely to be present (i.e., after periods of rainfall and not in drought conditions). On the first round of monitoring, paired surface water / sediment samples should be collected as only one round of monitoring data is currently available in most locations. On subsequent monitoring rounds, surface water will be collected from all locations if present. If surface water is absent, a sediment sample will be collected instead.

4.1.2 Sampling locations and frequency

The sample locations are depicted on **Figure A1** and summarised below.

Table 4-1: OMP Creek sampling locations

Location	Number of locations	Sample IDs	Notes	Frequency of sampling; sampling media
Mission Creek	12	WWII_DAM, MC_OMP01 – MC_OMP11	MC_OMP08 represents creek water within a paddock accessible to cattle prior to management (see also **Section 4.3** for discussion of monitoring of managed stock water). MC_OMP10 targets Mission Pool where water has not been present on previous sampling rounds; if water is present anywhere within Mission Pool, it should be sampled.	**Annual** First round: surface water and sediment Subsequent rounds: water only, or sediment if water is absent
Watermill Creek	5	WC_OMP01 – WC_OMP05		
Cascade Creek	1	COCKPIT_SW01		
Headstone Creek	1	PWS_HEAD_DAM		

4.2 Monitoring of water utilised for irrigation

4.2.1 Scope and rationale

There are two properties in the Mission Creek catchment which use water from Mission Creek for produce irrigation. The risks associated with this have been assessed to be low and acceptable based on current data. Ongoing monitoring is required to assess if the risk profile might change.

4.2.2 Sampling locations and frequency

The sample locations are depicted on **Figure A1** and summarised below:

Table 4-2: Mission Creek irrigation water sampling locations

Location	Number of locations	Sample IDs	Frequency of sampling; sampling media
Mission Creek	2	ID013_SW01 ID016_BORE	**Annual -** Point of use water sampling

4.3 Monitoring of water for which stock watering use is currently managed

4.3.1 Scope and rationale

There are three properties in the Mission Creek catchment where cattle previously had access to water from Mission Creek for stock watering. There was one property where water from Mission Creek was used for chicken drinking water. The PFAS Management Plan recommends that these uses are managed going forward. Monitoring of these water sources is required to assess trends in concentrations. If concentrations decrease, management may be no longer required.

4.3.2 Sampling locations and frequency

The sample locations are depicted on **Figure A1** and summarised below:

Table 4-3: Managed stock water sampling locations (Mission Creek)

Location	Previous use (prior to management)	Number of locations	Sample IDs	Notes	Frequency of sampling; sampling media
Mission Creek	Cattle stock watering	4	ID014_BORE	HHERA Property A	**Annual** Point of use water sampling
			ID015_BORE	HHERA Property B	
			MC_OMP08	MC_OMP08 represents creek water within a paddock accessible to cattle prior to management (HHERA Property C). See also **Section 4.1** for discussion of creek monitoring.	
			MC_OMP10	MC_OMP10 represents Mission Pool, which was accessible to cattle prior to management although water has not been identified in the monitoring undertaken by Senversa. See also **Section 4.1** for discussion of creek monitoring.	
	Chicken drinking water	1	ID013_SW01	This water is also used for irrigation (see **Section 4.2**)	

4.4 Monitoring of Airport Bore and facility water supplies

4.4.1 Scope and rationale

There are a number of water supplies in public facilities which were previously used for drinking water / domestic use, but where PFAS impacts above the HBGV for drinking water are currently present. These uses are currently managed (e.g., through the provision of alternate water supplies).

Monitoring of these water supplies is required to assess trends in concentrations. If concentrations decrease, management of water use may be no longer required. It is noted that new reticulated supplies are planned for some facilities at the airport including the new fire station.

4.4.2 Sampling locations and frequency

Table 4-4: Managed public water supply sampling locations

Location	Number of locations	Sample IDs	Notes	Frequency of sampling; sampling media
On-airport	5	AIRPORT_BORE		**Annual** Point of use water sampling
		FRE_TAP1	Fire station kitchen; new rainwater tanks recently installed	
		FRE_TAP2	Fire hydrant (used for fire testing). New water supply is being put in place. Testing to be superseded with new supply for fire testing after switchover	
		A_TAP1	Airport terminal female toilets	
		A_TAP4	Mech/maintenance shed adjacent airport terminal and gate 1	
Off-airport: Works depot	4	DEPOT_TAP, DEPOT_TANK1, DEPOT_TANK2, DEPOT_TANK3		

4.5 Summary of samples to be collected

All non-private sample locations to be targeted in the ongoing monitoring program are depicted on **Figure A1**.

Table 4-5: OMP sampling location summary

Sample purpose	Location	Number of locations	Sample IDs	Frequency of sampling; sampling media
Creek sampling	Mission Creek	12	WWII_DAM, MC_OMP01 to MC_OMP11	**Annual** First round: surface water and sediment
	Watermill Creek	5	WC_OMP01 to WC_OMP05	
	Cascade Creek	1	COCKPIT_SW01	

Sample purpose	Location	Number of locations	Sample IDs	Frequency of sampling; sampling media
	Headstone Creek	1	PWS_HEAD_DAM	Subsequent rounds: water only, or sediment if water is absent
Irrigation water	Mission Creek	2	ID013_SW01 ID016_BORE	**Annual** Point of use water sampling
Managed stock water	Mission Creek	2*	ID014_BORE ID015_BORE *(MC_OMP08*)* *(MC_OMP10*)* *(ID013_SW01*)*	
Managed water supplies	On-airport	5	AIRPORT_BORE FRE_TAP1 FRE_TAP2 A_TAP1 A_TAP4	
	Off-airport	4	DEPOT_TAP DEPOT_TANK1 DEPOT_TANK2 DEPOT_TANK3	
Total		**32**		

Notes: * There are 5 samples relevant for managed stock watering, however only two unique samples (ID014_BORE and ID015_BORE, used for cattle watering) not also collected for another purpose. MC_OMP08 and MC_OMP10 (creek locations with possible cattle access in the absence of management) are included in the total sample numbers for creek sampling and ID013_SW01 (used for chicken watering) is included in the total sample numbers for irrigation water sampling

4.6 DQOs

The data quality objective (DQO) process is a systematic planning approach outlined in the NEPM (2013) that is used to define the purpose of the investigation to be undertaken and the type, quantity and quality of data needed to inform decisions relating to the assessment of site contamination. Proposed DQOs for the ongoing monitoring are outlined in the table below.

Table 4-6: DQO Summary

DQO Seven-step Process
1. State the problem. Elevated concentrations of PFAS have been reported in the Airport Bore (groundwater at and adjacent to the airport) and in water supplies at a number of public facilities which were historically supplied with water from the airport bore. The risks associated with these concentrations are currently managed (i.e., groundwater is not currently used for drinking). In addition, PFAS has been identified in creeks which collect run-off from the airport, with the highest concentrations identified in Mission Creek. These elevated concentrations are not considered to pose a significant risk to human health from recreational direct contact, however they are contributing to a potentially elevated risk for ecosystem receptors. In addition, potentially elevated exposures have not been excluded for cattle product or chicken egg consumption where livestock have access to Mission Creek water for drinking. Management of livestock access to water from Mission Creek catchment (surface water and/or groundwater) is therefore currently required. Risks have been assessed to be low and acceptable for livestock drinking water from other creeks.

DQO Seven-step Process

Risks from produce consumption are assessed to be low and acceptable based on the current concentrations measured at properties within the Mission Creek catchment where water is used for produce irrigation. Risks are also assessed to be low and acceptable where water from other creeks is used for produce irrigation.

Further, the concentration trends in surface water, sediment and groundwater are not well understood based on the available monitoring data.

2. Identify the decision/goal of the study.

The goal is to monitor the nature and extent of PFAS impacts and identify trends and changes to PFAS impacts in the environment on and off-site that may alter the understanding or assessment of identified risks into the future.

3. Identify the information inputs.

The primary inputs are considered to be PFAS concentrations in groundwater, surface water and sediment.

4. Define the boundaries of the study.

Ongoing monitoring will be undertaken at a selected number of surface water locations and point of use water supplies at and surrounding the site.

5. Develop the analytical approach/decision rules.

The data will be used in the to assess whether site-derived PFAS has changed in nature and extent which may alter the understanding or assessment of identified risks into the future to human or ecological receptors.

The useability of the data will be assessed in terms of accuracy and reliability in forming conclusions on the concentrations within the samples collected, based on guidance from the relevant sources listed above. The data quality objectives, measures and acceptance criteria to be adopted for monitoring should be outlined in the SAQP to be developed for each monitoring round.

It is required that, as a minimum, the following type and frequency of quality control samples be collected.

Field duplicates (intra laboratory and inter laboratory) samples at a rate of at least 1 in 10 separately groundwater and surface water.

Rinsate blanks where equipment decontamination will be necessary (e.g., groundwater sampling) at a rate of one per day per set of equipment.

As part of the reporting, the results of the monitoring should be used to assess trends using an appropriate statistical approach such as Mann-Kendall methods, or similar, to identify increases, declines or stabilisation of concentrations across monitoring rounds to a specified statistical confidence limit based on the amount of data collected over time.

Some examples of the decisions to be made from investigation results include:

If detections of PFAS are reported in field blanks or rinsate blanks, then consider if there is a potential for cross contamination between sample locations and what impact this has on conclusions of trends.

If reported PFAS concentrations in relevant sample locations increase above the defined upper threshold values (UTVs) defined in the OMP (and/or an increasing trend is identified), then consider further risk assessment to assess whether additional management measures are required.

If reported PFAS concentrations in relevant sample locations decrease below the lower threshold values (LTVs) defined in the OMP (and/or a decreasing trend is identified), then consider further risk assessment to assess whether management measures can be reduced.

6. Specify performance or acceptance criteria.

Adopted screening criteria, LTVs and UTVs defined in the OMP will be used to provide a screening level of results obtained during sampling and asses if risk revision is required.

A data validation checklist with specific acceptance criteria and discussion of results must be documented and reviewed as part of the SAQP development.

At the end of the initial monitoring period, reporting should assess trends in concentrations. This should include development and use of a statistical based decision criteria to assess the significance of trends. Where significant trends are identified, the requirement for further monitoring, assessment and/or management (in the case of an increasing trend) or cessation of monitoring (in the case of a decreasing trend) will be assessed.

7. Develop the plan for obtaining data.

The overarching scope and methodology is provided in this OMP. Prior to each sampling event, a SAQP should be developed which assesses the appropriateness of sample locations, sampling methodologies and risk screening/assessment criteria. The SAQP is to outline the optimum manner to collect the data required to meet the objectives for the assessment and which will meet the project DQOs.

Permission to access sampling locations on public and private properties is to be confirmed prior to sampling.

4.7 Health, Safety and Environment Management

A Health, Safety and Environment Management Plan (HSEP) will be prepared for the investigation to outline how safety and the environment will be managed during field investigations. This will include site specific risk assessment, safe work method statements (SWMS) and waste management plan.

- All Senversa staff involved in the site works will be inducted to the HSEP.
- Senversa personnel will have sufficient information, instruction, training and competency to safely undertake work at the site. Minimum training requirements for personnel will be listed in the HSEP and should be reviewed for all field work.
- Senversa will complete necessary inductions (to be confirmed on arrival on Island) and comply with Norfolk Island Airport site rules and regulations whilst on the site.

4.8 Sampling and Investigation Methodology

The following section describes the methodology to be adopted by field personnel in the conduct of the surface water, sediment, groundwater, soil and biota sampling.

4.8.1 Specific Sampling Requirements

The table below summarises the specific methodology and investigation techniques to be adopted for the various proposed sampling tasks.

Table 4-7: Summary of Specific Sampling Requirements

Sample Type	Detail
Surface Water	• Surface water samples will be collected either directly into the sampling containers or using a hand-held sampling device (e.g., Swing Sampler) with subsequent decanting into the laboratory sampling containers. • Surface water samples will be collected prior to sediment to minimise disturbance and avoid excess sediment load in the water sample. • Direct surface water sampling methods that are used will depend on location access. Sampling of deeper drains may have health and safety risks associated with access, and an appropriate sampling method for that location will be reviewed and applied. • Water quality parameters (pH, redox, dissolved oxygen, electrical conductivity, and temperature) will be recorded at each sample location using a calibrated water quality meter. Sample locations will be selected on island prior to works based on location and safe access requirements.
Sediment	Sediment samples will be collected using a gloved hand with the aid of a small hand trowel/shovel and transferred into sample jars using disposable nitrile gloves. • Sediment samples will be collected from the base of the waterbody (i.e., 0 - 0.05 m below the top of the sediment layer) beneath any surface water (if present). • Sampling of potentially deeper waterbodies may have health and safety risks associated with access, and an appropriate sampling method for that location will likely utilise hand tools such as shovels or trowels. • Access to the exact location indicated for sampling may be dependent on ground cover, the angle of any banks, etc. Therefore, the location where samples are collected may vary. • Where grass, reeds or vegetation growth covers the sediment, this material will be moved aside using hand tools, with the sediment sample collected from directly underneath the vegetation layer. • Any tools used (trowel/shovel) will be decontaminated prior to use.

Sample Type	Detail
Groundwater (point of use water) Sampling	• The outlet to be sampled is to be determined as the first extraction discharge point within the water supply infrastructure (i.e., closed tap to the extraction well discharge). • The outlet / tap will be turned on to flush it of water for approximately 30 seconds by using a smooth flowing water stream at moderate pressure. • Where a line to be sampled supplied both hot and cold water, only the cold water will be sampled. • If a tap is not available, a disposable bailer will be placed inside the bore to collect the sample. • Samples will be placed directly into laboratory supplied bottles. • Water quality parameters (pH, redox, dissolved oxygen, electrical conductivity, and temperature) will be recorded at each sample location using a calibrated water quality meter.

4.8.2 General Sampling Requirements

The following table details general sampling techniques associated with the site works.

Table 4-8: General Sampling Requirements

Activity	Description and Further Information
Field Parameter Measurement	Field water quality parameters will be measured using a water quality meter prior to sampling for all surface water and bore water sampling. The parameters include pH, electrical conductivity, dissolved oxygen, oxidation reduction potential (redox) and temperature. For soil and sediment sampling, field observations will be noted of characteristics such as colour, particle size, odour, discoloration, presence of unusual materials such as waste, etc.
Photographs	A photograph of the sampling location will be taken at each sampling location for record.
Location Survey	All sample locations will be logged using the ArcGIS “Collector” application to enable the location of each sample to be uploaded each evening once connected to the internet.
Sample Handling and Preservation	• Samples will be placed into laboratory-supplied jars and bottles containing appropriate preservatives for the selected analytes to be tested. • Samples will be collected and stored on bagged ice prior to and during transit to the laboratory to minimise sample degradation. • Sample bottles will be filled to the top with no head space and splashing during filling should be prevented. • All samples collected will be recorded on field logs sheets. • Chain of Custody (CoC) forms will be completed for transport. • Quality control samples will be collected during the sampling program as per **Section 4.10.2**.
Waste Disposal	Water purged from taps or bores is expected to be minimal in volume and will be disposed at the ground surface.
Equipment Calibration	Equipment requiring calibration (water quality meter) for environmental assessment purposes will be calibrated by the supplier or by Senversa staff prior to use. Relevant calibration certificates will be provided in the report.

Activity	Description and Further Information
Avoidance of Cross Contamination	Sampling procedures used to prevent cross contamination will consider the guidance provided in Appendix 1 of the Interim Guideline of the Assessment and Management of PFAS (WA DER, 2016[1]) during site works and involve: Samples will be placed into laboratory-supplied jars / bottles appropriate for PFAS sampling (i.e., without Teflon liners). Decontamination of re-usable sampling equipment will be completed between sampling locations, using a potable water wash, and rinse with potable water. Use of dedicated disposable latex free gloves that will be replaced between each sample collection and location. Quality control samples to assess cross contamination will be collected during the sampling program as per **Section 4.10.2**.

4.9 Sample Nomenclature

Sample nomenclature will be based on sample matrix type (surface water, sediment, groundwater). The proposed sample nomenclature to be used is presented in **Appendix A**.

4.10 Laboratory Analysis

All groundwater, surface water, sediment, soil and biota samples will be submitted to chemical laboratories (ALS Environmental Pty Ltd as primary laboratory and Eurofins Environmental Pty Ltd as secondary laboratory) that are NATA accredited for the methods used.

The following PFAS analyses (extended suite of 28 individual PFAS) will be completed on samples collected and scheduled for analysis:

- Perfluorobutane sulfonic acid (PFBS)
- Perfluoropentane sulfonic acid (PFPeS)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluoroheptane sulfonic acid (PFHpS)
- Perfluorooctane sulfonic acid (PFOS)
- Perfluorodecane sulfonic acid (PFDS)
- Perfluorobutanoic acid (PFBA)
- Perfluoropentanoic acid (PFPeA)
- Perfluorohexanoic acid (PFHxA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorooctanoic acid (PFOA)
- Perfluorononanoic acid (PFNA)
- Perfluorodecanoic acid (PFDA)
- Perfluoroundecanoic acid (PFUnDA)
- Perfluorododecanoic acid (PFDoDA)
- Perfluorotridecanoic acid (PFTrDA)
- Perfluorotetradecanoic acid (PFTeDA)
- Perfluorooctane sulfonamide (FOSA)
- N-Methyl perfluorooctane sulphonamide (MeFOSA)
- N-Ethyl perfluorooctane sulfonamide (EtFOSA)
- N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)
- N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)
- N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)
- N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)
- 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)

[1] WA DER 2016. *Interim Guidelines on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances – Contaminated Sites Guidelines.* Government of Western Australia, Department of Environment Regulations. February 2016.

Sediment samples will additionally be analysed for pH and total organic carbon (TOC).

The following laboratory limits of reporting, where achievable, will be requested from the laboratories:

- Sediment – <0.005 milligrams per kilogram (mg/kg)
- Water – <0.01 µg/L

All PFAS samples collected will be analysed on a standard 5-7day turn-around time (TAT). However, the time required for transport of samples from site to Sydney laboratories will be in addition to any laboratory guaranteed TAT. Senversa notes that the standard quarantine turn-around time at Sydney Airport is 7 days.

4.10.1 Physical Parameters

In addition to the collection of samples for laboratory analysis, the parameters outlined in the table below will also be recorded.

Table 4-9: Physical Parameters to be Assessed for Different Media

Sampling Media	Parameters
Sediment	Logged to AS1726:2017[2]; visual and olfactory observations.
Groundwater	Physio-chemical parameters as per EPA Publication 669[3], obtained during sampling; visual and olfactory observations.
Surface Water / Tank & Tap Water	Physio-chemical parameters, obtained during purging and sampling; visual and olfactory observations.

4.10.2 Quality Assurance Procedures

The data QA/QC procedures to be adopted must provide a consistent approach to evaluation of whether the DQOs required by the project have been achieved. The process focuses on assessment of the useability of the data in terms of accuracy and reliability in forming conclusions on the condition of the element of the environment being investigated.

Table 4-10: Data Quality Objectives for QA/QC Elements

QA/QC Element	Data Quality Objectives
Analytical Laboratories	All methods to be used will be NATA accredited. Changing these arrangements must be justified with detailed assessment and comparison of laboratory methods and analytical reference standards used.
Turnaround Times	A standard laboratory analysis TAT of 5-7 days will be requested for all samples submitted for analysis.

[2] AS1726:2017. *Geotechnical Site Investigations.* 5 February 2017.

[3] EPA Victoria 2022. *Groundwater Sampling Guidelines.* Publication 669.1. February 2022.

QA/QC Element	Data Quality Objectives
Analytical QA/QC Guidance	The QA/QC approach must be based on guidance from the following sources: • AS4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds. • NEPC 2013, Schedule B (3) Guideline on Laboratory Analysis of Potentially Contaminated Soils. • USEPA - Guidance on Systematic Planning Using the Data Quality Objectives Process EPA QA/G-4. • USEPA - Guidance on Environmental Data Verification and Data Validation EPA QA/G-8.
QA/QC Procedures	The QA/QC procedures applied will include the use of equipment decontamination, Chain of Custody documentation, laboratory data verification and the use of quality control samples in accordance with Section 8.2 of AS4482.1-2005. All rinsate blanks and laboratory method blanks have an acceptance limit of concentrations below the laboratory limit of reporting. Detection of an analyte in a rinsate sample must trigger an assessment of the decontamination process followed by an assessment if the analyte reported is a contaminant of interest or if it impacts the validity of the assessment data. The % relative percentage difference (RPD) for field and laboratory duplicates must meet the NEPM (NEPC, 2013) guidelines. A data quality assurance review, which includes a data validation checklist with specific acceptance criteria for each batch of samples. Data quality will be checked against the data validation checklist as results become available throughout the investigation program to establish if further checking of precision or accuracy is required as the investigation progresses.

5.0 Reporting Requirements

On completion of the OMP Year 1 field program, Senversa will prepare an interpretive report on the nature and extent of PFAS. The report will include the following:

- An executive summary.
- A summary of the project objectives and scope of works consistent with those outlined in this SAQP.
- A summary of the environmental setting of the site, including the site-specific topography, geology and hydrogeology.
- A summary of the surface water, sediment and groundwater sampling methodology used.
- Analytical results, including quality assurance assessment.
- Qualitative risk assessment using published and site-specific data.
- Trend analysis and assessment of results against the upper and lower trigger values as defined in the OMP.
- Updated conceptual site model including sources, pathways and receptor linkages and identified data gaps.
- Figures including site and sample location plans and PFAS criteria exceedances.
- Tables and appendices of supporting documentation from field investigations.
- Conclusions on risks to sensitive receptors and assessment against defined trigger values and decision tree as outlined it the OMP.

6.0 References

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Figures

Figure 1: PFAS Management Areas

N

ID013_SW01
ID015_BORE
MC_OMP11
MC_OMP10
MC_OMP09
ID014_BORE
PS08
MC_OMP08
MC_OMP07
ID016_BORE
MC_OMP06
MC_OMP05
MC_OMP04
MC_OMP03
PS04
PS03
PS02
PS05
WW11_DAM
AIRPORT_BORE
A_TAP1
A_TAP4
MC_OMP02
MC_OMP01
PS11
PWS_HEAD_DAM
PS15
FRE_TAP2
FRE_TAP1
WC_OMP01
WC_OMP02
WC_OMP03
DEPOT_TANK1
DEPOT_TANK2
DEPOT_TAP
DEPOT_TANK 3
Cockpit_SW01
Cockpit_SW01
WC_OMP04_DUCKDAM
PS10
PS07
WC_OMP05
WC_OMP05

Broken Bridge Creek
Headstone Creek
Cascade Creek
Stockyard Creek
Watermill Creek
Rocky Point Creek
Town Creek

Maxar

Path: S:\01_Jobs\1 NSW_Jobs\S17776_DITCRD_NORFOLK_DSI\C17776_TS.aprx

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Legend:

Water Samples
- Surface Water / Sediment (Cascade and Headstone Creeks)
- Surface Water / Sediment (Mission Creek)
- Surface Water / Sediment (Watermill Creek)
- Tap
- Stock Water (Beef Cattle)
- Fruit and Vegetable Irrigation Water
- Pump
- Stock Water (Chickens)

- Approximate Airport Boundary
- Approximate Extent of Upper Watermill Catchment
- Approximate Extent of Mission Creek Catchment
- Alternative Water Supply
- Creek

Potential Sources
- Group 1 Potential PFAS Primary Source Areas
- Off-site

Details:

Data Sources:
Aerial imagery: Esri maps
Vector Datasets: Open Street Maps

Created: T. Sohi
PM: C. Sandiford
Approved: x
Date: 10/12/2021
Revision: 0

0 710 1,420 2,130 Metres

Datum/Projection:GDA 1994 MGA Zone 55 Scale: (A3) 1:25,000

Figure No: A1

Title: PFAS Management Areas

Project: PFAS Management Plan

Location: Norfolk Island International Airport

Client: Department for Infrastructure, Transport, Regional Development and Communications

Last Edited by: tiara.sohi

Appendix A: Sample Nomenclature

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Senversa Pty Ltd

Preliminary PFAS Investigation - Senversa Sample Nomenclature

Sample Type	Sample Nomenclature	Detail
Soil – Surface	SS01, SS02 etc.	For surface soil samples collected within the top 10 cm of the surface.
Soil bores	SB01_0.01, SB01_0.05 etc.	For all target sample locations where soil bores are advanced using a hand auger.
Surface Water Samples	SW01, SW02 etc.	A two-letter identifier will be added to the beginning of the sample ID to identify catchment area, e.g. MC for Mission Creek (MC_SW01).
Sediment Samples	SD01, SD02 etc.	To be paired with surface water locations (i.e. MC_SD01 to be paired with MC_SW01) or a unique ID to be assigned in the event surface water is not sampled.
Water Supply Samples (Public)	PWS_01, PWS_02 etc.	Publicly accessible bores will contain an individual Bore ID starting with PWS (Public Water Supply).
Water Supply Samples (Private Property)	ID001_BORE_01, ID001_BORE_02, ID001_TAP_01 etc.	De-identified IDs to be assigned to each sampled property or location. Sample type to be identified i.e. bore/ tap/ tank etc.
Biota Samples	ID001_FRUIT_01	De-identified IDs to be assigned to each sampled property as per water supply samples above. Biota type to be identified i.e. fruit/ egg/ grass etc.
Quality Samples	QC101, QC102 etc.	To be used for blind (intra-laboratory) duplicates. QA/QC register will be used during field works to record and track the quality samples collected.
	QC201, QC202 etc.	To be used for split (inter-laboratory) duplicates. QC sets will be paired (i.e. QC101 and QC201) at each location.
	QC301, QC302 etc.	To be used for rinsate blanks.
	QC401, QC402 etc.	To be used for trip and/or field blanks.

Always include a “0” before single digit numbers; this is important for ESDAT data management.

Senversa Pty Ltd

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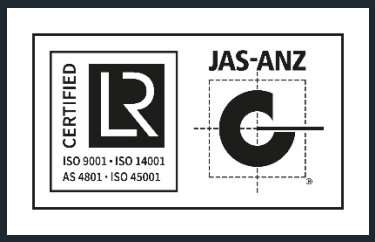

Appendix B: Data Validation

Appendix B: Quality Assurance / Quality Control

The data quality assurance and control (QA/QC) procedures adopted by Senversa provide a consistent approach to evaluation of whether the data quality objectives (DQO's) required by the project have been achieved. The process focuses on assessment of the useability of the data in terms of accuracy and reliability in forming conclusions on the condition of the element of the environment being investigated. The approach is generally based on guidance from the following sources:

- Australian Standard (AS) 4482.1-2005: Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds.
- National Environment Protection Council (NEPC), National Environment Protection (Assessment of Site Contamination) Amendment Measure No. 1 2013 (NEPM), Schedule B2: Guideline on Site Characterisation.
- NEPC – National Environment Protection (Assessment of Site Contamination) Amendment Measure No. 1 2013 (NEPM), Schedule B3: Guideline on Laboratory Analysis of Potentially Contaminated Soils.
- Heads of Environmental Protection Authorities (HEPA), PFAS National Environmental Management Plan (PFAS NEMP) 2.0.
- United States Environmental Protection Agency (USEPA) – Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4).
- USEPA – Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8).

Quality Assurance Procedure

The following data quality objectives, measures and acceptance criteria were adopted to verify compliance with the planned QA procedures:

Quality Assurance Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
Standard Procedures	Comparability, Reproducibility, Representativeness.	Standard field sampling procedures and forms used.	No deviation from standard procedure and forms used.
Equipment Calibration	Accuracy.	All equipment calibrated in accordance with manufacturers specifications.	All equipment calibrated in accordance with manufacturers specifications.
Testing Method Accreditation	Accuracy and Comparability.	NATA accredited methods used for all analyses determined.	Primary and secondary laboratories to use NATA accredited methods for all analytes determined
Quality Control Sampling Frequency	Precision and Repeatability.	Field QC sampling frequency in accordance with AS4482.1-2005 and the PFAS NEMP 2.0.	Field Duplicates – ≥ 1 in 10 primary samples. Secondary Duplicates – ≥ 1 in 10 primary samples. Rinsate Blanks – ≥ 1 per day, per matrix per equipment.

Quality Assurance Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
	Accuracy, Precision and Comparability.	Laboratory QC analysis frequency in accordance with NEPC (2013), Schedule B3.	Laboratory Duplicates – at least 1 in 10 analyses or one per process batch Method Blanks – at least 1 per process batch. Surrogate Recoveries – all samples spiked where appropriate (e.g. chromatographic analysis of organics). Laboratory Control Samples – at least 1 per process batch. Matrix Spikes – at least 1 per matrix type per process batch.
Sample Preservation, Handling and Holding Times	Accuracy.	Samples appropriately preserved upon collection, stored and transported, and analysed within holding times.	Sample containers, holding times and preservation in accordance laboratory specific method requirements.
Data Management	Accuracy.	No errors in data transcription.	Entry of field data verified by peer.
Data Useability	Completeness.	Limits of reporting less than adopted beneficial use investigation levels. Sample volumes and analytical methods selected to enable required limits of reporting to be achieved.	Limits of reporting less than investigation levels.

Quality Control Sampling and Analysis

The following data quality objectives, measures and acceptance criteria were adopted to evaluate the validity of the analytical data produced.

Quality Control Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
Field Duplicate Sampling and Analysis	Precision and Field Repeatability.	Field duplicate samples used to assess the variability in analyte concentration between samples collected from the sample location and the reproducibility of the laboratory analysis. Where required, resubmission of previously analysed samples for chemicals within their holding times may be undertaken to further assess level of precision.	Analysed for same chemicals as primary sample RPD1 <30% of mean concentration where both concentrations >20 x limit of reporting. RPD <50% of mean concentration where higher concentration 10 – 20 x limit of reporting. RPD - No limit where both concentrations < 10 x limit of reporting.

[1] Relative Percent Difference (%): Calculated as: (Result No.1 – Result No. 2/Mean Result)*100

Quality Control Process	Data Quality Element	Objectives and Measure	Acceptance Criteria
Secondary Duplicate Sampling and Analysis	Accuracy.	Results are accurate and free from laboratory error. Secondary duplicate samples sent to a secondary laboratory to assess the accuracy of the analyte concentrations reported by the primary laboratory.	Analysed for same chemicals as primary sample. RPD <30% of mean concentration where both concentrations >20 x limit of reporting. RPD <50% of mean concentration where higher concentration 10 – 20 x limit of reporting RPD - No limit where both concentrations < 10 x limit of reporting.
Field Rinsate Blank Preparation and Analysis	Accuracy and Representativeness.	Cross contamination of samples does not occur between sampling locations due to carry-over from sampling equipment. Rinsate blank samples prepared for each sampling procedure. Where possible the rinsate blanks are prepared immediately after sampling locations known to contain concentrations of the chemicals of concern above the limit of quantification and / or before sampling locations where the chemicals being targeted in the laboratory analysis are to be compared to investigation levels near the limit of quantification of the chemical.	Analyte concentrations below limits of reporting.
Trip Blank Sampling and Analysis	Accuracy and Representativeness.	Cross contamination between samples does not occur in transit or as an artefact of the sample handling procedure. Trip blank samples prepared by the laboratory which accompany the empty sampling containers from the laboratory to the sampling site, and return with the samples to the laboratory to assess whether cross contamination occurs between samples or as an artefact of the sampling procedure.	Analyte concentrations below limits of reporting.
Laboratory QC Analysis	Laboratory Precision and Accuracy.	Laboratory duplicates.	As specified by the laboratory.
		Laboratory control spike.	Dynamic recovery limits as specified by the laboratory.
		Surrogate recovery.	Dynamic recovery limits as specified by the laboratory.
		Matrix spike recovery	Recovery 70% – 130% or dynamic recovery limits specified by laboratory. However note that recovery of phenols is generally significantly lower and a recovery in the range 20% to 130% is considered acceptable by most laboratories.

Data Verification and Validation

The data validation process involved the checking of analytical procedure compliance with acceptance criteria and an assessment of the accuracy and precision of analytical data from the range of quality control indicators generated from both the sampling and analytical programmes.

The checks undertaken are summarised in the attached data validation checklist **Table B1**. Field replicate and field blank analytical results relevant to the project are summarised in **Table B2** and **Table B3**.

Instances where the data quality acceptance criteria were not achieved are discussed in the table below:

Item	Comment
Quality Control Sampling Frequency	Rinsate blanks Rinsate blanks were collected from the sampling pole used for surface water sampling on three out of the four days of sampling. As the sampling pole was not utilised for sampling on the fourth day, a rinsate sample was not required. One Rinsate Sample was reported to have a detection of 8:2 Fluorotelomer sulfonic acid (8:2 FTS). However, the concentrations of 8:2 FTS were below the LOR in all primary samples and this detection is considered likely due to laboratory error or residual 8:2 FTS in the rinsate water batch. Sediment field and secondary duplicate sampling One sediment sample was collected from location WC_OMP07 due to this location being dry. As only one sediment sample was analysed, a field and secondary duplicate sample were not analysed for sediment and the water duplicate samples are considered suitable for assessment of precision and accuracy. Laboratory matrix spike and duplicate samples Laboratory matrix spike and duplicate water samples were not analysed by the laboratory due to whole-bottle extraction of primary samples for analysis and therefore insufficient residual sample for QC analysis. The laboratory quality control reports note that these quality control samples were not required to verify the quality of the results. It is noted that ALS is NATA-approved for PFAS analysis and this outlier is not considered to impact interpretation of the results.
Field and Secondary Duplicate Sampling and Analysis	Surface water All water sample primary and duplicate sample pairs were within acceptable RPD limits, with the exception of: • QC200 (primary sample MC_OMP05) RPD outliers reported for PFHxA (58%), PFPeA (71%), PFOA (49%), PFPeS (61%), PFHxS (47%), PFBS (67%), Sum of PFHxS and PFOS (32%) and Sum of PFAS (36%). QC200 and MC_OMP05 PFAS concentrations were within the same order of magnitude and the variation did not alter criteria exceedances. Therefore, non-compliance is not considered to impact on the quality of data.
Laboratory QC Analysis	Matrix spike recovery Matrix Spike recoveries for PFAS were not determined in two samples in report ES2317554, as the background level was greater than or equal to 4x spike level from anonymous samples. All other matrix spike recoveries were within acceptable limits.

Data Suitability

While a small number of QC results were outside specified acceptance criteria, these were not considered to significantly impact on the quality or representativeness of the data, and the majority of results indicated that the precision and accuracy of the data were within acceptable limits. The results are therefore considered to be representative of chemical concentrations in the environmental media sampled at the time of sampling, and to be suitable to be used for their intended purpose in forming conclusions relating to the contamination status of water and sediment at the site.

Table B1: Validation Checklist

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Project Name: Ongoing Monitoring - Year 2 **Project Number:** C17776

Sampling Information

		Sample Type	No.	Frequency	DQI Compliant?
Sample Media:	Sediment	Primary:	55	-	
Date Sampled:	16/5/23 - 19/5/23	Intra-laboratory duplicate (FD):	6	1 per 9.167 primary samples	Yes
Days of Sampling:	4	Inter-laboratory duplicate (FT):	6	1 per 9.167 primary samples	Yes
Sampling Personnel:	MA, BC	Trip Blank (TB):	0	1 per - day / batch	Yes
Primary Laboratory:	ALS	Rinsate Blank (RB):	3	1 per 1.333 day	Substantial
Secondary Laboratory:	Eurofins	Trip Spike (TS):	0	1 per - day / batch	Yes
No. Batches:	2				
Batch IDs:	ES2317549, ES2317550, ES2317551, ES2317553, ES2317554, 324402	Other:	NA		-

Precision

Intra-laboratory Duplicate (FD) analyses

Analyte Group	Primary ID	Duplicate ID	DQI Compliant?	Comments
PFAS	MC_OMP05	QC100	Yes	
PFAS	MC_OMP04	QC101	Yes	
PFAS	MC_OMP01	QC102	Yes	
PFAS	MC_OMP10	QC103	Yes	
PFAS	MC_OMP02	QC104	Yes	
PFAS	MC_OMP03	QC105	Yes	

Inter-laboratory Duplicate (FT) analyses

Analyte Group	Primary ID	Duplicate ID	DQI Compliant?	Comments
PFAS	MC_OMP05	QC200	Substantial	RPDs exceed acceptance limits for six PFAS compounds (PFOA, PFHxA, PFPeA, PFPeS, PFHxS and PFBS) and two sums of PFAS compounds. Results are generally within the same order of magnitude and exceed the same criteria. Non-compliance is not considered to impact on the quality of the data.
PFAS	MC_OMP04	QC201	Yes	
PFAS	MC_OMP01	QC202	Yes	
PFAS	MC_OMP10	QC203	Yes	
PFAS	MC_OMP02	QC204	Yes	
PFAS	MC_OMP03	QC205	Yes	

Laboratory Duplicate (LD) analyses

Analyte Group	Batch No.	DQI Compliant?	Comments
PFAS	ES2317549, ES2317550, ES2317551, ES2317553, ES2317554, 324402	Yes	

Accuracy

Laboratory Control Sample (LCS) analyses

	Batch No.(s)	DQI Compliant?	Comments
PFAS	ES2317549, ES2317550, ES2317551, ES2317553, ES2317554, 324402	Yes	

Surrogate Compound or Reference analyses

	Batch No.(s)	DQI Compliant?	Comments
PFAS	ES2317549, ES2317550, ES2317551, ES2317553, ES2317554, 324402	Yes	

Spike Samples

Type	Analyte Group	DQI Compliant?	Comments
Laboratory matrix spike (MS)	PFAS	Substantial	MS recoveries for PFAS not determined in two samples in report ES2317554, as the background level greater than or equal to 4x spike level from anonymous samples.

Blank Samples

Type	Analyte Group	Sample ID	DQI Compliant?	Comments
Rinsate Blank (RB):	PFAS	QC300	Yes	
Rinsate Blank (RB):	PFAS	QC301	Yes	
Rinsate Blank (RB):	PFAS	QC302	Substantial	Detection of 8:2 Fluorotelomer sulfonic acid (8:2 FTS), however this still remains below acceptance criteria and the weight that the rinsate was collected off was only used on one sample. All levels of 8:2 Fluorotelomer sulfonic acid (8:2 FTS) were below LOR in primary samples.

Field equipment calibration

Equipment	Calibrated?	Record?	Equipment	Calibrated?	Record?
WQM	Yes	Yes		-	-

Represent-ativeness

	DQI Compliant?	Comments
Appropriate & standard sampling methods used for media/CoPC?	Yes	
Appropriate decontamination procedures carried out?	Yes	
Samples collected in appropriate containers / preservatives?	Yes	
Samples received at appropriate temperature / or with ice present?	Yes	Samples were received at 5.3 degrees celcius with ice present.
Samples extracted / analysed within holding times?	Yes	
Samples analysed using appropriate NATA accredited methods?	Yes	

Compar-ability

	DQI Compliant?	Comments
Consistent sampling methods used?	Yes	
Sampler(s) appropriately trained?	Yes	
Consistent site conditions and field scientist(s)?	Yes	
Consistent analytical methods used?	Yes	

Completeness

	DQI Compliant?	Comments
Field records / logs complete and retained?	Yes	
Frequency of QC samples adequate per sampling plan?	Yes	
Requested analyses completed per sampling plan?	Yes	
Appropriate PQLs? (relative to adopted criteria; available)	Yes	
Chain-of-custody forms complete and correct?	Yes	
QC check of data tables (against field records / laboratory reports)?	Yes	

Data Use Suitability

	Yes / No	
Data from critical samples considered of suitable quality?	Yes	
Data considered suitable for the objective of the assessment?	Yes	

Overall Comments: While a small number of QC results were outside specified acceptance criteria, these were not considered to significantly impact on the quality or representativeness of the data, and majority of results indicated that the precision and accuracy of the data was within acceptable limits. The results are therefore considered to be representative of chemical concentrations in the environmental media sampled at the time of sampling, and to be suitable to be used for their intended purpose in forming conclusions relating to the contamination status of groundwater at the site.

Performed By:	Bec Chapple	Checked By:	
Date:	5/06/2023	Date:	

Table B2: RPD Analytical Results
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

		Location Code	MC_OMP04	MC_OMP04		MC_OMP04	MC_OMP04		MC_OMP05	MC_OMP05		MC_OMP05	MC_OMP05		MC_OMP10	MC_OMP10		MC_OMP10	MC_OMP10		WC_OMP01	WC_OMP01
		Field ID	MC_OMP04	QC101		MC_OMP04	QC201		MC_OMP05	QC100		MC_OMP05	QC200		MC_OMP10	QC103		MC_OMP10	QC203		WC_OMP01	QC102
		Date	17/05/2023	17/05/2023		17/05/2023	17/05/2023		17/05/2023	17/05/2023		17/05/2023	17/05/2023		17/05/2023	17/05/2023		17/05/2023	17/05/2023		17/05/2023	17/05/2023
		Sample Type	Normal	Field_D		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D		Normal	Field_D
		Lab Report No.	ES2317554	ES2317554	RPD	ES2317554	324402	RPD	ES2317554	ES2317554	RPD	ES2317554	324402	RPD	ES2317554	ES2317554	RPD	ES2317554	324402	RPD	ES2317554	ES2317554
	Unit	EQL																				
(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	<0.05	<0.01	0	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 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	<0.05	<0.01	0	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.02	<0.05	<0.05	0	<0.05	<0.02	0	<0.05	<0.05	0	<0.05	<0.02	0	<0.05	<0.05	0	<0.05	<0.02	0	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.02	<0.05	<0.05	0	<0.05	<0.02	0	<0.05	<0.05	0	<0.05	<0.02	0	<0.05	<0.05	0	<0.05	<0.02	0	<0.05	<0.05
Perfluoroalkane Carboxylic Acids																						
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	0.54	0.53	2	0.54	0.46	16	0.51	0.55	8	0.51	0.28	**58**	0.41	0.39	5	0.41	0.33	22	0.07	0.07
Perfluorododecanoic acid (PFDoDA)	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	<0.02	<0.05	0	<0.02	<0.02
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	<0.02	<0.01	0	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02	0.23	0.23	0	0.23	0.2	14	0.21	0.24	13	0.21	0.1	**71**	0.16	0.15	6	0.16	0.1	46	0.03	0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.5	0	<0.05	<0.05	0	<0.05	<0.5	0	<0.05	<0.05	0	<0.05	<0.5	0	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	0.12	0.11	9	0.12	0.09	29	0.11	0.12	9	0.11	0.06	59	0.09	0.08	12	0.09	0.06	40	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.02	0.1	0.1	0	0.1	0.1	0	0.1	0.1	0	0.1	0.06	50	<0.1	<0.1	0	<0.1	0.07	0	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.1	0	<0.02	<0.02	0	<0.02	<0.1	0	<0.02	<0.02	0	<0.02	<0.1	0	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.23	0.22	4	0.23	0.20	14	0.23	0.24	4	0.23	0.14	**49**	0.17	0.16	6	0.17	0.14	19	0.01	0.01
Perfluoroalkane Sulfonic Acids																						
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	7.37	6.74	9	7.37	5.8	24	7.53	7.56	0	7.53	5.9	24	5.32	5.50	3	5.32	4.1	26	0.18	0.18
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	0.49	0.45	9	0.49	0.38	25	0.45	0.49	9	0.45	0.24	**61**	0.38	0.33	14	0.38	0.29	27	0.09	0.08
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	3.78	3.44	9	3.78	3.1	20	3.54	3.74	5	3.54	2.2	**47**	2.79	2.55	9	2.79	2.2	24	0.49	0.46
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	0.25	0.24	4	0.25	0.20	22	0.24	0.26	8	0.24	0.17	34	0.19	0.19	0	0.19	0.15	24	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	0.50	0.47	6	0.50	0.36	**33**	0.46	0.50	8	0.46	0.23	**67**	0.33	0.35	6	0.33	0.27	20	0.07	0.08
Sum of PFHxS and PFOS	µg/L	0.01	11.2	10.2	9	11.2	8.8	24	11.1	11.3	2	11.1	8.0	**32**	8.11	8.05	1	8.11	6.3	25	0.67	0.64
Perfluoroalkyl Sulfonamides																						
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.5	0	<0.05	<0.05	0	<0.05	<0.5	0	<0.05	<0.05	0	<0.05	<0.5	0	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.1	0	<0.05	<0.05	0	<0.05	<0.1	0	<0.05	<0.05	0	<0.05	<0.1	0	<0.05	<0.05
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	<0.05	<0.05	0	<0.05	<0.05
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	<0.05	<0.05	0	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.1	0	<0.02	<0.02	0	<0.02	<0.1	0	<0.02	<0.02	0	<0.02	<0.1	0	<0.02	<0.02
PFAS																						
Sum of US EPA PFAS (PFOS + PFOA)*	µg/L	0.01	-	-	-	-	6.0	-	-	-	-	-	6.0	-	-	-	-	-	4.2	-	-	-
Sum of PFAS	µg/L	0.01	13.6	12.5	8	13.6	11	21	13.4	13.8	3	13.4	9.3	**36**	9.84	9.70	1	9.84	7.7	24	0.94	0.90

***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: 1000 (1 - 10 x EQL); 50 (10 - 20 x EQL); 30 (> 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 B2: RPD Analytical Results
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

		Location Code		WC_OMP01	WC_OMP01		MC_OMP02	MC_OMP02		MC_OMP02	MC_OMP02		MC_OMP03	MC_OMP03		MC_OMP03	MC_OMP03	
		Field ID		WC_OMP01	QC202		MC_OMP02	QC104		MC_OMP02	QC204		MCOMP03	QC105		MCOMP03	QC205	
		Date		17/05/2023	17/05/2023		18/05/2023	18/05/2023		18/05/2023	17/05/2023		18/05/2023	18/05/2023		18/05/2023	18/05/2023	
		Sample Type		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D	
		Lab Report No.	RPD	ES2317554	324402	RPD	ES2317554	ES2317554	RPD	ES2317554	324402	RPD	ES2317554	ES2317554	RPD	ES2317554	324402	RPD
	Unit	EQL																
(n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01	0	<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 Sulfonate (6:2 FtS)	µg/L	0.01	0	<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
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.02	0	<0.05	<0.02	0	<0.05	<0.05	0	<0.05	<0.02	0	<0.05	<0.05	0	<0.05	<0.02	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.02	0	<0.05	<0.02	0	<0.05	<0.05	0	<0.05	<0.02	0	<0.05	<0.05	0	<0.05	<0.02	0
Perfluoroalkane Carboxylic Acids																		
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	0	0.07	0.06	15	0.09	0.08	12	0.09	0.07	25	0.69	0.72	4	0.69	0.62	11
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	0	<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
Perfluorononanoic acid (PFNA)	µg/L	0.01	0	<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
Perfluoropentanoic acid (PFPeA)	µg/L	0.02	40	0.03	0.02	40	0.24	0.23	4	0.24	0.2	18	0.22	0.23	4	0.22	0.2	10
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	0	<0.05	<0.5	0	<0.05	<0.05	0	<0.05	<0.5	0	<0.05	<0.05	0	<0.05	<0.5	0
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	0	<0.02	0.01	0	0.03	0.03	0	0.03	0.02	40	0.16	0.16	0	0.16	0.12	29
Perfluorobutanoic acid (PFBA)	µg/L	0.02	0	<0.1	<0.02	0	0.1	0.1	0	0.1	0.1	0	0.1	0.1	0	0.1	0.1	0
Perfluorodecanoic acid (PFDA)	µg/L	0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02	0	<0.02	<0.1	0	<0.02	<0.02	0	<0.02	<0.1	0	<0.02	<0.02	0	<0.02	<0.1	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0	0.01	0.01	0	0.02	0.02	0	0.02	0.01	67	0.31	0.33	6	0.31	0.29	7
Perfluoroalkane Sulfonic Acids																		
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	0	0.18	0.15	18	0.10	0.09	11	0.10	0.08	22	11.4	11.8	3	11.4	10	13
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	12	0.09	0.07	25	0.06	0.05	18	0.06	0.05	18	0.73	0.74	1	0.73	0.66	10
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	6	0.49	0.42	15	0.32	0.30	6	0.32	0.26	21	5.68	6.08	7	5.68	4.9	15
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	0	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0	0.39	0.40	3	0.39	0.32	20
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	13	0.07	0.06	15	0.07	0.06	15	0.07	0.05	33	0.70	0.73	4	0.70	0.58	19
Sum of PFHxS and PFOS	µg/L	0.01	5	0.67	0.57	16	0.42	0.39	7	0.42	0.34	21	17.1	17.9	5	17.1	15	13
Perfluoroalkyl Sulfonamides																		
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	0	<0.05	<0.5	0	<0.05	<0.05	0	<0.05	<0.5	0	<0.05	<0.05	0	<0.05	<0.5	0
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	0	<0.05	<0.1	0	<0.05	<0.05	0	<0.05	<0.1	0	<0.05	<0.05	0	<0.05	<0.1	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	0	<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 sulfonamidoethanol (MeFOSE)	µg/L	0.05	0	<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
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	0	<0.02	<0.1	0	<0.02	<0.02	0	<0.02	<0.1	0	<0.02	<0.02	0	<0.02	<0.1	0
PFAS																		
Sum of US EPA PFAS (PFOS + PFOA)*	µg/L	0.01	-	-	0.16	-	-	-	-	-	0.09	-	-	-	-	-	11	-
Sum of PFAS	µg/L	0.01	4	0.94	0.81	15	1.03	0.96	7	1.03	0.84	20	20.4	21.3	4	20.4	18	12

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

Table B3: Rinsate Blank Analytical Results
DITCRD, Norfolk, DSI
Norfolk Island,
DITCRD

		Field ID	QC300	QC301	QC302
		Date	16/05/2023	17/05/2023	19/05/2023
		Sample Type	Rinsate	Rinsate	Rinsate
		Lab Report No.	ES2317554	ES2317554	ES2317554
	Unit	EQL			
(n:2) Fluorotelomer Sulfonic Acids					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05	<0.05	<0.05	0.47
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05	<0.05	<0.05	<0.05
Perfluoroalkane Carboxylic Acids					
Perfluorohexanoic acid (PFHxA)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05	<0.05	<0.05
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1	<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01	<0.01	<0.01
Perfluoroalkane Sulfonic Acids					
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02	<0.02	<0.02	<0.02
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02	<0.02	<0.02	<0.02
Sum of PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	<0.01
Perfluoroalkyl Sulfonamides					
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	<0.05
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	0.02	<0.02	<0.02	<0.02
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	µg/L	0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	<0.02
PFAS					
Sum of PFAS	µg/L	0.01	<0.01	<0.01	0.47

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Certificate of Service and Calibration
Water Quality Meter
YSI Professional Plus

Company Name	WAM Scientific
Office Address	26 Bungarra Crescent, Chipping Norton NSW 2170
Phone Number	+61 405 241 484
Contact Name	William Pak
Instrument	YSI Pro Quatro Water Quality Meter w/ 1m Quatro Cable
Serial Number	23A107176
Client Name	Michelle Agnew/Bec Chapple (Senversa)
Project Number	C17776
Comments	-

Instrument Check

Item	Test	Test Passed	Comments
2 x Alkaline C-size Batteries	Klein Tools MM300 Multimeter	✓	Both batteries reading above 2.9V
Battery Saver Function	Operation	✓	Automatically turns off after 60 minutes if idle
Unit Display	Operation	✓	Screen visible, no damage
Keypad	Operation	✓	Responsive, no damage
Connection Port and Cable	Condition/Check	✓	Clean, no damage
Monitor Housing	Condition/Check	✓	No damage
Firmware	Version	✓	4.0.0
pH Probe	Condition/Calibration	✓	Calibrated and conforms to manufacturer's specs
pH millivolts for pH 7.00	Calibration	✓	pH 7.00 calibration range between 0 mV ± 50 mV
pH millivolts for pH 4.00	Calibration	✓	pH 4 mV range +165 to +180 from 7 buffer mV value
pH slope	Calibration	✓	Range between 55 to 60 mV/pH (ideal value 59 mV)
Response time < 90 seconds	Calibration	✓	Responds to correct value within 90 seconds
ORP Probe	Condition/Calibration	✓	Calibrated and conforms to manufacturer's specs
ORP Reading	Calibration	✓	Within ± 80 mV of reference Zobell Reading
Response time < 90 seconds	Calibration	✓	Responds to correct value within 90 seconds
Conductivity/Temp Probe	Condition/Calibration	✓	Calibrated and conforms to manufacturer's specs
Conductivity Cell	Calibration	✓	Conductivity cell constant 5.0 ± 1.0 in GLP file
Clean Sensor Readings	Calibration	✓	Clean sensor reads less than 3 uS/cm in dry air
Dissolved Oxygen Probe	Condition/Calibration	✓	Calibrated and conforms to manufacturer's specs
DO Cap	Condition/Calibration	✓	1.25 mil PE membrane (yellow membrane)
DO Sensor in Use	Condition	✓	Polarographic DO sensor
DO Sensor Value	Calibration	✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA

Instrument Readings

Parameter	Standard Used	Reference No.	Calibration Value	Observed	Actual	Units
Temperature	Centre 370 Thermometer	Room Temp.	13.1	13.2	13.1	°C
pH	pH 4.00	386466	4.01	4.17	4.01	pH
pH	pH 7.00	387329	7.00	7.16	7.00	pH
Conductivity	2760 µs/cm at 25°C	388521	2760	3141	2760	µs/cm
ORP (Ref. check only)	Zobell A & B	380835/382785	240.5	236.0	240.5	mV
Zero Dissolved O_2	$NaSO_3$ in Distilled H_2O	389912	0.0	3.1	0.0	%
100% Dissolved O_2	100% Air Saturated H_2O	Fresh Air	100.0	124.2	100.0	%

Declaration

WAM Scientific certifies that the above instrument was successfully tested according to manufacturer's standards and all necessary checks were conducted to ensure the instrument was fully operational prior to dispatch. The calibration data supplied was obtained in accordance with manufacturer's specifications using solutions of known values.

Calibrated By	William Pak
Calibration Date	10/05/2023
Calibration Due	10/11/2023

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Appendix C: Field Observations

Appendix C: Field Observations

Water Sample Information			Water Quality Results						
Sample ID	Monitoring Zone	Date Sampled	DO (mg/L)	EC (µS/cm)	TDS (mg/L)1	pH	Redox (mV)	Temp (°C)	Water and Sediment Field Observations
AIRPORT_BORE	Groundwater	17/05/2023	6.43	570.0	370.5	6.76	114	19.7	Colourless, no odour, no sheen, non-turbid.
ID016_BORE	Groundwater	18/05/2023	3.14	351.3	228.3	4.80	185.8	21.0	Colourless, no odour, no sheen, non-turbid.
ID013_BORE	Groundwater	18/05/2023	6.20	430.0	279.5	5.80	18.3	20.7	Colourless, no odour, no sheen, non-turbid. SW01 location pump broken.
AIRPORT_RESERVOIR	Airport water supply	17/05/2023	6.40	22.7	14.8	6.68	83.4	18.1	Colourless, no odour, no sheen, non-turbid. Reservoir shed supplied by rain water.
MC_OMP01	Mission Creek	16/05/2023	7.33	396.7	257.9	6.63	123.0	17.3	Colourless, no odour, no sheen, non-turbid. Orange precipitate on banks. Moderate flow.
MC_OMP02	Mission Creek	18/05/2023	2.42	503.0	327.0	6.97	76.0	19.5	Colourless, no odour, no sheen, non-turbid. Low flow.
MC_OMP03	Mission Creek	18/05/2023	6.64	508.0	330.2	6.96	29.3	18.8	Colourless, no odour, no sheen, non-turbid. Moderate flow.
MC_OMP04	Mission Creek	17/05/2023	6.45	469.0	304.9	7.21	51.2	17.6	Colourless, no odour, no sheen, non-turbid. Low flow.
MC_OMP05	Mission Creek	17/05/2023	6.57	467.3	303.7	7.07	47.7	17.6	Colourless, no odour, no sheen, non-turbid. Low flow.
MC_OMP06	Mission Creek	17/05/2023	3.13	689.0	447.9	7.06	24.9	17.2	Slightly orange, no odour, moderate microbial sheen, non-turbid. Low flow.
MC_OMP07	Mission Creek	18/05/2023	5.25	530.0	344.5	7.13	50	18.5	Colourless, no odour, no sheen, non-turbid. Low flow.
MC_OMP09	Mission Creek	18/05/2023	1.07	530.0	344.5	6.94	28.1	20.4	Colourless, no odour, no sheen, non-turbid. No flow.
MC_OMP11	Mission Creek	18/05/2023	7.10	572.0	371.8	7.05	153.0	18.8	Colourless, no odour, no sheen, suspended sediments. low flow.
WW11_DAM	Mission Creek	16/05/2023	3.41	403.8	262.5	6.57	217.8	17.3	Colourless, no odour, no sheen, non-turbid. Green algae on surface. No flow.
ID014_BORE	Mission Creek Stock Watering	18/05/2023	6.85	560.0	364.0	7.33	111.5	20.1	Colourless, no odour, no sheen, non-turbid.
ID015_BORE	Mission Creek Stock Watering	17/05/2023	6.90	139.4	90.6	5.34	166.3	20.5	Colourless, no odour, no sheen, non-turbid.
MC_OMP08	Mission Creek Stock Watering	18/05/2023	6.80	537.0	349.1	7.27	111.0	19.7	Colourless, no odour, no sheen, non-turbid. Low flow.
MC_OMP10	Mission Creek Stock Watering	17/05/2023	5.88	503.0	327.0	7.00	156.7	17.4	Colourless, no odour, no sheen, non-turbid. No flow.
A_TAP1	Public tap/tank	17/05/2023	5.57	6.9	4.5	6.08	178.9	21.1	Colourless, no odour, no sheen, non-turbid.
A_TAP4	Public tap/tank	17/05/2023	6.17	17.0	11.1	6.45	130.1	20.2	Colourless, no odour, no sheen, non-turbid.
A_TAP10	Public tap/tank	17/05/2023	5.35	7.8	5.1	6.24	162.9	19.3	Colourless, no odour, no sheen, non-turbid.
A_TAP11	Public tap/tank	17/05/2023	6.17	9.6	6.2	6.12	170	18.7	Colourless, no odour, no sheen, non-turbid.
A_TAP12	Public tap/tank	17/05/2023	7.42	7.5	4.9	6.50	164.7	19.4	Colourless, no odour, no sheen, non-turbid.
A_TAP13	Public tap/tank	17/05/2023	6.13	8.3	5.4	6.43	172.2	15.4	Colourless, no odour, no sheen, non-turbid.
A_TAP14	Public tap/tank	17/05/2023	5.25	7.5	4.9	6.18	175	20.9	Colourless, no odour, no sheen, non-turbid.
A_TAP15	Public tap/tank	17/05/2023	7.01	6.6	4.3	6.24	181.0	14.0	Colourless, no odour, no sheen, non-turbid.
A_TAP16	Public tap/tank	17/05/2023	5.82	8.2	5.3	6.01	180.6	20.9	Colourless, no odour, no sheen, non-turbid.
A_TAP17	Public tap/tank	17/05/2023	1.82	7.2	4.7	5.63	198.4	20.0	Colourless, no odour, no sheen, non-turbid.
DEPOT_TANK1	Public tap/tank	16/05/2023	6.45	16.9	11.0	7.91	90	22.4	Colourless, no odour, no sheen, non-turbid.
DEPOT_TANK2	Public tap/tank	16/05/2023	5.38	23.0	15.0	7.10	163.8	22.6	Colourless, no odour, no sheen, non-turbid.
DEPOT_TANK3	Public tap/tank	16/05/2023	7.22	349.2	227.0	7.55	189.4	20.9	Colourless, no odour, no sheen, non-turbid.
DEPOT_TAP	Public tap/tank	16/05/2023	5.60	15.5	10.1	8.37	161.5	21.0	Colourless, no odour, no sheen, non-turbid.
FRE_TAP1	Public tap/tank	18/05/2023	6.02	23.4	15.2	6.95	103.9	22.5	Colourless, no odour, no sheen, non-turbid.
FRE_TAP2	Public tap/tank	18/05/2023	4.07	20.2	13.1	7.62	103.5	26.4	Colourless, no odour, no sheen, non-turbid.
FRE_TANK1	Public tap/tank	19/05/2023	6.28	105.1	68.3	7.17	123.3	19.8	Colourless, no odour, no sheen, non-turbid.
WASTE_TAP1	Public tap/tank	16/05/2023	4.92	13.5	8.8	5.56	220.9	21.4	Colourless, no odour, no sheen, non-turbid.
WASTE_TAP2	Public tap/tank	16/05/2023	5.36	18.0	11.7	5.92	203.9	21.4	Colourless, no odour, no sheen, non-turbid.
WASTE_TAP3	Public tap/tank	16/05/2023	5.12	14.8	9.6	5.71	209.4	20.6	Colourless, no odour, no sheen, non-turbid.
WASTE_TAP4	Public tap/tank	16/05/2023	5.45	15.8	10.3	5.66	209.9	21.1	Colourless, no odour, no sheen, non-turbid.
WASTE_TAP5	Public tap/tank	16/05/2023	2.45	20.7	13.5	6.28	222.2	19.3	Colourless, no odour, no sheen, non-turbid.
WASTE_TAP6	Public tap/tank	19/05/2023	5.93	163.4	106.2	4.77	162.6	19.3	Colourless, no odour, no sheen, non-turbid.
ELEC_TAP1	Public tap/tank	19/05/2023	5.53	133.0	86.5	4.73	186.7	21.5	Colourless, no odour, no sheen, non-turbid.
WC_OMP01	Watermill Creek	17/05/2023	4.93	361.3	234.8	6.38	150.2	19.3	Colourless, no odour, no sheen, non-turbid. No flow.
WC_OMP02	Watermill Creek	17/05/2023	7.22	370.9	241.1	6.62	156	18.1	Colourless, no odour, no sheen, non-turbid. Moderate flow.
WC_OMP03	Watermill Creek	17/05/2023	8.02	385.1	250.3	6.72	155.4	18.1	Colourless, no odour, no sheen, non-turbid. Moderate flow.
WC_OMP04_DUCKDAM	Watermill Creek	16/05/2023	8.63	391.5	254.5	7.24	129.1	17.1	Colourless, no odour, no sheen, non-turbid.
WC_OMP05	Watermill Creek/Marine	16/05/2023	6.93	650.0	422.5	7.79	141.4	18.1	Colourless, no odour, no sheen, non-turbid. Moderate flow into the bay.
WC_OMP06	Watermill Creek	17/05/2023	7.21	475.1	308.8	6.53	142.3	18.4	Colourless, no odour, no sheen, non-turbid. Moderate flow.
EB_OMP1	Marine	16/05/2023	6.77	47008.0	30555.2	8.13	186.1	22.1	Colourless, no odour, no sheen, non-turbid.
EB_OMP2	Marine	16/05/2023	7.21	46602.0	30291.3	8.17	186.1	21.9	Colourless, no odour, no sheen, non-turbid.
EB_OMP3	Marine	16/05/2023	21.70	47339.0	30770.4	8.17	200.3	21.8	Colourless, no odour, no sheen, non-turbid.
EB_OMP4	Marine	16/05/2023	7.10	47763.0	31046.0	8.16	201.2	21.8	Colourless, no odour, no sheen, non-turbid.
Cockpit_SW01	Cascade Creek	16/05/2023	9.19	377.7	245.5	7.47	179.1	17.4	Colourless, no odour, no sheen, non-turbid. Moderate flow.
PWS_HEAD_DAM	Headstone Creek	16/05/2023	4.00	431.5	280.5	6.73	130	18.1	Slightly brown, no odour, no sheen, non-turbid.
WC_OMP07_SD	Airport drainage to Watermill Creek	18/05/2023	-	-	-	-	-	-	Clayey SILT: low plasticity, soft, moist, brown. No surface water.

Notes:
1- 0.65 EC conversion

Appendix D: Laboratory Certificates

* bec.chapple@senversa.com.au
michelle.agnew@senversa.com.au

senversa

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Chain of Custody Documentation

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	Purchase Order:	
Project Name:	NF_OMP_Y2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard
Project Manager:	~~Chris Bowditch~~	Page:	1 of 1
Email Report To:	* Michelle Agnew	Phone/Mobile:	0408 038 593

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS ~~Suite~~ standard (28 Analytes)										HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
1	ID015_BORE	Water	17/5/23	PM	1 x bottle	1	X											Separate COA
Total						1												

Environmental Division
Sydney
Work Order Reference
ES2317549
Telephone : +61-2-8784 8555

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:	Sampler Name: Bec Chapple	Signature:	Date: 17/5/23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Bec Chapple	Date: 19-5-23	Carrier / Reference #:	Name/Signature: Zac C	Date: 25/5/23
Of: Senversa	Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

CERTIFICATE OF ANALYSIS

Work Order	: **ES2317549**	Page	: 1 of 5
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C17776 NF_OMP_Y2	Date Samples Received	: 25-May-2023 16:30
Order number	: ----	Date Analysis Commenced	: 29-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023 13:23
Sampler	: BC+MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This 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*
Franco Lentini	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.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	ID015_BORE	----	----	----	----
				Sampling date / time	17-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317549-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**0.03**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.03**	----	----	----	----
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: WATER (Matrix: WATER)				Sample ID	ID015_BORE	----	----	----	----
				Sampling date / time	17-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317549-001	--------	--------	--------	--------
					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		**0.06**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.06**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.06**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**104**	----	----	----	----
13C8-PFOA	----	0.02	%		**107**	----	----	----	----

Surrogate Control Limits

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2317549**	Page	: 1 of 4
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Telephone	: + 61 2 8784 8555
Project	: C17776 NF_OMP_Y2	Date Samples Received	: 25-May-2023
Site	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC+MA	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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 QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
	0				
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / ***Container*** / Client Sample ID(s)	***Sample Date***	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
ID015_BORE	**17-May-2023**	**30-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X)							
ID015_BORE	**17-May-2023**	**30-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X)							
ID015_BORE	**17-May-2023**	**30-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
ID015_BORE	**17-May-2023**	**30-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X)							
ID015_BORE	**17-May-2023**	**30-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	20	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	20	**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.

QUALITY CONTROL REPORT

Work Order	: **ES2317549**	Page	: 1 of 4
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C17776 NF_OMP_Y2	Date Samples Received	: 25-May-2023
Order number	: ----	Date Analysis Commenced	: 29-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC+MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Franco Lentini	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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5081242)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	97.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	106	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	110	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	123	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	106	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5081242)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	110	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	101	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	97.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	122	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	120	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	93.3	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5081242)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	110	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	74.0	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.7	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	75.6	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	90.1	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	126	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	120	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	111	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	122	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	122	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	105	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.**

* bec.chapple@senversa.com.au
michelle.agnew@senversa.com.au.

senversa

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Chain of Custody Documentation

Laboratory: ~~mgt/Eurofins VIC~~
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	Purchase Order:	
Project Name:	NF_GMP Y2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard
Project Manager:	~~Michelle Agnew~~ Michelle Agnew	Page:	1 of 1
Email Report To: *		Phone/Mobile:	0408 038 593.

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS standard suite (28 Analytes)										HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
(1)	ID016_BORE	water	18-5-23	PM	1 x bottle	1												separate COA
Total																		

Environmental Division
Sydney
Work Order Reference
ES2317550

Telephone : +61-2-8784 8555

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:	Sampler Name: Bec Chapple	Signature:	Date: 18-5-23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Bec Chapple Senversa	Date: 19-5-23	Carrier / Reference #:	Name/Signature:	Date: 25/5/23
Of:	Time:	Date/Time:	Of:	Time: 16:20
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

CERTIFICATE OF ANALYSIS

Work Order	: **ES2317550**	Page	: 1 of 5
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023 16:30
Order number	: ----	Date Analysis Commenced	: 29-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023 13:24
Sampler	: BC + MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This 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*
Franco Lentini	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.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	IDO16_BORE	----	----	----	----
				Sampling date / time	18-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317550-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.08**	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.06**	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**0.29**	----	----	----	----
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		**0.05**	----	----	----	----
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: WATER (Matrix: WATER)				Sample ID	IDO16_BORE	----	----	----	----
				Sampling date / time	18-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317550-001	--------	--------	--------	--------
					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		**0.48**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.29**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.42**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**93.3**	----	----	----	----
13C8-PFOA	----	0.02	%		**108**	----	----	----	----

Surrogate Control Limits

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2317550**	Page	: 1 of 4
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023
Site	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC + MA	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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 QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
	0				
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / ***Container*** / Client Sample ID(s)	***Sample Date***	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
IDO16_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X)							
IDO16_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X)							
IDO16_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
IDO16_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X)							
IDO16_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	20	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	20	**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.

QUALITY CONTROL REPORT

Work Order	: **ES2317550**	Page	: 1 of 4
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023
Order number	: ----	Date Analysis Commenced	: 29-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC + MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Franco Lentini	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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5081242)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	97.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	106	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	110	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	123	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	106	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5081242)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	110	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	101	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	97.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	122	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	120	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	93.3	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5081242)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	110	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	74.0	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.7	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	75.6	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	90.1	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	126	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	120	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	111	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	122	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	122	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	105	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.**

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michelle.agnew@senversa.com.au

senversa

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	**Purchase Order:**	
Project Name:	NF_OMP Y2	**Quote No:**	
Sampled By:	BC + MA	**Turn Around Time:**	Standard
Project Manager:	Michelle Agnew	**Page:**	1 of 1
Email Report To:	*	**Phone/Mobile:**	0408 038 593

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS standard suite (28 Analytes)										HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
①	1D014_BORE	Water	18-5-23	PM	1 x bottle	1	X											separate COA
Total																		

Environmental Division
Sydney
Work Order Reference
ES2317551

Telephone : +61-2-8784 8555

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Bec Chapple **Signature:** **Date:** 18-5-23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Bec Chapple	Date: 19-5-23	Carrier / Reference #:	Name/Signature:	Date: 25/5/23
Of: Senversa	Time:	Date/Time:	Of:	Time: 6:30
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

CERTIFICATE OF ANALYSIS

Work Order	: **ES2317551**	Page	: 1 of 5
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MICHELLE AGNEW	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023 16:30
Order number	: ----	Date Analysis Commenced	: 29-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023 13:26
Sampler	: BC+MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This 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*
Franco Lentini	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.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	IDO14_BORE	----	----	----	----
				Sampling date / time	18-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317551-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.15**	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.19**	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**1.36**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.09**	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**2.37**	----	----	----	----
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		**0.08**	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.20**	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.04**	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.08**	----	----	----	----
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: WATER (Matrix: WATER)				Sample ID	IDO14_BORE	----	----	----	----
				Sampling date / time	18-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317551-001	--------	--------	--------	--------
					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		**4.56**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**3.73**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**4.28**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**103**	----	----	----	----
13C8-PFOA	----	0.02	%		**107**	----	----	----	----

Surrogate Control Limits

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2317551**	Page	: 1 of 4
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MICHELLE AGNEW	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023
Site	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC+MA	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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 QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
	0				
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / *Container* / Client Sample ID(s)	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X) IDO14_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X) IDO14_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X) IDO14_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X) IDO14_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X) IDO14_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	20	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	20	**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.

QUALITY CONTROL REPORT

Work Order	: **ES2317551**	Page	: 1 of 4
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MICHELLE AGNEW	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023
Order number	: ----	Date Analysis Commenced	: 29-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC+MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Franco Lentini	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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5081242)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	97.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	106	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	110	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	123	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	106	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5081242)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	110	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	101	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	97.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	122	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	120	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	93.3	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5081242)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	110	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	74.0	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.7	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	75.6	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	90.1	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	126	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	120	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	111	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	122	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	122	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	105	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.**

* bec-chapple@senversa.com.au
michelle.agnew@senversa.com.au.

senversa

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Chain of Custody Documentation

Laboratory: mgt/Eurofins VIC
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	Purchase Order:	
Project Name:	NF_OMP Y2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard
Project Manager:	~~Chris~~ ~~Sandiford~~ Michelle Agnew	Page:	1 of 1
Email Report To:	*	Phone/Mobile:	0408 058 593

Lab ID	Sample ID	Matrix *	Date	Time	Container Information: Type / Code	Container Information: Total Bottles	Analysis Required: PFAS standard suite (28 Analytes)	HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
	~~Vial Matrix~~								separate COA
(1)	ID013_BORE	water	18-5-23	PM	1 x bottle	1	X		
Total									

Environmental Division
Sydney
Work Order Reference
ES2317553

Telephone : +61-2-8784 8555

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Bec Chapple | Signature: | Date: 18-5-23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Bec Chapple Senversa	Date: 19-5-23	Carrier / Reference #:	Name/Signature:	Date: 25/5/23
Of:	Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

CERTIFICATE OF ANALYSIS

Work Order	: **ES2317553**	Page	: 1 of 5
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023 16:30
Order number	: ----	Date Analysis Commenced	: 29-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023 13:25
Sampler	: BC+MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This 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*
Franco Lentini	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.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	ID013_BORE	----	----	----	----
				Sampling date / time	18-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317553-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	ID013_BORE	----	----	----	----
				Sampling date / time	18-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317553-001	--------	--------	--------	--------
					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	%		**107**	----	----	----	----

Surrogate Control Limits

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2317553**	Page	: 1 of 4
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023
Site	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC+MA	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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 QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
	0				
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / *Container* / Client Sample ID(s)	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) ID013_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) ID013_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) ID013_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) ID013_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) ID013_BORE	**18-May-2023**	**30-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	20	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	20	**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.

QUALITY CONTROL REPORT

Work Order	: **ES2317553**	Page	: 1 of 4
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C1776 NF_OMP Y2	Date Samples Received	: 25-May-2023
Order number	: ----	Date Analysis Commenced	: 29-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC+MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Franco Lentini	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%.

- **No Laboratory Duplicate (DUP) Results are required to be reported.**

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5081242)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	97.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	106	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	110	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	123	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	106	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5081242)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	110	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	101	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	97.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	122	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	120	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	93.3	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5081242)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	110	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	74.0	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.7	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	75.6	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	90.1	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	126	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	120	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	111	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	122	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	122	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	105	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.**

* bec.chapple
michelle.agnew } @senversa.com.au.
[redacted]

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Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	Purchase Order:	
Project Name:	NF_OMP_Y2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard
Project Manager:	[redacted]	Page:	1 of 4
Email Report To: *	Michelle Agnew	Phone/Mobile:	0408 038 593

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS short suite standard (28 Analytes)									HOLD		Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
1	WASTE_TAP_1	Water	16-5-23	AM	1x bottle	1	X											
2	WASTE_TAP_2			AM	1x	1	X											
3	DEPOT_TANK1			AM		1	X											
4	DEPOT_TANK2			AM		1	X											
5	DEPOT_TANK3			AM		1	X											
6	DEPOT_TAP			AM		1	X											
7	NC_OMP05			PM		1	X											
8	EB_OMP01			PM		1	X											
9	EB_OMP02			PM		1	X											
10	EB_OMP03			PM		1	X											
11	EB_OMP04			PM		1	X											
12	Cockpit_SW01			PM		1	X											
13	PWS_Head_Dam			PM		1	X											
14	NW11_DAM			AM		1	X											
15	MC_OMP01			PM		1	X											
16	NC_OMP04_DUCKDAM		16-5-23	AM		1	X											
17	QC300	16	~~17~~-5-23	AM		1	X											
18	A_Tap14		17-5-23	AM		1	X											
19	A_Tap17		17-5-23	AM		1	X											
20	A_Tap16	Water	17-5-23	AM	1x bottle	1	X											
Total																		

Environmental Division
Sydney
Work Order Reference
ES2317554

Telephone : + 61-2-8784 8555

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:	Sampler Name: Bec Chapple	Signature: [redacted]	Date: 16-5-23

Relinquished By:			Method of Shipment (if applicable):	Received by:	
Name/Signature:	Bec Chapple [redacted] Senversa	Date: 19-5-23	Carrier / Reference #:	Name/Signature: [redacted]	Date: 25/5/23
Of:		Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:		Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:		Time:	Date/Time:	Of:	Time:
Name/Signature:		Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:		Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: NA

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Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	**Purchase Order:**	
Project Name:	NF_OMP Y2	**Quote No:**	
Sampled By:	BC + MA	**Turn Around Time:**	Standard
Project Manager:	~~Dennis Summerhayes~~ Michelle Agnew	**Page:**	2 of 4
Email Report To:	* see page 1	**Phone/Mobile:**	0408 038 593

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	~~PFAS Suite~~ Standard (28 Analytes)									HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
21	WC_OMP03	Water	17-5-23	PM	1 x bottle	1	X											
22	Airport_Reservoir	water	17-5-23	AM	1 x bottle	1	X											
23	Airport_Bore	↓	↓	AM	↓	1	X											
24	A_Tap1			AM		1	X											
25	A_Tap1B			AM		1	X											
26	WC_OMP06			PM		1	X											
27	A_Tap11			AM		1	X											
28	MC_OMP06			AM		1	X											
29	A_Tap4			AM		1	X											
30	A_Tap13			AM		1	X											
31	A_Tap10			AM		1	X											
32	WC_OMP02			PM		1	X											
33	A_Tap12			AM		1	X											
34	WC_OMP01			PM		1	X											
35	MC_OMP10			~~PM~~ AM		1	X											
36	MC_OMP04			AM		1	X											
37	MC_OMP05			AM		1	X											
38	QC100			PM		1	X											
39	QC101	↓	↓	PM	↓	1	X											
40	QC102	water	17-5-23	PM	1 x bottle	1	X											
Total																		

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Bec Chapple **Signature:** ~~Bec Chapple~~ **Date:** 17-5-23

Relinquished By:			Method of Shipment (if applicable):	Received by:	
Name/Signature:	Bec Chapple ~~Bec Chapple~~	Date: 19-5-23	Carrier / Reference #:	Name/Signature: Zac. C ~~Zac~~	Date: 25/5/23 16:30
Of:	Senversa	Time:	Date/Time:	Of:	Time:
Name/Signature:		Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:		Time:	Date/Time:	Of:	Time:
Name/Signature:		Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:		Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

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Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	**Purchase Order:**	
Project Name:	~~WWWWW~~ NF_OMP Y2	**Quote No:**	
Sampled By:	BC + MA	**Turn Around Time:**	Standard.
Project Manager:	~~Adam Shepherd~~ Michelle Agnew	**Page:**	3 of 4
Email Report To:	* see page 1	**Phone/Mobile:**	0408 038 593

Sample Information					Container Information		Analysis Required										
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS ~~Analytes~~ suite	Standard (28 Analytes)								HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
41	QC103	Water	17-5-23	PM	1 x bottle	1	X										
-	QC200			PM		1	X										Please forward to Eurofins
-	QC201			PM		1	X										Please forward to Eurofins
-	QC202			PM		1	X										Please forward to Eurofins
-	QC203		17-5-23	PM		1	X										Please forward to Eurofins
42	MC_OMP02		18-5-23	AM		1	X										
43	QC104			AM		1	X										
-	QC204			AM		1	X										Please forward to Eurofins
44	FRE_TAP1			PM		1	X										
45	FRE_TAP2			PM		1	X										
46	QC301		17-5-23	AM		1	X										
47	MCOMP03		18-5-23	AM		1	X										
48	QC105			AM		1	X										
-	QC205			AM		1	X										Please forward to Eurofins
49	MC_OMP11			PM		1	X										
50	MCOMP09			PM		1	X										
51	MC_OMP07			AM		1	X										
52	MC_OMP08			AM		1	X										
53	MC_OMP07	sediment		AM	1 x jar	1	X										
54	QC106	sediment	18-5-23	PM	1 x jar	1	✓									X	
Total																	

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples: **Sampler Name:** Bec Chapple **Signature:** [signature] **Date:** 17-5-23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Bec Chapple [signature]	Date: 19-5-23	Carrier / Reference #:	Name/Signature: Zac C [signature]	Date: 25/5/23
Of: Senversa	Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; E = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

* bec.chapple@senversa.com.au.
michelle.agnew@senversa.com.au

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Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory: mgt/Eurofins VIC
Address:
Contact: Sample Receipt
Phone:

Job Number:	CI7776	**Purchase Order:**	
Project Name:	NF_OMP X2	**Quote No:**	
Sampled By:	BC + MA	**Turn Around Time:**	Standard
Project Manager:	Michelle Agnew	**Page:**	4 of 4
Email Report To:	*	**Phone/Mobile:**	0408 038 593

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS Standard Suite (28 Analytes)										HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
-	QC206	sediment	18-5-23	PM	1x jar	1											X	Please forward to Eurofins
55	WASTE-TAP3	water	19-5-23	AM	1x bottle	1	X											
56	WASTE_TAP4	water	19-5-23	AM	1x bottle	1	X											
57	WASTE_TAP5	water	19-5-23	AM	1x bottle	1	X											
58	WASTE_TAP6	water	19-5-23	AM	1x bottle	1	X											
59	FRE_TANK1	water	19-5-23	AM	1x bottle	1	X											
	[illegible]																	
60	QC302	water	18-5-23	PM	1x bottle	1	X											
	ELEC-TAP1	"	19-5-23	AM	"	1	X											
Total																		

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Bec Chapple **Signature:** [signature] **Date:** 19-5-23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Bec Chapple [signature]	Date:	Carrier / Reference #:	Name/Signature: [signature]	Date: 25/5/23
Of:	Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: ~~AM~~ BC
Checked by: _____ MA

* bec.chapple
michelle.agnew } @senversa.com.au.
[redacted]

senversa

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	Purchase Order:	
Project Name:	NF_OMP_Y2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard
Project Manager:	[redacted]	Page:	1 of 4
Email Report To: *	Michelle Agnew	Phone/Mobile:	0408 038 593

Lab ID	Sample ID	Matrix *	Date	Time	Container Information: Type / Code	Container Information: Total Bottles	Analysis Required: PFAS short suite standard (28 Analytes)	Analysis Required: HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
1	WASTE_TAP1	Water	16-5-23	AM	1x bottle	1	X		
2	WASTE_TAP2			AM	1x	1	X		
3	DEPOT_TANK1			AM		1	X		
4	DEPOT_TANK2			AM		1	X		
5	DEPOT_TANK3			AM		1	X		
6	DEPOT_TAP			AM		1	X		
7	NC_OMP05			PM		1	X		
8	EB_OMP01			PM		1	X		
9	EB_OMP02			PM		1	X		
10	EB_OMP03			PM		1	X		
11	EB_OMP04			PM		1	X		
12	Cockpit_SW01			PM		1	X		
13	PWS_Head_Dam			PM		1	X		
14	WW11_DAM			AM		1	X		
15	MC_OMP01			PM		1	X		
16	NC_OMP04_DUCKDAM		16-5-23	AM		1	X		
17	QC300	16	~~17~~-5-23	AM		1	X		
18	A_Tap14		17-5-23	AM		1	X		
19	A_Tap17		17-5-23	AM		1	X		
20	A_Tap16	Water	17-5-23	AM	1x bottle	1	X		
Total									

Environmental Division
Sydney
Work Order Reference
ES2317554
Telephone : +61-2-8784 8555

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples: Sampler Name: Bec Chapple Signature: [redacted] Date: 16-5-23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature:	Bec Chapple [redacted] Date: 19-5-23	Carrier / Reference #:	Name/Signature: [redacted]	Date: 25/5/23
Of:	Senversa Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: NA

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Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	**Purchase Order:**	
Project Name:	NF_OMP Y2	**Quote No:**	
Sampled By:	BC + MA	**Turn Around Time:**	Standard
Project Manager:	~~Emma Hammond~~ Michelle Agnew	**Page:**	2 of 4
Email Report To:	* see page 1	**Phone/Mobile:**	0408 038 593

Sample Information					Container Information		Analysis Required											
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS ~~Suite~~ Standard (28 Analytes)									HOLD		Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
21	WC_OMP03	Water	17-5-23	PM	1 x bottle	1	X											
22	Airport_Reservoir	water	17-5-23	~~PM~~ AM	1 x bottle	1	X											
23	Airport_Bore	↓	↓	AM	↓	1	X											
24	A_Tap1			AM		1	X											
25	A_Tap1B			AM		1	X											
26	WC_OMP06			PM		1	X											
27	A_Tap11			AM		1	X											
28	MC_OMP06			AM		1	X											
29	A_Tap4			AM		1	X											
30	A_Tap13			AM		1	X											
31	A_Tap10			AM		1	X											
32	WC_OMP02			PM		1	X											
33	A_Tap12			AM		1	X											
34	WC_OMP01			PM		1	X											
35	MC_OMP10			~~PM~~ AM		1	X											
36	MC_OMP04			AM		1	X											
37	MC_OMP05			AM		1	X											
38	QC100			PM		1	X											
39	QC101	↓	↓	PM	↓	1	X											
40	QC102	water	17-5-23	PM	1 x bottle	1	X											
Total																		

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Bec Chapple **Signature:** [signature] **Date:** 17-5-23

Relinquished By:			**Method of Shipment (if applicable):**	**Received by:**	
Name/Signature:	Bec Chapple Senversa [signature]	Date: 19-5-23	Carrier / Reference #:	Name/Signature: [signature]	Date: 25/5/23 16:30
Of:		Time:	Date/Time:	Of:	Time:
Name/Signature:		Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:		Time:	Date/Time:	Of:	Time:
Name/Signature:		Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:		Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: ~~MA~~ MD

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Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	**Purchase Order:**	
Project Name:	~~[illegible]~~ NF_OMP Y2	**Quote No:**	
Sampled By:	BC + MA	**Turn Around Time:**	Standard.
Project Manager:	~~[illegible]~~ Michelle Agnew	**Page:**	3 of 4
Email Report To:	* see page 1	**Phone/Mobile:**	0408 038 593

Sample Information					Container Information		Analysis Required											Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS ~~[illegible]~~ suite	Standard (28 Analytes)									HOLD	
41	QC103	Water	17-5-23	PM	1 x bottle	1	X											
-	QC200			PM		1	X											Please forward to Eurofins
-	QC201			PM		1	X											Please forward to Eurofins
-	QC202			PM		1	X											Please forward to Eurofins
-	QC203		17-5-23	PM		1	X											Please forward to Eurofins
42	MC_OMP02		18-5-23	AM		1	X											
43	QC104			AM		1	X											
-	QC204			AM		1	X											Please forward to Eurofins
44	FRE_TAP1			PM		1	X											
45	FRE_TAP2			PM		1	X											
46	QC301		17-5-23	AM		1	X											
47	MCOMP03		18-5-23	AM		1	X											
48	QC105			AM		1	X											
-	QC205			AM		1	X											Please forward to Eurofins
49	MC_OMP11			PM		1	X											
50	MCOMP09			PM		1	X											
51	MC_OMP07			AM		1	X											
52	MC_OMP08			AM		1	X											
53	MC_OMP07	sediment		AM	1 x jar	1	X											
54	QC106	sediment	18-5-23	PM	1 x jar	1	✓										X	
Total																		

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Bec Chapple **Signature:** [signature] **Date:** 17-5-23

Relinquished By:		**Method of Shipment (if applicable):**	**Received by:**	
Name/Signature: Bec Chapple [signature]	Date: 19-5-23	Carrier / Reference #:	Name/Signature: Zac C [signature]	Date: 25/5/23
Of: Senversa	Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

* bec.chapple@senversa.com.au.
michelle.agnew@senversa.com.au

senversa

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory: mgt/Eurofins VIC
Address:
Contact: Sample Receipt
Phone:

Job Number:	CI7776	**Purchase Order:**	
Project Name:	NF_OMP x2	**Quote No:**	
Sampled By:	BC + MA	**Turn Around Time:**	Standard
Project Manager:	Michelle Agnew	**Page:**	4 of 4
Email Report To:	*	**Phone/Mobile:**	0408 038 593

Sample Information					Container Information		Analysis Required										
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS Standard Suite (28 Analytes)									HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
-	QC206	sediment	18-5-23	PM	1x jar	1										X	Please forward to Eurofins
55	~~WASTE_TAP3~~	water	19-5-23	AM	1x bottle	1	X										
56	WASTE_TAP4	water	19-5-23	AM	1x bottle	1	X										
57	WASTE_TAP5	water	19-5-23	AM	1x bottle	1	X										
58	WASTE_TAP6	water	19-5-23	AM	1x bottle	1	X										
59	FRE_TANK1	water	19-5-23	AM	1x bottle	1	X										
	~~FRE_TANK2~~	~~water~~	~~19-5-23~~	~~AM~~	~~1x bottle~~	~~1~~	~~X~~										
60	QC302	water	18-5-23	PM	1x bottle	1	X										
	ELEC_TAP1	"	19-5-23	AM	"	1	X										
Total																	

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Bec Chapple **Signature:** **Date:** 19-5-23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Bec Chapple	Date:	Carrier / Reference #:	Name/Signature:	Date: 25/5/23
Of:	Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: ~~AA~~ BC
Checked by: _____ MA

CERTIFICATE OF ANALYSIS

Work Order	: **ES2317554**	Page	: 1 of 29
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C17776 NF_OMP_Y2	Date Samples Received	: 25-May-2023 16:30
Order number	: ----	Date Analysis Commenced	: 30-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023 17:24
Sampler	: BC+MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 61		
No. of samples analysed	: 60		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW
Franco Lentini	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.

- 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: SEDIMENT (Matrix: SOIL)				Sample ID	WC_OMP07	----	----	----	----
				Sampling date / time	18-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2317554-053	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**37.4**	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0002**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0036**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	WC_OMP07	----	----	----	----
			Sampling date / time	18-May-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2317554-053	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0038**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0038**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0038**	----	----	----	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	WASTE_TAP 1	WASTE TAP 2	DEPOT_TANK 1	DEPOT_TANK 2	DEPOT_TANK 3
				Sampling date / time	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00
					ES2317554-001	ES2317554-002	ES2317554-003	ES2317554-004	ES2317554-005
					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		<0.01	<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: WATER (Matrix: WATER)				Sample ID	WASTE_TAP 1	WASTE TAP 2	DEPOT_TANK 1	DEPOT_TANK 2	DEPOT_TANK 3
				Sampling date / time	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-001	ES2317554-002	ES2317554-003	ES2317554-004	ES2317554-005
					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	<0.01	<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	%		**101**	**100**	**103**	**109**	**102**
13C8-PFOA	----	0.02	%		**108**	**106**	**105**	**108**	**107**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DEPOT_TAP	WC_OMP05	EB_OMP01	EB_OMP02	EB_OMP03
				Sampling date / time	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-006	ES2317554-007	ES2317554-008	ES2317554-009	ES2317554-010
					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	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DEPOT_TAP	WC_OMP05	EB_OMP01	EB_OMP02	EB_OMP03
				Sampling date / time	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-006	ES2317554-007	ES2317554-008	ES2317554-009	ES2317554-010
					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	**0.04**	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	**0.04**	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	**0.04**	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**109**	**99.4**	**91.9**	**103**	**97.9**
13C8-PFOA	----	0.02	%		**105**	**104**	**101**	**101**	**99.2**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	EB_OMP04	COCKPIT_SW01	PWS_HEAD_DAM	WW11_DAM	MC_DMP01
				Sampling date / time	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00
					ES2317554-011	ES2317554-012	ES2317554-013	ES2317554-014	ES2317554-015
					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	**0.59**	**0.40**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	**0.87**	**0.60**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	<0.01	<0.01	**5.87**	**4.73**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	**0.53**	**0.55**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	**14.6**	**19.1**
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	**0.21**	**0.13**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	**0.71**	**0.45**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	**0.15**	**0.10**
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	**0.37**	**0.31**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	EB_OMP04	COCKPIT_SW01	PWS_HEAD_DAM	WW11_DAM	MC_DMP01
				Sampling date / time	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00	16-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-011	ES2317554-012	ES2317554-013	ES2317554-014	ES2317554-015
					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	**24.0**	**26.4**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	**20.5**	**23.8**
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	<0.01	**22.6**	**25.2**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**102**	**105**	**102**	**103**	**99.6**
13C8-PFOA	----	0.02	%		**99.2**	**104**	**104**	**104**	**106**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	WC_OMP04_OUCKDAM	QC300	A_TAP14	A_TAP17	A_TAP16
				Sampling date / time	16-May-2023 00:00	16-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
					ES2317554-016	ES2317554-017	ES2317554-018	ES2317554-019	ES2317554-020
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**0.07**	<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		**0.05**	<0.01	**0.02**	<0.01	**0.03**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<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: WATER (Matrix: WATER)			Sample ID	WC_OMP04_OUCKDAM	QC300	A_TAP14	A_TAP17	A_TAP16
			Sampling date / time	16-May-2023 00:00	16-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
Compound	CAS Number	LOR	Unit	ES2317554-016	ES2317554-017	ES2317554-018	ES2317554-019	ES2317554-020
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.12**	<0.01	**0.02**	<0.01	**0.03**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.12**	<0.01	**0.02**	<0.01	**0.03**
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.12**	<0.01	**0.02**	<0.01	**0.03**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**98.3**	**102**	**100**	**108**	**106**
13C8-PFOA	----	0.02	%	**106**	**97.7**	**99.3**	**99.0**	**96.0**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	WC_OMP03	AIRPORT_RESERVOIR	AIRPORT_BORE	A_TAP1	A_TAP15
				Sampling date / time	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-021	ES2317554-022	ES2317554-023	ES2317554-024	ES2317554-025
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	**0.65**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.02**	<0.02	**0.83**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**0.15**	<0.01	**6.21**	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	**0.46**	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.06**	<0.01	**13.1**	**0.06**	**0.03**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	**0.1**	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	**0.20**	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	**0.68**	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	**0.17**	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	**0.37**	<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: WATER (Matrix: WATER)			Sample ID	WC_OMP03	AIRPORT_RESERVOIR	AIRPORT_BORE	A_TAP1	A_TAP15
			Sampling date / time	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
Compound	CAS Number	LOR	Unit	ES2317554-021	ES2317554-022	ES2317554-023	ES2317554-024	ES2317554-025
				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	**0.23**	<0.01	**22.8**	**0.06**	**0.03**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.21**	<0.01	**19.3**	**0.06**	**0.03**
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.21**	<0.01	**21.5**	**0.06**	**0.03**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**98.6**	**108**	**106**	**99.2**	**101**
13C8-PFOA	----	0.02	%	**102**	**97.8**	**100**	**102**	**95.9**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	WC_OMP06	A_TAP11	MC_OMP06	A_TAP 4	A_TAP 13
				Sampling date / time	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
					ES2317554-026	ES2317554-027	ES2317554-028	ES2317554-029	ES2317554-030
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	**0.40**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	**0.45**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**0.03**	<0.01	**3.22**	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	**0.22**	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	**6.23**	<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	**0.20**	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	**0.49**	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	**0.10**	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	**0.20**	<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: WATER (Matrix: WATER)				Sample ID	WC_OMP06	A_TAP11	MC_OMP06	A_TAP 4	A_TAP 13
				Sampling date / time	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-026	ES2317554-027	ES2317554-028	ES2317554-029	ES2317554-030
					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	**11.6**	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.03**	<0.01	**9.45**	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.03**	<0.01	**10.9**	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**102**	**112**	**100**	**103**	**106**
13C8-PFOA	----	0.02	%		**96.1**	**97.7**	**96.6**	**99.9**	**96.6**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	A_TAP 10	WC_OMP02	A_TAP12	WC_OMP01	MC_OMP10
				Sampling date / time	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-031	ES2317554-032	ES2317554-033	ES2317554-034	ES2317554-035
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	**0.03**	<0.02	**0.07**	**0.33**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	**0.03**	<0.02	**0.09**	**0.38**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	**0.19**	<0.01	**0.49**	**2.79**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**0.19**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	**0.08**	**0.02**	**0.18**	**5.32**
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	**0.03**	**0.16**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	**0.02**	<0.02	**0.07**	**0.41**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	**0.09**
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	**0.01**	**0.17**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	A_TAP 10	WC_OMP02	A_TAP12	WC_OMP01	MC_OMP10
				Sampling date / time	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-031	ES2317554-032	ES2317554-033	ES2317554-034	ES2317554-035
					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	**0.35**	**0.02**	**0.94**	**9.84**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	**0.27**	**0.02**	**0.67**	**8.11**
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	**0.32**	**0.02**	**0.85**	**9.27**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**106**	**106**	**104**	**100**	**99.9**
13C8-PFOA	----	0.02	%		**99.4**	**101**	**101**	**96.5**	**99.2**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	MC_OMP04	MC_OMP05	QC100	QC101	QC102
				Sampling date / time	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
					ES2317554-036	ES2317554-037	ES2317554-038	ES2317554-039	ES2317554-040
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.50**	**0.46**	**0.50**	**0.47**	**0.08**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.49**	**0.45**	**0.49**	**0.45**	**0.08**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**3.78**	**3.54**	**3.74**	**3.44**	**0.46**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.25**	**0.24**	**0.26**	**0.24**	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**7.37**	**7.53**	**7.56**	**6.74**	**0.18**
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		**0.23**	**0.21**	**0.24**	**0.23**	**0.02**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.54**	**0.51**	**0.55**	**0.53**	**0.07**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.12**	**0.11**	**0.12**	**0.11**	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.23**	**0.23**	**0.24**	**0.22**	**0.01**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MC_OMP04	MC_OMP05	QC100	QC101	QC102
				Sampling date / time	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00	17-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-036	ES2317554-037	ES2317554-038	ES2317554-039	ES2317554-040
					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		**13.6**	**13.4**	**13.8**	**12.5**	**0.90**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**11.2**	**11.1**	**11.3**	**10.2**	**0.64**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**12.9**	**12.7**	**13.0**	**11.8**	**0.82**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**99.1**	**100**	**102**	**103**	**101**
13C8-PFOA	----	0.02	%		**100**	**102**	**99.2**	**103**	**102**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC103	MC_OMP02	QC104	FRE_TAP1	FRE_TAP2
				Sampling date / time	17-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-041	ES2317554-042	ES2317554-043	ES2317554-044	ES2317554-045
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.35**	**0.07**	**0.06**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.33**	**0.06**	**0.05**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**2.55**	**0.32**	**0.30**	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.19**	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**5.50**	**0.10**	**0.09**	<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		**0.15**	**0.24**	**0.23**	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.39**	**0.09**	**0.08**	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.08**	**0.03**	**0.03**	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.16**	**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: WATER (Matrix: WATER)				Sample ID	QC103	MC_OMP02	QC104	FRE_TAP1	FRE_TAP2
				Sampling date / time	17-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-041	ES2317554-042	ES2317554-043	ES2317554-044	ES2317554-045
					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		**9.70**	**1.03**	**0.96**	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**8.05**	**0.42**	**0.39**	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		**9.18**	**0.97**	**0.91**	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**104**	**108**	**101**	**98.8**	**95.7**
13C8-PFOA	----	0.02	%		**101**	**98.3**	**101**	**99.5**	**100**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC301	MCOMP03	QC105	MC_OMP11	MC_OMP09
				Sampling date / time	17-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-046	ES2317554-047	ES2317554-048	ES2317554-049	ES2317554-050
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	**0.70**	**0.73**	**0.27**	**0.36**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	**0.73**	**0.74**	**0.26**	**0.34**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	**5.68**	**6.08**	**1.93**	**2.45**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	**0.39**	**0.40**	**0.14**	**0.17**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	**11.4**	**11.8**	**3.29**	**4.94**
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	**0.22**	**0.23**	**0.11**	**0.15**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	**0.69**	**0.72**	**0.30**	**0.39**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	**0.16**	**0.16**	**0.06**	**0.08**
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	**0.31**	**0.33**	**0.11**	**0.16**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	QC301	MCOMP03	QC105	MC_OMP11	MC_OMP09
				Sampling date / time	17-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00	18-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-046	ES2317554-047	ES2317554-048	ES2317554-049	ES2317554-050
					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	**20.4**	**21.3**	**6.47**	**9.04**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	**17.1**	**17.9**	**5.22**	**7.39**
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	**19.3**	**20.2**	**6.07**	**8.53**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**101**	**108**	**105**	**108**	**104**
13C8-PFOA	----	0.02	%		**97.3**	**101**	**99.0**	**97.9**	**99.7**

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	MC_OMP07	MC_OMP08	WASTE_TAP3	WASTE_TAP4	WASTE_TAP5
				Sampling date / time	18-May-2023 00:00	18-May-2023 00:00	19-May-2023 00:00	19-May-2023 00:00	19-May-2023 00:00
					ES2317554-051	ES2317554-052	ES2317554-055	ES2317554-056	ES2317554-057
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.43**	**0.43**	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.43**	**0.42**	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		**3.16**	**3.07**	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.24**	**0.23**	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**6.50**	**6.44**	<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		**0.20**	**0.20**	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.49**	**0.49**	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.10**	**0.10**	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.21**	**0.20**	<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: WATER (Matrix: WATER)				Sample ID	MC_OMP07	MC_OMP08	WASTE_TAP3	WASTE_TAP4	WASTE_TAP5
				Sampling date / time	18-May-2023 00:00	18-May-2023 00:00	19-May-2023 00:00	19-May-2023 00:00	19-May-2023 00:00
Compound	CAS Number	LOR	Unit		ES2317554-051	ES2317554-052	ES2317554-055	ES2317554-056	ES2317554-057
					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		**11.9**	**11.7**	<0.01	**0.01**	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**9.66**	**9.51**	<0.01	**0.01**	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		**11.2**	**11.0**	<0.01	**0.01**	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**107**	**105**	**102**	**98.7**	**92.1**
13C8-PFOA	----	0.02	%		**101**	**102**	**99.1**	**97.2**	**104**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	WASTE_TAP6	FRE_TANK 1	QC302	ELEC_TAP1	----
				Sampling date / time	19-May-2023 00:00	19-May-2023 00:00	19-May-2023 00:00	19-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		ES2317554-058	ES2317554-059	ES2317554-060	ES2317554-061	--------
					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: WATER (Matrix: WATER)				Sample ID	WASTE_TAP6	FRE_TANK 1	QC302	ELEC_TAP1	----
				Sampling date / time	19-May-2023 00:00	19-May-2023 00:00	19-May-2023 00:00	19-May-2023 00:00	----
Compound	CAS Number	LOR	Unit		ES2317554-058	ES2317554-059	ES2317554-060	ES2317554-061	--------
					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	**0.47**	<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	**0.47**	<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	**0.47**	<0.01	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**98.3**	**104**	**100**	**102**	----
13C8-PFOA	----	0.02	%		**106**	**107**	**105**	**104**	----

Surrogate Control Limits

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2317554**	Page	: 1 of 10
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Telephone	: + 61 2 8784 8555
Project	: C17776 NF_OMP_Y2	Date Samples Received	: 25-May-2023
Site	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC+MA	No. of samples received	: 61
Order number	: ----	No. of samples analysed	: 60

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EM2309170--031	Anonymous	**Perfluorohexane sulfonic acid (PFHxS)**	355-46-4	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP231A: Perfluoroalkyl Sulfonic Acids	EM2309170--031	Anonymous	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC 2	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	2	76	2.63	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	76	1.32	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: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055) WC_OMP07	**18-May-2023**	**----**	----	**----**	**30-May-2023**	01-Jun-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X) WC_OMP07	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**31-May-2023**	10-Jul-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X) WC_OMP07	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**31-May-2023**	10-Jul-2023	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X) WC_OMP07	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**31-May-2023**	10-Jul-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X) WC_OMP07	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**31-May-2023**	10-Jul-2023	✓
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X) WC_OMP07	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**31-May-2023**	10-Jul-2023	✓

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) WASTE_TAP 1, WASTE TAP 2, DEPOT_TANK 1, DEPOT_TANK 2, DEPOT_TANK 3, DEPOT_TAP, WC_OMP05, EB_OMP01, EB_OMP02, EB_OMP03, EB_OMP04, COCKPIT_SW01, PWS_HEAD_DAM, WW11_DAM, MC_DMP01, WC_OMP04_OUCKDAM	**16-May-2023**	**30-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X) QC300	**16-May-2023**	**31-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X) A_TAP14, A_TAP17, A_TAP16, WC_OMP03, AIRPORT_RESERVOIR, AIRPORT_BORE, A_TAP1, A_TAP15, WC_OMP06, A_TAP11, MC_OMP06, A_TAP 4, A_TAP 13, A_TAP 10, WC_OMP02, A_TAP12, WC_OMP01, MC_OMP10, MC_OMP04, MC_OMP05, QC100, QC101, QC102, QC103, QC301	**17-May-2023**	**31-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
HDPE (no PTFE) (EP231X) MC_OMP02, QC104, FRE_TAP1, FRE_TAP2, MCOMP03, QC105, MC_OMP11, MC_OMP09, MC_OMP07, MC_OMP08	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
HDPE Soil Jar (EP231X) WASTE_TAP3, WASTE_TAP4, WASTE_TAP5, WASTE_TAP6, FRE_TANK 1, QC302, ELEC_TAP1	**19-May-2023**	**31-May-2023**	15-Nov-2023	✓	**01-Jun-2023**	15-Nov-2023	✓

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
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) WASTE_TAP 1, WASTE TAP 2, DEPOT_TANK 1, DEPOT_TANK 2, DEPOT_TANK 3, DEPOT_TAP, WC_OMP05, EB_OMP01, EB_OMP02, EB_OMP03, EB_OMP04, COCKPIT_SW01, PWS_HEAD_DAM, WW11_DAM, MC_DMP01, WC_OMP04_OUCKDAM	**16-May-2023**	**30-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X) QC300	**16-May-2023**	**31-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X) A_TAP14, A_TAP17, A_TAP16, WC_OMP03, AIRPORT_RESERVOIR, AIRPORT_BORE, A_TAP1, A_TAP15, WC_OMP06, A_TAP11, MC_OMP06, A_TAP 4, A_TAP 13, A_TAP 10, WC_OMP02, A_TAP12, WC_OMP01, MC_OMP10, MC_OMP04, MC_OMP05, QC100, QC101, QC102, QC103, QC301	**17-May-2023**	**31-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
HDPE (no PTFE) (EP231X) MC_OMP02, QC104, FRE_TAP1, FRE_TAP2, MCOMP03, QC105, MC_OMP11, MC_OMP09, MC_OMP07, MC_OMP08	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
HDPE Soil Jar (EP231X) WASTE_TAP3, WASTE_TAP4, WASTE_TAP5, WASTE_TAP6, FRE_TANK 1, QC302, ELEC_TAP1	**19-May-2023**	**31-May-2023**	15-Nov-2023	✓	**01-Jun-2023**	15-Nov-2023	✓

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) WASTE_TAP 1, WASTE TAP 2, DEPOT_TANK 1, DEPOT_TANK 2, DEPOT_TANK 3, DEPOT_TAP, WC_OMP05, EB_OMP01, EB_OMP02, EB_OMP03, EB_OMP04, COCKPIT_SW01, PWS_HEAD_DAM, WW11_DAM, MC_DMP01, WC_OMP04_OUCKDAM	**16-May-2023**	**30-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X) QC300	**16-May-2023**	**31-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X) A_TAP14, A_TAP17, A_TAP16, WC_OMP03, AIRPORT_RESERVOIR, AIRPORT_BORE, A_TAP1, A_TAP15, WC_OMP06, A_TAP11, MC_OMP06, A_TAP 4, A_TAP 13, A_TAP 10, WC_OMP02, A_TAP12, WC_OMP01, MC_OMP10, MC_OMP04, MC_OMP05, QC100, QC101, QC102, QC103, QC301	**17-May-2023**	**31-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
HDPE (no PTFE) (EP231X) MC_OMP02, QC104, FRE_TAP1, FRE_TAP2, MCOMP03, QC105, MC_OMP11, MC_OMP09, MC_OMP07, MC_OMP08	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
HDPE Soil Jar (EP231X) WASTE_TAP3, WASTE_TAP4, WASTE_TAP5, WASTE_TAP6, FRE_TANK 1, QC302, ELEC_TAP1	**19-May-2023**	**31-May-2023**	15-Nov-2023	✓	**01-Jun-2023**	15-Nov-2023	✓

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
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
WASTE_TAP 1, WASTE TAP 2, DEPOT_TANK 1, DEPOT_TANK 2, DEPOT_TANK 3, DEPOT_TAP, WC_OMP05, EB_OMP01, EB_OMP02, EB_OMP03, EB_OMP04, COCKPIT_SW01, PWS_HEAD_DAM, WW11_DAM, MC_DMP01, WC_OMP04_OUCKDAM	**16-May-2023**	**30-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X)							
QC300	**16-May-2023**	**31-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X)							
A_TAP14, A_TAP17, A_TAP16, WC_OMP03, AIRPORT_RESERVOIR, AIRPORT_BORE, A_TAP1, A_TAP15, WC_OMP06, A_TAP11, MC_OMP06, A_TAP 4, A_TAP 13, A_TAP 10, WC_OMP02, A_TAP12, WC_OMP01, MC_OMP10, MC_OMP04, MC_OMP05, QC100, QC101, QC102, QC103, QC301	**17-May-2023**	**31-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
HDPE (no PTFE) (EP231X)							
MC_OMP02, QC104, FRE_TAP1, FRE_TAP2, MCOMP03, QC105, MC_OMP11, MC_OMP09, MC_OMP07, MC_OMP08	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
HDPE Soil Jar (EP231X)							
WASTE_TAP3, WASTE_TAP4, WASTE_TAP5, WASTE_TAP6, FRE_TANK 1, QC302, ELEC_TAP1	**19-May-2023**	**31-May-2023**	15-Nov-2023	✓	**01-Jun-2023**	15-Nov-2023	✓

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
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X)							
WASTE_TAP 1, WASTE TAP 2, DEPOT_TANK 1, DEPOT_TANK 2, DEPOT_TANK 3, DEPOT_TAP, WC_OMP05, EB_OMP01, EB_OMP02, EB_OMP03, EB_OMP04, COCKPIT_SW01, PWS_HEAD_DAM, WW11_DAM, MC_DMP01, WC_OMP04_OUCKDAM	**16-May-2023**	**30-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X)							
QC300	**16-May-2023**	**31-May-2023**	12-Nov-2023	✓	**01-Jun-2023**	12-Nov-2023	✓
HDPE (no PTFE) (EP231X)							
A_TAP14, A_TAP17, A_TAP16, WC_OMP03, AIRPORT_RESERVOIR, AIRPORT_BORE, A_TAP1, A_TAP15, WC_OMP06, A_TAP11, MC_OMP06, A_TAP 4, A_TAP 13, A_TAP 10, WC_OMP02, A_TAP12, WC_OMP01, MC_OMP10, MC_OMP04, MC_OMP05, QC100, QC101, QC102, QC103, QC301	**17-May-2023**	**31-May-2023**	13-Nov-2023	✓	**01-Jun-2023**	13-Nov-2023	✓
HDPE (no PTFE) (EP231X)							
MC_OMP02, QC104, FRE_TAP1, FRE_TAP2, MCOMP03, QC105, MC_OMP11, MC_OMP09, MC_OMP07, MC_OMP08	**18-May-2023**	**31-May-2023**	14-Nov-2023	✓	**01-Jun-2023**	14-Nov-2023	✓
HDPE Soil Jar (EP231X)							
WASTE_TAP3, WASTE_TAP4, WASTE_TAP5, WASTE_TAP6, FRE_TANK 1, QC302, ELEC_TAP1	**19-May-2023**	**31-May-2023**	15-Nov-2023	✓	**01-Jun-2023**	15-Nov-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	76	**2.63**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	76	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	76	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	76	**1.32**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	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
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

QUALITY CONTROL REPORT

Work Order	: **ES2317554**	Page	: 1 of 13
Client	: **SENVERSA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: BEC CHAPPLE	Contact	: Khaleda Ataei
Address	: Level 24, 1 Market St, Sydney NSW 2000 SYDNEY NSW 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: + 61 2 8784 8555
Project	: C17776 NF_OMP_Y2	Date Samples Received	: 25-May-2023
Order number	: ----	Date Analysis Commenced	: 30-May-2023
C-O-C number	: ----	Issue Date	: 01-Jun-2023
Sampler	: BC+MA		
Site	: ----		
Quote number	: EN/103/21		
No. of samples received	: 61		
No. of samples analysed	: 60		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW
Franco Lentini	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: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5079925)									
ES2317484-012	Anonymous	EA055: Moisture Content	----	0.1	%	16.2	15.6	3.5	0% - 20%
ES2317516-007	Anonymous	EA055: Moisture Content	----	0.1	%	9.0	8.5	5.9	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5082549)									
EM2309170-031	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0004	0.0005	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0005	0.0006	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0081	0.0095	16.1	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0012	0.0014	21.9	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0586	0.0629	7.1	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5082549)									
EM2309170-031	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0004	0.0005	26.1	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	0.0007	0.0008	15.8	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5082549)									
EM2309170-031	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	0.0005	0.0006	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5082549) - continued									
EM2309170-031	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5082549)									
EM2309170-031	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5082895)									
EM2309170-023	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.22	0.22	0.0	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EM2309170-030	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	13.8	13.2	3.9	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	39.3	40.6	3.3	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.52	0.52	0.0	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	1.10	1.00	9.6	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	3.49	3.38	3.2	0% - 20%
		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: 5082895)									
EM2309170-023	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

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: 5082895) - continued									
EM2309170-023	Anonymous	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
EM2309170-030	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.57	0.60	5.0	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.18	0.19	7.5	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.96	0.97	1.5	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.07	0.07	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: 5082895)									
EM2309170-023	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
EM2309170-030	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

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: 5082895) - continued									
EM2309170-030	Anonymous	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: 5082895)									
EM2309170-023	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
EM2309170-030	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: 5082895)									
EM2309170-023	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.26	0.26	0.0	0% - 20%
EM2309170-030	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	60.1	60.6	0.9	0% - 20%

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5082549)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	81.8	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.5	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	101	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.4	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.8	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5082549)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	93.4	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.2	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.0	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.2	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	101	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	112	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	119	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5082549)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.1	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	105	71.6	129
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	104	69.8	131
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	94.4	68.7	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	95.5	65.1	134
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	113	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5082549)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5082549) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	99.2	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	118	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	90.8	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	99.9	69.2	143

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5081242)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	97.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	106	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	110	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	123	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	106	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5082624)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	95.4	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	92.8	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	91.8	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	103	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	93.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	99.0	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5082635)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	111	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	99.2	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	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	108	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	102	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5082895)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	92.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	88.3	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	96.8	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	112	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	87.1	65.0	140

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5082895) - continued								
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	99.9	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5081242)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	110	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	101	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	97.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	122	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	120	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	93.3	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5082624)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.1	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	98.8	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	112	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	107	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	92.8	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	112	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	100	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5082635)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	101	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	113	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	121	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	116	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	98.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	106	69.0	133

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5082635) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	125	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	109	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5082895)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	84.6	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	97.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	93.5	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	90.8	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	92.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	96.9	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	89.7	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	110	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	118	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	82.6	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5081242)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	110	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	74.0	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.7	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	75.6	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	90.1	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	126	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	120	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5082624)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	107	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	92.4	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	92.3	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	99.0	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	87.9	57.6	145

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5082624) - continued								
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	96.8	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5082635)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	122	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	98.8	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	105	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	92.3	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	103	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5082895)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	108	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	79.0	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	76.9	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	87.2	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	75.8	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	119	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	119	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5081242)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	111	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	122	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	122	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	105	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5082624)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	97.2	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	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	105	67.0	138

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5082624) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	77.6	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5082635)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	109	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	125	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	123	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	82.0	71.4	144
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5082895)								
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	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	105	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	84.9	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: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5082549)							
EM2309170-031	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	78.0	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	101	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	# Not Determined	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	100	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	# Not Determined	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	92.1	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5082549)							
EM2309170-031	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	95.6	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	110	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	89.6	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	93.4	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	105	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	101	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	88.4	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	113	64.0	136

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Acceptable Limits (%) Low	Matrix Spike (MS) Report: Acceptable Limits (%) High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5082549) - continued							
EM2309170-031	Anonymous	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	99.6	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	96.2	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	104	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5082549)							
EM2309170-031	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	106	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	88.4	71.6	129
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	86.9	69.8	131
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	79.6	68.7	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	81.2	65.1	134
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	125	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	106	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5082549)							
EM2309170-031	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	108	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	118	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	98.4	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	85.4	69.2	143

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Acceptable Limits (%) Low	Matrix Spike (MS) Report: Acceptable Limits (%) High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5082895)							
EM2309170-024	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	107	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.25 µg/L	126	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	116	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	124	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5082895)							
EM2309170-024	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	98.8	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	121	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	114	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	121	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	118	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	125	69.0	130

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: 5082895) - continued							
EM2309170-024	Anonymous	EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	120	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	122	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	95.0	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	121	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	121	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5082895)							
EM2309170-024	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	90.8	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	97.2	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	104	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	113	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	115	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	88.6	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	84.9	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5082895)							
EM2309170-024	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	117	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	124	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	119	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	113	71.4	144

* bec.chapple
michelle.agnew } @senversa.com.au.

senversa

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	Purchase Order:	
Project Name:	NF_OMP_Y2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard
Project Manager:	[redacted]	Page:	1 of 4
Email Report To: *	Michelle Agnew	Phone/Mobile:	0408 038 593

Sample Information					Container Information		Analysis Required												
Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS short Suite standard (28 Analytes)										HOLD		Comments: e.g. Highly contaminated sample, hazardous materials present; trace LORs etc.
1	WASTE_TAP_1	Water	16-5-23	AM	1x bottle	1	X												
2	WASTE_TAP_2			AM	1x	1	X												
3	DEPOT_TANK1			AM		1	X												
4	DEPOT_TANK2			AM		1	X												
5	DEPOT_TANK3			AM		1	X												
6	DEPOT_TAP			AM		1	X												
7	NC_OMP05			PM		1	X												
8	EB_OMP01			PM		1	X												
9	EB_OMP02			PM		1	X												
10	EB_OMP03			PM		1	X												
11	EB_OMP04			PM		1	X												
12	Cockpit_SW01			PM		1	X												
13	PNS_Head_Dam			PM		1	X												
14	WW11_DAM			AM		1	X												
15	MC_OMP01			PM		1	X												
16	NC_OMP04_DUCKDAM		16-5-23	AM		1	X												
17	QC300	16	~~17~~-5-23	AM		1	X												
18	A_Tap14		17-5-23	AM		1	X												
19	A_Tap17		17-5-23	AM		1	X												
20	A_Tap16	Water	17-5-23	AM	1x bottle	1	X												
Total																			

Environmental Division
Sydney
Work Order Reference
ES2317554

Telephone : +61-2-8784 8555

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:	Sampler Name: Bec Chapple	Signature:	Date: 16-5-23

Relinquished By:			Method of Shipment (if applicable):	Received by:	
Name/Signature:	Bec Chapple	Date: 17-5-23	Carrier / Reference #:	Name/Signature:	Date: 25/5/23
Of:	Senversa	Time:	Date/Time:	Of:	Time: 16:30
Name/Signature:	EW	Date: 30/5	Carrier / Reference #:	Name/Signature:	Date:
Of:	ELS	Time: 1515	Date/Time:	Of:	Time:
Name/Signature:		Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:		Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BE
Checked by: MA

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Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	Purchase Order:	
Project Name:	NF_OMP Y2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard
Project Manager:	~~Chris Tunnicliffe~~ Michelle Agnew	Page:	2 of 4
Email Report To:	* see page 1	Phone/Mobile:	0408 038 593

Lab ID	Sample ID	Matrix *	Date	Time	Container Information: Type / Code	Total Bottles	Analysis Required: PFAS ~~Suite~~ Standard (28 Analytes)	HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present; trace LORs etc.
21	WC_OMP03	Water	17-5-23	PM	1 x bottle	1	X		
22	Airport_Reservoir	water	17-5-23	~~PM~~ AM	1 x bottle	1	X		
23	Airport_Bore	↓	↓	AM	↓	1	X		
24	A_Tap1			AM		1	X		
25	A_Tap1B			AM		1	X		
26	WC_OMP06			PM		1	X		
27	A_Tap11			AM		1	X		
28	MC_OMP06			AM		1	X		
29	A_Tap 4			AM		1	X		
30	A_Tap13			AM		1	X		
31	A_Tap 10			AM		1	X		
32	WC_OMP02			PM		1	X		
33	A_Tap12			AM		1	X		
34	WC_OMP01			PM		1	X		
35	MC_OMP10			~~PM~~ AM		1	X		
36	MC_OMP04			AM		1	X		
37	MC_OMP05			AM		1	X		
38	QC100			PM		1	X		
39	QC101	↓	↓	PM	↓	1	X		
40	QC102	Water	17-5-23	PM	1 x bottle	1	X		
Total									

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:	Sampler Name: Bec Chapple	Signature: [signature]	Date: 17-5-23

Relinquished By:		Method of Shipment (if applicable):	Received by:	
Name/Signature: Bec Chapple [signature]	Date: 19-5-23	Carrier / Reference #:	Name/Signature: [signature]	Date: 25/5/23 16:3c
Of: Senversa	Time:	Date/Time:	Of:	Time:
Name/Signature: FW	Date: 30/5	Carrier / Reference #:	Name/Signature:	Date:
Of: GLS	Time: 1515	Date/Time:	Of:	Time:
Name/Signature:	Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:	Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's Iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

senversa

Chain of Custody Documentation

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Laboratory:
Address:
Contact: Sample Receipt
Phone:

Job Number:	C17776	Purchase Order:	
Project Name:	NF_OMP Y2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard.
Project Manager:	Michelle Agnew	Page:	3 of 4
Email Report To:	* see page 1	Phone/Mobile:	0408 038 593

Lab ID	Sample ID	Matrix *	Date	Time	Container Information: Type / Code	Total Bottles	Analysis Required: PFAS full suite	Standard (28 Analytes)	HOLD	Comments: e.g. Highly contaminated sample; hazardous materials present:
41	QC103	Water	17-5-23	PM	1 x bottle	1	X			
-1	QC200			PM		1	X			Please forward to Eurofins
-2	QC201			PM		1	X			Please forward to Eurofins
-3	QC202		↓	PM		1	X			Please forward to Eurofins
-4	QC203		17-5-23	PM		1	X			Please forward to Eurofins
42	MC_OMP02		18-5-23	AM		1	X			
43	QC104			AM		1	X			
-5	QC204			AM		1	X			Please forward to Eurofins
44	FRE_TAP1			PM		1	X			
45	FRE_TAP2		↓	PM		1	X			
46	QC301		17-5-23	AM		1	X			
47	MCOMP03		18-5-23	AM		1	X			
48	QC105			AM		1	X			
-6	QC205			AM		1	X			Please forward to Eurofins
49	MC_OMP11			PM		1	X			
50	MCOMP09			PM		1	X			
51	MC_OMP07			AM		1	X			
52	MC_OMP08	↓		AM	↓	1	X			
53	MC_OMP07	sediment	↓	PM	1 x jar	1	X			
54	QC106	sediment	18-5-23	PM	1 x jar	1	/		X	
Total										

Lab: ALS Environmental Service
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job NO: 324402.
Date Received: 30/5/23.
Time Received: 1515.
Received By: EW.
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:

Sampler Name: Bec Chapple | Signature: | Date: 17-5-23

Relinquished By:			Method of Shipment (if applicable):	Received by:	
Name/Signature:	Bec Chapple	Date: 19-5-23	Carrier / Reference #:	Name/Signature: Zac C	Date: 25/5/23
Of:	senversa	Time:	Date/Time:	Of:	Time: 16 30
Name/Signature:	EW	Date: 30/5	Carrier / Reference #:	Name/Signature:	Date:
Of:	ALS	Time: 1515	Date/Time:	Of:	Time:
Name/Signature:		Date:	Carrier / Reference #:	Name/Signature:	Date:
Of:		Time:	Date/Time:	Of:	Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic; V = VOA Vial Hydrochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's Iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: BC
Checked by: MA

* bec.chapple@senversa.com.au.
michelle.agnew@senversa.com.au

senversa

Senversa Pty Ltd
www.senversa.com.au
ABN 89 132 231 380

Chain of Custody Documentation

Laboratory: mgt/Eurofins VIC
Address:
Contact: Sample Receipt
Phone:

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Comments: e.g. Highly contaminated samples, hazardous materials present

Job No: 324902
Date Received: 30/5/23
Time Received: 1515
Received By: EW
Temp: Cool/Ambient (Cool circled)
Cooling: Ice/Icepack (Ice circled)
Security: Intact/...

Job Number:	C17776	Purchase Order:	
Project Name:	NF_OMP X2	Quote No:	
Sampled By:	BC + MA	Turn Around Time:	Standard
Project Manager:	Michelle Agnew	Page:	4 of 4
Email Report To:	*	Phone/Mobile:	0408 038 593

Analysis Required: PFAS Standard Suite (28 Analytes)

Lab ID	Sample ID	Matrix *	Date	Time	Type / Code	Total Bottles	PFAS Standard Suite (28 Analytes)										HOLD	Comments
-7	QC206	sediment	18-5-23	PM	1x jar	1											X	Please forward to Eurofins
55	WASTE_TAP3	water	19-5-23	AM	1x bottle	1	X											
56	WASTE_TAP4	water	19-5-23	AM	1x bottle	1	X											
57	WASTE_TAP5	water	19-5-23	AM	1x bottle	1	X											
58	WASTE_TAP6	water	19-5-23	AM	1x bottle	1	X											
59	FRE_TANK1	water	19-5-23	AM	1x bottle	1	X											
	~~[illegible]~~	~~water~~	~~19-5-23~~	~~AM~~	~~1x bottle~~	~~1~~	~~X~~											
60	QC302	water	18-5-23	PM	1x bottle	1	X											
	ELEC_TAP1	"	19-5-23	AM	"	1	X											
Total																		

Sampler: I attest that proper field sampling procedures in accordance with Senversa standard procedures and/or project specifications were used during the collection of these samples:	Sampler Name: Bec Chapple	Signature: [signature]	Date: 19-5-23

Relinquished By:				Method of Shipment (if applicable):	Received by:		
Name/Signature:	Bec Chapple [signature]	Date:		Carrier / Reference #:	Name/Signature: [signature]	Date:	25/5/23
Of:		Time:		Date/Time:	Of:	Time:	16:30
Name/Signature:	EW	Date:	30/5	Carrier / Reference #:	Name/Signature:	Date:	
Of:	ELS	Time:	1515	Date/Time:	Of:	Time:	
Name/Signature:		Date:		Carrier / Reference #:	Name/Signature:	Date:	
Of:		Time:		Date/Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Acid (HNO_3) Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide (NaOH)/Cadmium (Cd) Preserved; S = Sodium Hydroxide Preserved Plastic; STH = Sodium thiosulfate preserved plastic;
V = VOA Vial Hydochloric Acid (HCl) Preserved; VS = VOA Vial Sulphuric Preserved; VSA = Sulphuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation Bottle; SP = Sulphuric Preserved Plastic;
F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; UA = Unpreserved Amber Glass; L=Lugol's iodine preserved white plastic bottle; SW= sulfuric acid preserved wide mouth glass jar

Completed by: [signature] BC
Checked by: MA

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 324402

Client Details

Client	Senversa Pty Ltd
Attention	Michelle Agnew
Address	6/15 William St, Melbourne, VIC, 3000

Sample Details

Your Reference	**C17776, NF_OMP Y2**
Number of Samples	6 Water, 1 Soil
Date samples received	30/05/2023
Date completed instructions received	30/05/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	06/06/2023
Date of Issue	01/06/2023

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Phalak Inthakesone, Organics Development Manager, Sydney

Authorised By
Nancy Zhang, Laboratory Manager

PFAS in Waters Extended						
Our Reference		324402-1	324402-2	324402-3	324402-4	324402-5
Your Reference	UNITS	QC200	QC201	QC202	QC203	QC204
Date Sampled		17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Date analysed	-	31/05/2023	31/05/2023	31/05/2023	31/05/2023	31/05/2023
Perfluorobutanesulfonic acid	µg/L	0.23	0.36	0.06	0.27	0.05
Perfluoropentanesulfonic acid	µg/L	0.24	0.38	0.07	0.29	0.05
Perfluorohexanesulfonic acid - PFHxS	µg/L	2.2	3.1	0.42	2.2	0.26
Perfluoroheptanesulfonic acid	µg/L	0.17	0.20	<0.01	0.15	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	5.9	5.8	0.15	4.1	0.08
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	0.06	0.1	<0.02	0.07	0.1
Perfluoropentanoic acid	µg/L	0.1	0.2	0.02	0.1	0.2
Perfluorohexanoic acid	µg/L	0.28	0.46	0.06	0.33	0.07
Perfluoroheptanoic acid	µg/L	0.06	0.09	0.01	0.06	0.02
Perfluorooctanoic acid PFOA	µg/L	0.14	0.20	0.01	0.14	0.01
Perfluorononanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	102	100	101	99	105
Surrogate $^{13}C_2$ *PFOA*	%	104	105	103	102	104
Extracted ISTD $^{13}C_3$ *PFBS*	%	98	97	99	96	99
Extracted ISTD $^{18}O_2$ *PFHxS*	%	100	102	101	99	101
Extracted ISTD $^{13}C_4$ *PFOS*	%	95	95	97	96	98
Extracted ISTD $^{13}C_4$ *PFBA*	%	100	98	101	98	99

PFAS in Waters Extended						
Our Reference		324402-1	324402-2	324402-3	324402-4	324402-5
Your Reference	UNITS	QC200	QC201	QC202	QC203	QC204
Date Sampled		17/05/2023	17/05/2023	17/05/2023	17/05/2023	17/05/2023
Type of sample		Water	Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	105	101	104	103	103
Extracted ISTD $^{13}C_2$ *PFHxA*	%	100	100	100	101	105
Extracted ISTD $^{13}C_4$ *PFHpA*	%	100	95	96	97	100
Extracted ISTD $^{13}C_4$ *PFOA*	%	104	100	100	103	103
Extracted ISTD $^{13}C_5$ *PFNA*	%	95	91	96	94	97
Extracted ISTD $^{13}C_2$ *PFDA*	%	109	104	106	106	106
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	108	103	103	105	110
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	101	98	103	101	103
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	70	65	73	69	74
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	105	102	105	103	101
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	102	106	110	104	107
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	119	122	123	121	115
Extracted ISTD $^{13}C_8$ *FOSA*	%	101	102	103	101	102
Extracted ISTD d_3 *N MeFOSA*	%	93	90	94	92	95
Extracted ISTD d_5 *N EtFOSA*	%	90	89	92	93	92
Extracted ISTD d_7 *N MeFOSE*	%	94	91	96	96	95
Extracted ISTD d_9 *N EtFOSE*	%	103	98	99	99	101
Extracted ISTD d_3 *N MeFOSAA*	%	102	97	99	99	100
Extracted ISTD d_5 *N EtFOSAA*	%	105	104	104	106	103
Total Positive PFHxS & PFOS	µg/L	8.0	8.8	0.57	6.3	0.34
Total Positive PFOA & PFOS	µg/L	6.0	6.0	0.16	4.2	0.09
Total Positive PFAS	µg/L	9.3	11	0.81	7.7	0.84

PFAS in Waters Extended		
Our Reference		324402-6
Your Reference	UNITS	QC205
Date Sampled		18/05/2023
Type of sample		Water
Date prepared	-	31/05/2023
Date analysed	-	31/05/2023
Perfluorobutanesulfonic acid	µg/L	0.58
Perfluoropentanesulfonic acid	µg/L	0.66
Perfluorohexanesulfonic acid - PFHxS	µg/L	4.9
Perfluoroheptanesulfonic acid	µg/L	0.32
Perfluorooctanesulfonic acid PFOS	µg/L	10
Perfluorodecanesulfonic acid	µg/L	<0.02
Perfluorobutanoic acid	µg/L	0.1
Perfluoropentanoic acid	µg/L	0.2
Perfluorohexanoic acid	µg/L	0.62
Perfluoroheptanoic acid	µg/L	0.12
Perfluorooctanoic acid PFOA	µg/L	0.29
Perfluorononanoic acid	µg/L	<0.01
Perfluorodecanoic acid	µg/L	<0.02
Perfluoroundecanoic acid	µg/L	<0.02
Perfluorododecanoic acid	µg/L	<0.05
Perfluorotridecanoic acid	µg/L	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5
4:2 FTS	µg/L	<0.01
6:2 FTS	µg/L	<0.01
8:2 FTS	µg/L	<0.02
10:2 FTS	µg/L	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	103
Surrogate $^{13}C_2$ *PFOA*	%	105
Extracted ISTD $^{13}C_3$ *PFBS*	%	95
Extracted ISTD $^{18}O_2$ *PFHxS*	%	95
Extracted ISTD $^{13}C_4$ *PFOS*	%	92
Extracted ISTD $^{13}C_4$ *PFBA*	%	98

PFAS in Waters Extended		
Our Reference	UNITS	324402-6
Your Reference		QC205
Date Sampled		18/05/2023
Type of sample		Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	104
Extracted ISTD $^{13}C_2$ *PFHxA*	%	101
Extracted ISTD $^{13}C_4$ *PFHpA*	%	96
Extracted ISTD $^{13}C_4$ *PFOA*	%	101
Extracted ISTD $^{13}C_5$ *PFNA*	%	90
Extracted ISTD $^{13}C_2$ *PFDA*	%	106
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	107
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	101
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	67
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	102
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	107
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	120
Extracted ISTD $^{13}C_8$ *FOSA*	%	101
Extracted ISTD d_3 *N MeFOSA*	%	92
Extracted ISTD d_5 *N EtFOSA*	%	91
Extracted ISTD d_7 *N MeFOSE*	%	94
Extracted ISTD d_9 *N EtFOSE*	%	100
Extracted ISTD d_3 *N MeFOSAA*	%	97
Extracted ISTD d_5 *N EtFOSAA*	%	104
Total Positive PFHxS & PFOS	µg/L	15
Total Positive PFOA & PFOS	µg/L	11
Total Positive PFAS	µg/L	18

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	324402-2
Date prepared	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Date analysed	-			31/05/2023	1	31/05/2023	31/05/2023		31/05/2023	31/05/2023
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	0.23	0.26	12	104	108
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	0.24	0.25	4	105	113
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	1	2.2	2.2	0	100	117
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	1	0.17	0.16	6	102	105
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	1	5.9	5.9	0	104	89
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	91	96
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	1	0.06	0.06	0	102	103
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	1	0.1	0.1	0	101	101
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	1	0.28	0.30	7	102	99
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	1	0.06	0.06	0	99	103
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	1	0.14	0.15	7	103	102
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	106	106
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	100	104
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	99	110
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	99	101
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	82	92
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	101	104
4:2 FTS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	97	101
6:2 FTS	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	97	97
8:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	105	98
10:2 FTS	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	95	92
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	112	109
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	109	108
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	1	<0.1	<0.1	0	99	101
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	94	99
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	1	<0.5	<0.5	0	93	102
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	104	104
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	1	<0.02	<0.02	0	101	103
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	99	1	102	101	1	99	102
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	104	1	104	105	1	108	104

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	324402-2
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	96	1	98	90	9	93	96
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	97	1	100	99	1	99	97
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	98	1	95	95	0	98	95
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	103	1	100	100	0	102	98
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	105	1	105	101	4	101	102
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	102	1	100	98	2	101	101
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	98	1	100	96	4	95	95
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	103	1	104	99	5	98	100
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	98	1	95	94	1	95	92
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	105	1	109	105	4	105	104
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	110	1	108	104	4	102	98
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	99	1	101	101	0	97	96
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	67	1	70	65	7	68	69
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	105	1	105	108	3	98	100
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	108	1	102	104	2	101	102
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	120	1	119	123	3	111	118
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	102	1	101	101	0	94	95
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	95	1	93	95	2	90	90
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	92	1	90	90	0	73	85
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	95	1	94	94	0	93	94

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	324402-2
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	97	1	103	98	5	94	93
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	99	1	102	99	3	95	100
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	105	1	105	107	2	101	102

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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DATA QUALITY ASSESSMENT SUMMARY

Report Details

Envirolab Report Reference	**324402**
Client ID	Senversa Pty Ltd
Project Reference	C17776, NF_OMP Y2
Date Issued	01/06/2023

QC DATA

All laboratory QC data was within the Envirolab Group's specifications.

HOLDING TIME COMPLIANCE EVALUATION

All preservation / holding times (based on AS/ASPHA/ISO/NEPM/USEPA reference documents and standards) are compliant.

Certain analyses have had their recommended technical holding times elongated by filtering and/or freezing on receipt at the laboratory (e.g. BOD, chlorophyll/Pheophytin, nutrients and acid sulphate soil tests).

COMPLIANCE TO QC FREQUENCY (NEPM)

Internal laboratory QC rate complies with NEPM requirements (LCS/MB/MS 1 in 20, Duplicates 1 in 10 samples). Note, samples are batched together with other sample consignments in order to assign QC sample frequency.

QC Evaluation

Duplicate(s) was performed as per NEPM frequency	✓
Laboratory Control Sample(s) were analysed with the samples received	✓
A Method Blank was performed with the samples received	✓
Matrix spike(s) was performed as per NEPM frequency (Not Applicable for Air samples)	✓

Refer to Certificate of Analysis for all Quality Control data.

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