Prepared for
Department of Defence
ABN: 68706814312

AECOM

Annual Interpretive Report - 2021

PFAS OMP - Wide Bay Training Area

01-Dec-2023
Doc No. 60612563_RP_034_5_231201

aecom.com

Delivering a better world

Annual Interpretive Report - 2021

PFAS OMP - Wide Bay Training Area

Client: Department of Defence

ABN: 68706814312

Prepared by

AECOM Australia Pty Ltd
Turrbal and Jagera Country, Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3056 4800 www.aecom.com
ABN 20 093 846 925

01-Dec-2023

Job No.: 60612563

Quality Information

Document	Annual Interpretive Report - 2021
Ref	60612563
Date	01-Dec-2023
Prepared by	[redacted]
Reviewed by	[redacted]

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
0	19-Jan-2022	Draft	[redacted]	
1	01-Mar-2022	Draft	[redacted]	
2	04-Mar-2022	Draft	[redacted]	
3	22-Mar-2022	Draft	[redacted]	
4	13-Oct-2023	Draft	[redacted]	
5	01-Dec-2023	Final	[redacted]	[redacted]

Table of Contents

List of Tables (in Text)

List of Charts (in Text)

List of Figures (in Appendix A)

List of Tables (in Appendix B)

Abbreviations

Abbreviation	
AFFF	Aqueous film-forming foam
AHD	Australian height datum
ANZECC	Australia New Zealand Environmental Conservation Council
ASC NEPM	Assessment of Site Contamination National Environment Protection Measure 1999 (as amended 2013)
BOM	Bureau of Meteorology
COC	Chain of custody
CSM	Conceptual site model
DCMM	Defence Contamination Management Manual
Defence	Department of Defence
DO	Dissolved oxygen
DOC	Dissolved organic carbon
DQI	Data quality indicators
DQO	Data quality objectives
DSI	Detailed site investigation
EC	Electrical conductivity
HEPA	Heads of Environmental Protection Agencies
LOR	Limit of reporting
MA	Management Area
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan
NEPC	National Environment Protection Council
NHMRC	National Health and Medical Research Council
ORP	Oxidation reduction potential
OMP	Ongoing monitoring plan
PFAS	Per- and poly-fluorinated alkyl substances
PFHxS	Perfluorohexane sulfonate
PFOA	Perflurooctanoic acid
PFOS	Perflurooctanesulfonic acid
PMAP	PFAS management area plan
POL	Paints, oils, lubricants
PSI	Preliminary site investigation
QA/QC	Quality assurance / quality control
SAQP	Sampling analysis and quality plan
SPR	Source-pathway-receptor
TSS	Total suspended solids

Abbreviation	
US EPA	US Environmental Protection Agency
WBTA	Wide Bay Training Area
WTP	Water treatment plant
WWTP	Wastewater treatment plant

Executive Summary

Background

AECOM Australia Pty Ltd (AECOM) has been engaged by the Department of Defence (Defence) to implement the Ongoing Monitoring Program (OMP) (Defence, 2020) for monitoring of per- and poly-fluoroalkyl substances (PFAS) at Wide Bay Training Area (WBTA) (0224) (the 'Base') located to the west of Tin Can Bay, approximately 50 km to the southeast of Maryborough and 175 km to the north of Brisbane.

The objective of the monitoring is to continue to assess changes in the nature and extent of PFAS within the environment, where Defence's historical use of legacy aqueous film-forming foam (AFFF) has led to an identified potentially elevated risk or potential future risk to a receptor.

Monitoring Program

AECOM completed periodic monitoring of groundwater, surface water and sediment between October 2020 and November 2021 in accordance with the sampling and analysis quality plan (SAQP) (AECOM, 2021a). The monitoring included the collection of groundwater, surface water and sediment samples from selected locations on-Base and in surrounding off-Base areas including the WBTA Management Area.

Interpretive Assessment

Groundwater

Monitoring results indicated that the concentrations of PFAS in groundwater were similar to previous results. Elevated perfluorohexane sulfonate (PFHxS) and perflurooctanesulfonic acid (PFOS) concentrations (exceeding human health guideline values) were only detected at two monitoring wells (MW121 and MW122) in the eastern portion of Camp Kerr close to the Base entrance road. The localised lateral extent of PFAS in this area is understood and there is no indication that the groundwater contamination is migrating. The source of the PFAS in groundwater at this location is not known but could be related to historical irrigation of treated water (potentially containing PFAS) from the wastewater treatment plant to ground at a location close to monitoring wells MW121 and MW122. Three samples of treated water were collected during the monitoring period and analysed for PFAS. None of these samples reported detectable concentrations of PFHxS or PFOS indicating treated water is not currently a source of PFAS.

In the western portion of Camp Kerr, the non-detection of PFAS collected from monitoring wells indicates a low potential for off-Base migration of PFAS via a groundwater pathway between the Base and groundwater users in Wallu. In October 2020 and May 2021, PFAS were detected in groundwater samples collected from a monitoring well adjacent to the southern boundary (MW118), at concentrations equal to the limit of reporting. In the November 2021 sampling event PFAS was not detected above the reporting limit, which may reflect ongoing dispersion of residual PFAS in groundwater. The off-Base PFAS groundwater concentrations continue to remain below the HEPA (2020) drinking water guideline values. The potential for a complete source-pathway-receptor linkage to off-Base groundwater users is considered unlikely, and further assessment of the risk to human health is not required at the present time.

Consistent with the results of the DSI (AECOM, 2020), PFAS were not detected in groundwater samples from bores at other locations across the southern portion of the Management Area, which provide information on areas where landfilling has occurred, at the airfield where refuelling activities occurred and at locations where groundwater may discharge to surface water. This indicates source areas of PFAS are unlikely to be present in these areas.

Surface Water and Sediment

PFAS concentrations in surface water and sediment samples collected from on-Base drainage channels, on-Base creeks and off-Base drainage features and dams were generally consistent with historical data.

In Camp Kerr and Wallu area, PFAS were detected in on-Base drainage features and off-Base dams and ephemeral watercourses indicating a line of evidence for the presence of an overland flow pathway

for PFAS in surface water on-Base to migrate to surface features in Wallu. Concentrations detected during the monitoring period did not exceed human health guideline values. Ecological guidelines for PFOS for the protection of freshwater species were exceeded for surface water samples from on-Base drainage features and off-Base dams. As concentrations were consistent with historical data, further assessment of the risk to aquatic ecosystems is not required at the present time.

Three surface water samples from Kangaroo and Snapper Creeks in the southern portion of the Base reported detectable concentrations of PFOS in the monitoring period, which exceeded the ecological guideline for freshwater 99% species protection. These concentrations may indicate the potential for relatively minor source(s) of PFAS in the eastern portion of the Base. The presence of potential off-Base PFAS sources near Tin Can Bay including the waste transfer station, sewage treatment works and fire station, which are located to the east of the eastern Base boundary are considered to have the potential to contribute PFAS to the environment in the estuarine Snapper Creek system and Ramsar area. As PFAS concentrations in the downstream surface water samples in the western portion of WBTA were consistent with historical results reported in the DSI (AECOM, 2020), further assessment of the risk to ecological receptors is not required at the present time.

Conceptual Site Model and Risk Profile

The conceptual site model for WBTA was reviewed and no changes were identified to source, pathway or receptors.

The data collected during the OMP over the monitoring period suggest that the risk profile to human health within the Management Area is unchanged, based on the following conclusions of the data assessment:

- The extent of PFAS in groundwater is similar to that presented in the DSI (AECOM, 2020).
- PFAS analytical results for individual wells are in accordance with historical ranges, in particular there have been no new detections of sum of PFHxS and PFOS and PFOA in wells within the Management Area. There were no first-time detections or exceedances of the groundwater human health guideline values.
- PFAS concentrations in surface water locations were generally similar to previous (historical) results. There was a first-time PFAS detection in a surface water sample from an off-Base dam in October 2020, which exceeded the PFOS ecological guideline value. PFAS has been previously detected in upstream and downstream locations. There were no first-time detections in the other sampling locations and no exceedances of human health guideline values during the monitoring period.
- No significant change was observed in PFAS concentration in off-Base sediment.

Conclusions

Following a review of the data collected during the current monitoring period, there have been no significant changes to the understanding of risks associated with PFAS in the WBTA Management Area, spatial distribution of PFAS and the need for monitoring of additional media.

Due to the number of sample locations that have reported non-detection of PFAS in groundwater and surface water during the monitoring period, it is considered that there is scope to refine the monitoring network and frequency so the sampling program is targeted on the areas consistently reporting PFAS detections. This triggers the requirement to complete a review of the OMP.

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been engaged by the Department of Defence (Defence) to implement the Ongoing Monitoring Program (OMP) (Defence, 2020) for monitoring of per- and poly-fluoroalkyl substances (PFAS) at Wide Bay Training Area (WBTA) (0224) (the 'Base'), located to the west of Tin Can Bay, approximately 50 km to the southeast of Maryborough and 175 km to the north of Brisbane. The location of the Base and the Management Area is shown in **Figure 1** in **Appendix A**.

The monitoring targeted PFAS in a range of environmental media at selected locations on-Base and in surrounding off-Base areas, including the WBTA Management Area.

In order to meet the objectives of the OMP, the monitoring was undertaken in accordance with the AECOM (2021a) sampling and analysis quality plan (SAQP). This report has been prepared in accordance with the Defence (2021) OMP Annual Interpretive Report Guidance.

1.1 Purpose and Objectives

The objective of the OMP is to set out a program of monitoring to continue to assess the changes in the nature and extent of PFAS within the environment, where Defence's historical use of legacy aqueous film-forming foam (AFFF) has led to an identified potentially elevated risk to a receptor, or potential future risk to a receptor.

Assessing changes in the distribution, concentration, and transport (pathways and flow rates) of the contaminants against appropriate guideline values provides:

- An evidence base for targeted and effective risk management decision making to protect human health and environmental receptors.
- An early warning that additional management of PFAS contamination may be warranted in areas not currently understood to be affected by PFAS.

These data will be evaluated to determine environmental variability and significant trends in PFAS concentrations. This will inform any changes to the known risk profile and recommendations for triggers to review the PFAS Management Area Plan (PMAP) (Defence, 2020), if required.

1.2 Scope of Work

The scope of works for this interpretive report includes assessing changes to the distribution of PFAS over the preceding 12-month period (inclusive of three monitoring events in October 2020, May 2021 and November 2021) and how these change the understanding of the conceptual site model (CSM) and the risk profile with respect to PFAS impacts at the Base. This included evaluation of data reported in the following factual reports as well as data from historical reports:

- *Sampling Event Factual Report, October 2020, PFAS OMP, Wide Bay Training Area* (AECOM, 2021b)
- *Sampling Event Factual Report, May 2021, PFAS OMP, Wide Bay Training Area* (AECOM, 2021c).
- *Sampling Event Factual Report, November 2021, PFAS OMP, Wide Bay Training Area* (AECOM, 2022 in draft).
- Data and other outcomes of the detailed site investigation (DSI) at WBTA (AECOM, 2020) and the PMAP for WBTA (Defence, 2020).

To complete this scope of work AECOM completed periodic groundwater, surface water and sediment monitoring in accordance with the SAQP (AECOM, 2021a).

2.0 Site Setting

The subsections below describe the site and environmental setting for WBTA.

2.1 Site Description

Table 1 summarises the Base identification and site setting presented in the PMAP (Defence, 2020) for WBTA.

Table 1 WBTA Identification and Setting Summary

Element	Description
Base ID	0224
Location	The Management Area is located on Tin Can Bay Road, Tin Can Bay, Queensland, 4580, approximately 50 km south-east of Maryborough and 175 km north of the Brisbane central business district, Queensland, see **Figure 1**, **Appendix A**. The Management Area comprises WBTA (on-Base) and the small residential area of Wallu located adjacent to the southwest corner of the Base (off-Base). Base features are shown in **Figure 2**, **Appendix A**. WBTA covers approximately 19,100 hectares of remnant bush and coastal to sub-coastal wetland.
Regional Climate	The DSI (AECOM, 2020) reported that the region experiences warm wet summers and mild winters with a mean maximum temperature in January of 28.9°C and a mean minimum temperature in July of 10.3°C. The region experiences an annual mean rainfall of 1445.0 mm. On average, February experiences the highest mean rainfall of 199.4 mm, whereas September experiences the lowest monthly mean rainfall of 55.1 mm.
Topography	The western margin of the area comprises undulating to strongly undulating old coastal plain, about 90 metres above Australian Height Datum (AHD). The central and southeastern parts of the area comprise gently to strongly undulating portions of old dissected coastal plain, while the northeastern part of the area is coastal plain with low sandy banks and weakly defined drainage lines. Based on a 25 m-resolution digital elevation model of the area), total relief is 112 m (from sea level), and slopes range from 0° to 10°. Nearly the entire area (97.2%) comprises slopes <5°, with the remainder being 5–10°. Wallu, located 100 m to the west of Camp Kerr, is a flat area (approximately 65 mAHD) which is at slightly lower elevation (approximately 10 m) compared to Camp Kerr (approximately 75 mAHD). There are a number of surface water bodies (dams) present at Wallu which appear to be mainly fed from an unnamed creek to the west. The creek has multiple tributaries that drain areas of higher ground (elevations of over 100 mAHD) to the north, west and southwest of Wallu. Surface water flows out of the Wallu area to the southeast via an ephemeral waterway that crosses under Clyde Road and Tin Can Bay Road and discharges into a dam in the eastern portion of Wallu. The presence of the water bodies at Wallu indicate that this area has natural discharge features that reflect the topography of the area.
Geology and hydrogeology	The Management Area is underlain by a Late Triassic to Early Jurassic Duckinwilla Group and Grahams Creek Formation. The Duckinwilla Group comprises feldspathic and quartzose sandstone, shale, siltstone and coal, and the Grahams Creek Formation comprises intermediate to acidic lava flows and pyroclastics, tuffaceous sandstone and siltstone. The marine transgressive sequence of the Duckinwilla Group comprises almost 70% of the total area. This sequence is capped in places with Oligocene to Miocene duricrusted old land surfaces comprised of ferricrete, silcrete and indurated paleosols. These deposits comprise almost 10% of the area. Gully systems draining the marine transgressive sequence and duricrusted areas are filled with Quaternary undifferentiated alluvial plains comprised of sand, silt, clay, and gravel.

Element	Description
	Groundwater beneath WBTA is semi-confined within the sandstone of the Tertiary Duckinwilla Group, with flow likely to occur as fracture flow. Measurements of the physicochemical parameters during the preliminary site investigation (PSI) (AECOM, 2019) and DSI (AECOM, 2020) indicated the groundwater was slightly acidic to neutral and fresh (<500 mg/L total dissolved solids). This indicated the water is suitable for most purposes. The DSI reported that a shallow groundwater aquifer was present beneath the Base with groundwater encountered between 1.7 and 14.7 m below top of casing (mbtoc). Treated water from the wastewater treatment plant (WWTP) in Camp Kerr is irrigated to ground at three locations at the Base. These are to the west of the WWTP and two areas immediately north and south of the main entrance road, which is to the east of the Range Control building.
Surface Water	WBTA is located within the Mary Basin. There appear to be seven main creek catchments on-Base: • Mosquito Creek and its tributaries drain the western part of the training area. The creek discharges into the Kauri Creek Inlet • Kauri Creek in the central part of WTBA, flows in a northerly direction through the centre of the Base to the Kauri Creek Inlet and east to Tin Can Inlet • Kangaroo Creek in the central south flows into the Kauri Creek • Snapper Creek in the southeast, flows east into Tin Can Inlet • Griffen Creek in the east, flows east into Tin Can Inlet • Teebar Creek in the east, flows east into Tin Can Inlet • Little Stony Creek in the northwest, flows north into Kauri Creek. Kauri Creek is the main draining watercourse at the WBTA. Tributaries that flow into Kauri Creek include Mosquito Creek, Kangaroo Creek, and Little Stony Creek. Kauri Creek flows from south to north across the Base, then east to the Great Sandy Strait. The Teebar Creek, Snapper Creek and Griffen Creek catchments occupy the eastern portion of the Base and drain to the east into Tin Can Inlet. The Teebar Creek, Griffen Creek and Snapper Creeks are located in the lower lying areas of the Base and are likely to be seasonal and/or tidally influenced. The headwaters of Mosquito, Kangaroo and Kauri Creeks rise to the south and southwest beyond the boundary of the training area, indicating off-Base surface water flows onto the Base. The suburb of Wallu, located adjacent southwest of the Base has several surface water dams and an unnamed creek that flows from Wallu to the southeast.
Current and Previous Land Use	The PSI (AECOM, 2019) reported that the Base was likely to have been in use by Defence since 1958. Prior to 1958, the Base is likely to have been used for logging.
Landuses surrounding the Base	The surrounding landuse is predominantly State Forest with some small residential settlements to the southwest and south and the larger residential area of Tin Can Bay to the southeast. Identified land uses in each direction from WBTA are summarised below. • North: Toolara State Forest and Great Sandy Strait. • East: Tin Can Bay waste transfer station and sewage treatment plant, township of Tin Can Bay (residential) and Great Sandy Strait. • South: Township of Wallu west of Camp Kerr (residential), township of Wallu Heights east of Camp Kerr (residential), Tin Can Bay Road and Toolara State Forest. • West: Maryborough Cooloola Road and Toolara State Forest.

Element	Description
	The PSI (AECOM, 2019) identified that there is significant commercial and recreational fishing activity in waters surrounding the Base. Waterways contiguous and downstream of WBTA are listed as important wetlands under the Ramsar Convention (The Convention on Wetlands of International Importance). The Ramsar area includes Tin Can Inlet and tidal sections of creeks in the northern and eastern portions of the base.

2.2 WBTA Management Area

The Management Area comprises WBTA (on-Base) and the small residential area of Wallu located adjacent to the southwest corner of the Base (off-Base). WBTA is bordered by Toolara State Forest to the west and south, the Great Sandy Strait to the east, and the townships of Tin Can Bay and Wallu to the south-east and south-west, respectively. Refer to **Figure 1**, **Appendix A**.

2.3 Sources

No PFAS source areas have been identified in the investigations (PSI and DSI) completed to date. The investigations have identified the presence of PFAS in on-Base groundwater and surface water, indicating that there may be sources of PFAS present on-Base. The PSI and DSI identified the potential storage or use (for emergency and demonstration purposes) of small AFFF fire extinguishers at the paints, oil, lubricants (POL) refuelling area, in the caretaker's residence area and at the demonstration area north of Camp Kerr. The PSI and DSI also identified the potential for wash down of liquids containing PFAS at the vehicle wash point. PFAS is also present in the treated effluent which may have been irrigated to ground in the area of the WWTP and adjacent to the Camp Kerr entrance road. Historically, PFAS may have been discharged to creeks.

Interviews conducted during the PSI did not identify specific information regarding the potential use of firefighting foams containing PFAS on-Base and the types of AFFF potentially used are not known. No specific information was obtained on the potential for sources of PFAS other than firefighting foams at the Base.

Potential off-Base sources of PFAS impact include the Tin Can Bay waste transfer station and sewage treatment works, fire station, areas of infilling which may include waste containing PFAS and areas where historical bushfires may have been suppressed using firefighting foam containing PFAS.

3.0 Sampling and Analytical Methodology

3.1 Sampling Locations

The sampling events conducted in October 2020, May 2021 and November 2021 included the collection of selected groundwater, surface water and sediment samples from across the Management Area. Sampling locations at WBTA are shown in **Figure 3** and **Figure 4** in **Appendix A**.

3.2 Summary of OMP works 2020-2021

A summary of the monitoring works implemented as part of the SAQP (AECOM, 2021a) between October 2020 and November 2021 is summarised in the subsections below:

3.2.1 October 2020 Sampling Event

- Monitoring works undertaken between 13 and 30 October 2020.
- Groundwater sampling of 16 monitoring wells/bores on-Base and five monitoring wells off-Base in the shallow aquifer.
- Groundwater sampling of two abstraction bores at tap outlets.
- Surface water sampling of 15 on-Base locations and five off-Base locations.
- Sampling of the outlet of the WWTP.

3.2.2 May 2021 Sampling Event

- Monitoring works undertaken between 18 and 22 May 2021
- Groundwater sampling of 16 monitoring wells/bores on-Base and five monitoring wells off-Base in the shallow aquifer.
- Groundwater sampling of two abstraction bores at tap outlets.
- Surface water sampling of 15 on-Base locations and four off-Base locations.
- Sampling of the outlet of the WWTP.
- Sediment sampling at 19 locations (co-located with surface water samples).

3.2.3 November 2021 Sampling Event

- Monitoring works undertaken between 8 and 12 November 2021.
- Groundwater sampling of 17 monitoring wells/bores on-Base and five monitoring wells off-Base in the shallow aquifer.
- Groundwater sampling of two abstraction bores at tap outlets.
- Surface water sampling of 15 on-Base locations and four off-Base locations.
- Sampling of the outlet of the WWTP.

3.3 Sampling and Analysis Methodology

Refer to the SAQP (AECOM, 2021a) for the sampling methodology, data quality objectives (DQOs) including quality assurance (QA) and quality control (QC) parameters for field and laboratory programs. Refer to the factual reports (**Appendix D**) for QA/QC discussion and fit for purpose data.

3.4 Deviations from SAQP

The works undertaken over the monitoring period complied with the SAQP (AECOM, 2021a), with some minor exceptions as detailed in the subsections below. Between the October 2020 and November 2021 sampling events, the SAQP was reviewed. The scope of work and methodology were consistent with the OMP (Defence, 2020) with the exception of the following change:

- The OMP included analysis for a non-PFAS suite for approximately 20% of groundwater, surface water and sediment samples. The first OMP sampling event, completed in October 2020, included these analyses. Following the October 2020 sampling event, the SAQP was reviewed. It was concluded that non-PFAS analysis of environmental media was not required at the Base at this time to meet the requirements of the OMP and were removed from the analytical schedule in the latest version of the SAQP (AECOM, 2021a) for future sampling events, starting with the May 2021 sampling event.

3.4.1 October 2020 Sampling Event

A total of 21 of the 22 monitoring wells at WBTA Management area identified in the SAQP were sampled. Monitoring well MW102 could not be located as it was buried under road materials. The non-sampling of this monitoring well was not considered critical to understanding the distribution of PFAS in groundwater as two monitoring wells were present further down-gradient and were sampled.

3.4.2 May 2021 Sampling Event

The monitoring event was conducted in May 2021 rather than in April 2021. The monitoring event was delayed due to training exercises being carried out in April 2020.

A total of 21 out of 22 monitoring wells / bores at WBTA Management Area were sampled. Monitoring well MW102, located in the POL area, could not be located as it was buried under road materials. As noted above, the non-sampling of this bore was not considered critical to understanding the distribution of PFAS in groundwater as a monitoring well (MW115) was present further down-gradient and was able to be sampled.

A total of 19 out of the 20 co-located surface water and sediment locations were accessible and able to be sampled. Access permission was not provided for SW020 / SD020. Non-sampling of this location is not considered critical to understanding the distribution of PFAS as upstream and downstream locations (SW21 and SW24) were monitored during the sampling event.

3.4.3 November 2021 Sampling Event

The monitoring event was conducted on 8 November 2021 rather than in October 2021. The monitoring event was delayed due to training exercises being carried out in October 2021.

All 22 monitoring wells / bores at WBTA Management Area were sampled. During the October 2020 and May 2021 sampling events, monitoring well MW102 was not accessible as it was buried under road materials. Prior to the November 2021 sampling event, this well was exposed to surface by Defence and was sampled during the November 2021 event. The well was noted to be in good condition.

A total of 19 out of the 20 surface water locations were accessible and able to be sampled. Access permission was not provided for SW020. As noted above, non-sampling of this location is not considered critical to understanding the distribution of PFAS as upstream and downstream locations were monitored during the sampling event.

3.5 Changes to the Monitoring Network

A summary of the findings related to the condition of/and or access to the monitoring network from the sampling events following the November 2021 sampling event is provided below.

Physical maintenance

- MW102 was temporarily buried under road materials but was exposed to surface in September 2021.

Access issues

- Sampling location SW020/SD020 was not sampled in 2021 as the property has changed ownership and the new owners did not respond to requests for access in May or November 2021.

Further details are provided in the sample event factual reports in **Appendix C**. Excluding the locations listed above, there were no changes to the monitoring network condition or access. None of these changes are considered to have affected data integrity.

4.0 Quality Assurance and Quality Control

Data validation pertaining to the data in this report has been previously completed and discussed within the individual factual reports listed below:

- *Sampling Event Factual Report, October 2020, PFAS OMP – Wide Bay Training Area* (AECOM, 2021b)
- *Sampling Event Factual Report, May 2021, PFAS OMP – Wide Bay Training Area* (AECOM, 2021c).
- *Sampling Event Factual Report, November 2021, PFAS OMP – Wide Bay Training Area* (AECOM, 2021d).

Data validation procedures employed in the assessment of the field and laboratory QA/QC data indicated that the reported field and analytical results in the three sampling events (October 2020, May 2021 and November 2021) are representative of the sample locations and that the overall quality of the analytical data produced is acceptably reliable for the purpose of the factual and annual interpretive reports.

All data collected from the two sampling events has been reviewed and uploaded to the Defence ESdat database in accordance with Defence Contamination Management Manual (DCMM) (Defence, 2018) requirements, in particular, Annex L Guidance on Data Management. Refer to the sampling event factual reports in **Appendix C** for further information.

5.0 Assessment Criteria

Adopted screening criteria references national guidance in the form of the PFAS National Environmental Management Plan (NEMP, HEPA, 2020), Defence estate and environmental strategies, and Defence PFAS-specific strategies and guidance. At the time of preparing this report, a number of guidance documents were available in Australia including:

- PFAS National Environmental Management Plan (NEMP), version 2.0 (HEPA, 2020)
- Department of Health, 2019. Health Based Guidance Values for PFAS for use in site investigations in Australia. September 2019.
- National Health and Medical Research Council (NHMRC), 2019. Guidance on PFAS in Recreational Water. August 2019 (NHMRC, 2019)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B1, as amended in 2013 (ASC NEPM).

The adopted PFAS screening criteria used to assess the data generated as part of the OMP are presented in **Table 2** below.

Table 2 Summary of Adopted Screening Criteria

Pathway	Compound	Criteria	Comment / Reference
Human Health Receptors			
Drinking water - groundwater	PFOS + PFHxS	0.07 µg/L	The values are from the PFAS NEMP (HEPA, 2020). *All groundwater results were compared to these criteria.*
	PFOA	0.56 µg/L	
Recreational use – surface water	PFOS + PFHxS	2 µg/L	The values are from PFAS NEMP (2020). *All surface water results were compared to these criteria.*
	PFOA	10 µg/L	
Ecological Receptors			
Freshwater (99% species protection values)	PFOS	0.00023 µg/L	The values are from the PFAS NEMP (HEPA, 2020). The 99% level of protection has been applied for slightly to moderately disturbed ecosystems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. For the purposes of preliminary screening of analytical water results, the laboratory limit of reporting (LOR) will be adopted rather than sole use of the criteria value. *All surface water and groundwater results were compared to these criteria.*
	PFOA	19 µg/L	
Freshwater (95% species protection values)	PFOS	0.13 µg/L	Surface water in the ephemeral waterway south of Clyde Road (SW025) were screened against freshwater ecological guidelines for slight to moderately disturbed ecosystems (95% species protection).
	PFOA	220 µg/L	

It is noted that at the time this report was prepared, no HEPA (2020) endorsed criteria were available for PFAS in sediment.

6.0 Contextual and Ancillary Information

The development of the PMAP (Defence, 2020) involved a review of the key migration pathways and consideration of available management options. Due to the limited nature and extent of the contamination impacts, low exposure risks to human health, and as the net benefit of source, pathway or exposure / receptor management and resultant risk reduction was considered marginal, no specific management options were considered necessary. The OMP provides data for assessment of the potential changes in the nature of PFAS in groundwater and surface water systems.

6.1 Remediation Projects

No remediation projects were completed on Base during the monitoring period.

6.2 Infrastructure Projects

A summary of recent and planned infrastructure projects on Base (provided by the Environment and Sustainability Manager for WBTA in November 2021) are identified in **Appendix C**. These projects included repairs to roads and fencing, installation of toilets and reshaping of features at firing points. As no PFAS soil source areas have been identified at the Base, the infrastructure projects are considered unlikely to have disturbed or excavated PFAS-contaminated soil.

6.3 Climate and Extreme Weather Events

Table 3 summarises the rainfall activity during the sampling events for the weather station at Tin Can Bay (Defence) (Station ID 140010) and the occurrence of wet weather events (days with rainfall > 15 mm). There was one wet weather event during each of the sampling events. The data are sourced from the Bureau of Meteorology (http://www.bom.gov.au/).

Table 3 Rainfall During Monitoring Events over last 12-months

Sampling Event	Rainfall during month of monitoring from weather station 140010	Wet weather events during the monitoring period (days with rainfall > 15 mm)
October 2020	74.4 mm	42.2 mm on 28 October 2020
May 2021	179.4 mm	18.4 mm on 19 May 2021
November 2021	266.0 mm	16.2 mm on 08 November 2021 33.6 mm on 09 November 2021 41.4 mm on 10 November 2021

No extreme weather events (i.e. events with >100 mm rainfall on a single day) occurred during the monitoring period. Average rainfall data are not available for the weather station on-Base (data are only available for the period 2018 to 2021). The next nearest weather station is at Goomboorian (40068), located approximately 20 km away. Comparison of the rainfall data recorded on-Base in October 2020 and May 2021 with monthly average rainfall at Goomboorian (October (80.1 mm), May (80.0 mm)) and November 2021 (91.1 mm) indicated rainfall was much higher than the long-term averages in October 2020 and November 2021 and similar to the long-term average in May 2021.

7.0 Monitoring Data Summary

7.1 Groundwater

7.1.1 Groundwater Elevations

Groundwater elevations recorded during monitoring well gauging for the sampling events are summarised in **Table 4** below. The range in groundwater elevations in the shallow sandstone aquifer in all sampling events are similar.

Table 4 Depth to Groundwater and Groundwater Elevation

Date	No of wells	Range in hydraulic head (mAHD)
October 2020	21	7.38 to 50.30
May 2021	21	8.13 to 72.92
November 2021	22	6.12 to 70.30

7.1.2 Groundwater Flow Directions

Inferred groundwater contour maps for WBTA for the three monitoring periods were presented in the sampling event factual reports (AECOM, 2021b, AECOM, 2021c and AECOM, 2021d) and are presented as **Figure 5** to **Figure 10** in **Appendix A.** A groundwater divide appears to be present in the central portion of Camp Kerr with groundwater to the east of the groundwater divide flowing towards the east. Groundwater to the west of the groundwater divide appears to be flowing to the west and southwest towards Wallu and towards the south. This is consistent with that observed in previous investigations (AECOM, 2020).

7.1.3 Groundwater Quality Parameter Field Measurements

A summary of the water quality parameters in the different aquifer units measured during sample collection at WBTA in October 2020, May 2021 and November 2021 are presented in **Table 5**.

Table 5 Quality Parameter Field Measurements in Groundwater from the Shallow Sandstone Aquifer at WBTA

Field Parameter		No.	Min.	Max.	Mean
DO (mg/L)	Oct-20	23	0.16	3.71	1.37
	May-21	23	0.38	5.85	1.87
	Nov-21	24	0.14	3.93	1.55
EC (µS/cm)	Oct-20	23	93.2	611	264
	May-21	23	67.3	976	257
	Nov-21	24	53.9	659	243
pH	Oct-20	23	4.37	6.67	5.26
	May-21	23	4.26	8.05	5.68
	Nov-21	24	3.64	14.3	8.3
ORP (mV)	Oct-20	23	284	444	380
	May-21	23	56	489	366
	Nov-21	24	189	377	288
Temp (°C)	Oct-20	23	21.1	25.1	23.7
	May-21	23	19.6	24.8	22.2
	Nov-21	24	22.1	27.0	23.9

Note: DO is dissolved oxygen, EC is electrical conductivity, ORP is oxidation reduction potential, Temp is temperature.

Based on the mean groundwater parameter results over the sampling period, the aquifer unit at WBTA can be characterised as slightly acidic, mildly oxygenated, mildly reducing and fresh.

7.2 Groundwater Analytical Results

This section presents a summary of the human health and ecological PFAS screening assessments for groundwater samples collected during the monitoring periods. The groundwater laboratory PFAS analytical results are presented in **Table T1, Table T2** and **Table T3** in **Appendix B**.

Monitoring activities are summarised in the OMP Sampling Event Factual Reports provided in **Appendix D**. A summary of analytical results from the OMP works is provided in the table below.

Table 6 Summary of PFAS in Groundwater

Sampling Event	No. of Locations Analysed	Compound	Concentration Range (µg/L)	No. of Sample Locations with Concentration > LOR
October 2020	23	PFOS	<0.01 – 0.04	2
		PFOA	<0.01	0
		PFOS+PFHxS	<0.01 – 0.16	3
May 2021	23	PFOS	<0.01 – 0.03	3
		PFOA	<0.01	0
		PFOS+PFHxS	<0.01 – 0.20	3
November 2021	24	PFOS	<0.01 – 0.04	2
		PFOA	<0.01	0
		PFOS+PFHxS	<0.01 – 0.10	3

Groundwater sample results for sum of PFHxS and PFOS in groundwater are presented in **Figure 11** (for October 2020), **Figure 12** (for May 2021) and **Figure 13** (for November 2021) in **Appendix A.**

In addition to PFAS, selected groundwater samples were analysed during the October 2020 sampling events for the following geochemical parameters:

- Major ions (sodium, calcium, magnesium and potassium) and anions (chlorine, sulphate, bicarbonate, carbonate)
- Total suspended solids (TSS)
- Dissolved organic content (DOC).

The analytical results are presented on **Table T6**.

7.3 Surface Water Results

7.3.1 Surface Water Quality Parameter Field Measurement

Surface water quality parameters were measured prior to collecting surface water samples. The stabilised readings from the October 2020, May 2021 and November 2021 sampling events are presented in the sampling event factual report (**Appendix D**). A summary of the water quality parameters in the different sampling events are presented in **Table 7** and **Table 8**.

Table 7 Summary of Surface Water Quality Parameter Field Measurement Results: October 2020

Parameter	Units	Freshwater locations (n = 17)		Estuarine locations (n = 3)	
		Range	Mean	Range	Mean
pH	-	4.9 – 7.8	6.4	6.8 – 7.3	7.1
Temperature	ºC	20.4 – 26.2	23.8	20.4 – 26.2	23.8
Dissolved Oxygen	mg/L	0.3 – 6.3	4.1	3.1 – 6.0	4.8
Redox Potential	mV	256 – 452	341	246 – 289	263
Electrical Conductivity	µS/cm	118 – 254	185	41260 – 46198	42950

Table 8 Summary of Surface Water Quality Parameter Field Measurement Results: May 2021

Parameter	Units	May 2021 Freshwater locations (n = 16)		May 2021 Estuarine locations (n = 3)	
		Range	Mean	Range	Mean
pH	-	4.3 – 7.1	6.1	6.2 – 6.9	6.5
Temperature	ºC	16.5 – 22.0	18.3	19.3 – 21.1	20.0
Dissolved Oxygen	mg/L	0.96 – 9.56	4.8	5.16 – 5.77	5.51
Reduction Potential	mV	222 – 482	355	327 – 355	339
Electrical Conductivity	µS/cm	69 – 932	198	2959 – 9667	7362

Table 9 Summary of Surface Water Quality Parameter Field Measurement Results: November 2021

Parameter	Units	November 2021 Freshwater locations (n = 16)		November 2021 Estuarine locations (n = 3)	
		Range	Mean	Range	Mean
pH	-	3.8 – 9.6	6.2	5.3 – 7.6	6.6
Temperature	ºC	22.4 – 27.7	24.2	23.5 – 25.3	24.5
Dissolved Oxygen	mg/L	1.3 – 6.8	4.2	4.3 – 6.3	5.3
Reduction Potential	mV	229 - 386	306	279 – 346	317
Electrical Conductivity	µS/cm	15 - 464	137	402 - 51448	33196

Based on the averaged results the freshwater can be characterised as near neutral, moderately oxygenated, mildly reducing and fresh. The estuarine water is similar with the exception of being brackish or saline rather than fresh. These results are consistent with previous results (AECOM, 2020).

7.3.2 Surface Water Observations

During the sampling of overland flow locations (SW019, SW027) and drain sampling locations (SW017, SW018), observations were made regarding the presence of water. These observations are summarised in **Table 10**.

Table 10 Summary of PFAS in Surface Water

Sampling Event	Sampling Location	Observation
October 2020	SW017	Water was flowing in drains during sample collection.
	SW018	Water was flowing in drains during sample collection.
	SW019	Pooled surface water was present following rainfall over the previous three days.
	SW025	Water was flowing in channel during sample collection. Water was turbid.
	SW027	Water was flowing in the drainage channel.
May 2021	SW017	Some pooled water was present.
	SW018	Sampling location was dry so a sample was collected 30 m further upstream.
	SW019	Very little water was pooled on ground surface.
	SW027	Water was flowing in the drainage channel.
November 2021	SW017	Drain was gently flowing.
	SW018	Drain flowing rapidly due to heavy rainfall.
	SW019	Pooled water was present.
	SW027	Due to the heavy rain, overland flow along two routes was observed to converge at sampling location SW027. The first was from the north (direction of SW019 and MW111). The second was from the direction of the fuel farm (direction of MW101).

7.3.3 Surface Water Analytical Results

Surface water analytical results are presented in **Table T4** in **Appendix B** and monitoring activities are summarised in the sampling event factual reports in **Appendix E**. A summary of surface water analytical results is provided in **Table 11** below.

Table 11 Summary of PFAS in Surface Water

Sampling Event	No. of Locations Analysed	Compound	Concentration Range (µg/L)	No. of Sample Locations with Concentration > LOR
October 2020	20	PFOS	<0.0016 – 0.0308	6
		PFOA	<0.0016 – 0.0038	2
		PFOS+PFHxS	<0.0016 – 0.0741	9
May 2021	19	PFOS	<0.0016 – 0.077	7
		PFOA	<0.0016 – 0.0072	4
		PFOS+PFHxS	<0.0016 – 0.0202	12
November 2021	19	PFOS	<0.0008 – 0.0038	3
		PFOA	<0.0005 – <0.0032	0
		PFOS+PFHxS	<0.0008 – 0.0038	4

Surface water sample results for sum of PFHxS and PFOS are presented in **Figure 11** (for October 2020)**, Figure 12** (for May 2021) and **Figure 13** (for November 2021) in **Appendix A**. It should be noted that not all surface water sampling locations are shown on these plans for privacy reasons.

In addition to PFAS, selected surface water samples were analysed in the October 2020 sampling event for the following geochemical parameters:

- Major ions (sodium, calcium, magnesium and potassium) and anions (chlorine, sulfate, bicarbonate and carbonate)
- TSS
- DOC.

The analytical results are presented in **Table T7**, **Appendix A**.

7.4 Sediment Analytical Results

Sediment samples were co-located and collected with surface water samples during the May 2020 sampling event. Sediment PFAS analytical results are presented in **Table T5** in **Appendix B** and monitoring activities are summarised in the May 2021 sampling event factual report in **Appendix D**. A summary of sediment analytical results is provided in **Table 12** below.

Table 12 Summary of PFAS in Sediment

Sampling Event	No. of Locations Analysed	Compound	Concentration Range (mg/kg)	No. of Sample Locations with Concentration > LOR
May 2021	19	PFOS	<0.0002 – 0.0012	6
		PFOA	<0.0002 – <0.0005	0
		PFOS+PFHxS	<0.0002 – 0.0012	6

8.0 Discussion / Interpretive Analysis

8.1 Hydrogeology

All monitoring wells sampled during the sampling events were located in the southern portion of the Base between Camp Kerr, which is adjacent to the Base's western boundary, and Snapper Creek / Tin Can Inlet, which is adjacent to the Base's eastern boundary.

The inferred groundwater flow directions in October 2020, May 2021 and November 2021 are consistent with previously inferred groundwater flow direction (AECOM, 2020). The groundwater elevation data indicates groundwater to the east of Camp Kerr flows towards the northeast in the direction of the coast. There appears to be a groundwater divide situated in the centre of Camp Kerr that affects the local groundwater flow directions. The divide is likely to reflect the topography of the area with Camp Kerr located at a topographic high point. Groundwater flow in the eastern portion of Camp Kerr (i.e. in the vicinity of the caretaker's residence) has been inferred to be towards the east (i.e. on-Base). Groundwater in the western portion of Camp Kerr (i.e. around the water treatment plant (WTP) and POL) appears to flow to the west or southwest towards Wallu. Local groundwater flow in the southern portion of Camp Kerr is inferred to be towards the south. This indicates that the township of Wallu is hydraulically down-gradient of groundwater beneath the western portion of the Camp Kerr.

8.2 Groundwater Results

Groundwater results for sum of PFHxS and PFOS compared to assessment criteria are provided in **Figure 11**, **Figure 12** and **Figure 13** in **Appendix A**. PFAS concentrations were generally similar to previous (historical) results presented in the DSI (AECOM, 2020).

8.2.1 Eastern Portion of Camp Kerr

Elevated PFAS concentrations have been detected in the eastern portion of Camp Kerr in the vicinity of the caretaker's residence with sum of PFHxS and PFOS concentrations exceeding the drinking water guideline values in two monitoring wells (MW121 and MW122) in all three sampling events with the maximum sum of PFHxS and PFOS concentration recorded in MW122 (0.2 µg/L) in May, 2021. Sum of PFHxS and PFOS was not detected above the limit of reporting in any other monitoring well in the eastern portion of Camp Kerr. The non-detection of PFAS in monitoring wells down and cross gradient of MW121 and MW122 indicate the extent of PFAS in groundwater is localised, relatively stable and unlikely to be migrating off-Base to the south, southeast or southwest at concentrations exceeding human health guideline values. This also indicates it is unlikely there are unacceptable off-Base risks to human health from the localised area of PFAS impacts in the eastern portion of Camp Kerr.

During the monitoring period, PFAS were not detected in the treated water sample (OTH001) from the WWTP (other than the detection of PFPeA at the limit of reporting in the October 2020 sample). Treated water is irrigated at three locations; an open area to the west of the treatment plant and two open areas to the west of the Range Control Building on either side (north and south) of the entrance road. The results do not indicate a source of PFHxS and PFOS is present in the water being irrigated in these areas.

8.2.2 Western Portion of Camp Kerr

With the exception of the samples from MW118, PFAS concentrations were not detected above the limit of reporting in groundwater from the monitoring wells in the western portion of Camp Kerr. Sum of PFHxS and PFOS in off-Base monitoring well MW118, located to the south of Camp Kerr, was reported at 0.01 µg/L and 0.03 µg/L in October 2020 and May 2021 sampling events respectively. There were no exceedances of the human health guideline values for drinking water or recreational water. In particular, PFAS was not detected in groundwater in the monitoring wells between Camp Kerr and Wallu and the off-Base risk to human health from the detections of PFAS at MW118 is considered to be low.

During the monitoring period, PFAS were not detected in groundwater samples collected from the two sentinel monitoring wells (MW116 and MW117), located off-Base beyond the western Base boundary. PFAS has not been detected at these since their installation in 2019 indicating that PFAS in groundwater is not migrating off-Base towards the west.

8.2.3 Deeper Extraction Bores at Camp Kerr

Two on-Base water supply bores were sampled. Bore 1 (POT001) is screened between 18 and 78.4 mbgs and Bore 2 (POT005) is screened between 30 and 51.5 mbgs. PFAS was not detected in any of the three samples collected from Bore 2 during the three sampling events. PFAS was not detected in two of the three samples collected from Bore 1 with a concentration of 0.02 ug/L PFOS detected in November 2021, which marginally exceeded the limit of reporting. Historically, PFAS has been detected at Bore 1 with up to 0.04 µg/L detected in September 2018, indicating residual concentrations are present in the aquifer at this location. Due to the design of the bore, there is the potential for different sections of the aquifer to be connected or connection between different aquifers, if present.

8.2.4 Remaining Base Area

PFAS was not detected in groundwater samples from monitoring wells at other locations across the central and eastern portions of the southern area of the Base. This is consistent with previous results and indicates source areas of PFAS are unlikely to be present in these areas.

8.3 Groundwater Temporal Trends

A graph showing the historical results for sum of PFHxS and PFOS in monitoring wells that have recorded detectable concentrations of PFAS is shown in **Chart 1**. The graph indicates groundwater concentrations show steady or slightly decreasing trends, which suggests ongoing attenuation of PFAS concentrations.

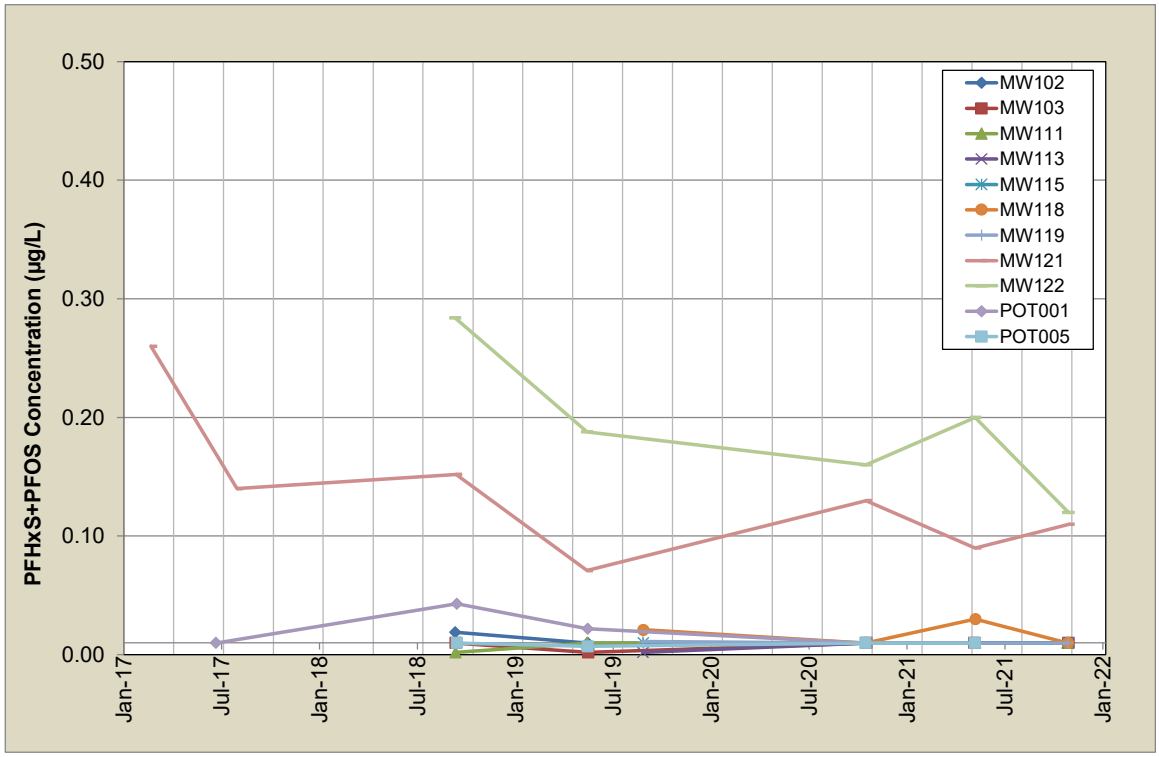


Chart 1 Sum of PFHxS and PFOS in selected monitoring wells: 2017 to 2021

8.4 Surface Water Results

Surface water results for sum of PFHxS and PFOS in October 2020, May 2021 and November 2021 are provided in **Figure 11**, **Figure 12** and **Figure 13**, respectively, in **Appendix A**.

8.4.1 Drainage features around Camp Kerr

Three drainage features were sampled during the monitoring events including:

- Ponded water and sediment from an unlined stormwater channel to the south of the caretaker's residence (SW017/SD017)
- Ponded water and sediment from an unlined stormwater channel to the southeast of the WTP (SW018/SD018). The channel receives water from the vehicle wash point and runs down the slope into vegetation along the western side of Camp Kerr.
- Ponded water and sediment along the perimeter track immediately adjacent to the Base's western boundary (SW019/SD019). The water was considered likely to be sourced form overland flow from the Camp Kerr area.
- Ponded water and sediment at an off-Base sampling location adjacent to Clyde Road at the base of the slope prior to the water discharging into a private dam (SW027/SD027).

PFAS has been frequently detected in all four surface water samples collected, with the highest concentration detected at the ponded water sampling location along the perimeter track (SW019) with 0.074 µg/L sum of PFHxS and PFOS in October 2020. The detection of PFAS compounds at these sampling locations indicates that residual PFAS impacts are present in the drainage channels. The detection of PFAS in ponded water at SW019 and SW027 indicates the presence of an overland flow pathway for the migration of PFAS from Camp Kerr to beyond the western Base boundary.

A sample was collected from SW027 for the first time in October 2020 and recorded a first-time detection of sum of PFHxS and PFOS (0.0124 µg/L). This concentration is similar to the concentration detected at an upstream location SW019, which reported 0.0074 µg/L.

8.4.2 Surface Water Bodies in Wallu

During the monitoring period, PFAS have been detected in all five surface water samples (SW020 to SW024) collected from four off-Base private dams in the eastern portion of Wallu (i.e. adjacent to Camp Kerr) and in the sample (SW025) collected from the ephemeral waterway, which is connected to, and drains some of the dams. Similar sum of PFHxS and PFOS concentrations were detected, in the range <0.001 to 0.0093 µg/L.

A sample was collected from SW021 for the first time in October 2020 and recorded a first-time detection of sum of PFHxS and PFOS (0.0043 µg/L). This concentration is consistent with the upstream location SW023, which reported 0.0067 µg/L.

The detection of PFAS compounds in these dams and waterway indicates the potential for a pathway to be present for PFAS from the Base to migrate into off-Base dams, potentially via overland flow pathways. The possibility of unknown off-Base sources impacting off-Base areas (e.g. use of foam for bushfires) cannot be discounted.

8.4.3 Creeks on the Base

The Ramsar area includes Tin Can Inlet and tidal sections of the creeks that discharge into Tin Can Inlet. Two of the surface water sampling locations were within the Ramsar area, these were SW012 (Kauri Creek) and SW016 (Snapper Creek) and PFAS was not detected at these locations.

Sampling locations SW013 and SW014 are located along a tributary of Snapper Creek at locations upstream of the Ramsar area and indicate water that may be entering the Ramsar area from the Base. SW013 is located approximately 600 m upstream from the Ramsar area, SW0014 is located approximately 1.3 km upstream from the Ramsar area. During the OMP sampling events PFAS was detected at both SW013 (0.003 µg/L in May 2021) and SW014 (0.0021 µg/L, 0.0016 µg/L and 0.0027 µg/L in October 2020, May 2021 and November 2021, respectively). These concentrations slightly exceeded the NEMP ecological guideline value for 99% species protection (0.00023 µg/L).

PFAS were detected at one other location, SW006, located along a tributary of Kangaroo Creek in the central eastern portion of the Base with sum of PFHxS and PFOS concentrations at 0.0017 µg/L and 0.0016 µg/L in October 2020 and May 2021 respectively.

The detectable PFAS concentrations along Kangaroo and Snapper Creeks may indicate the potential for relatively minor source(s) of PFAS in the eastern portion of the Base. The presence of potential off-Base PFAS sources near Tin Can Bay including the waste transfer station, sewage treatment works and fire station, which are located on the eastern side of Snapper Creek, have the potential to contribute PFAS to the environment in the estuarine Snapper Creek system and the Ramsar area.

8.5 Surface water - Temporal Trends

Chart 2 shows the change in sum of PFHxS and PFOS concentration in surface water in the on-Base drainage features, on-Base creeks and off-Base dams and waterways. Only sampling locations that have recorded one or more detectable concentration have been included[1]. Overall, sum of PFHxS and PFOS concentrations are steady. Higher variability is present at SW019, which is a sampling location of ponded water along the western Base boundary with lower sum of PFHxS and PFOS concentrations detected in 2020 and 2021 compared to 2019.

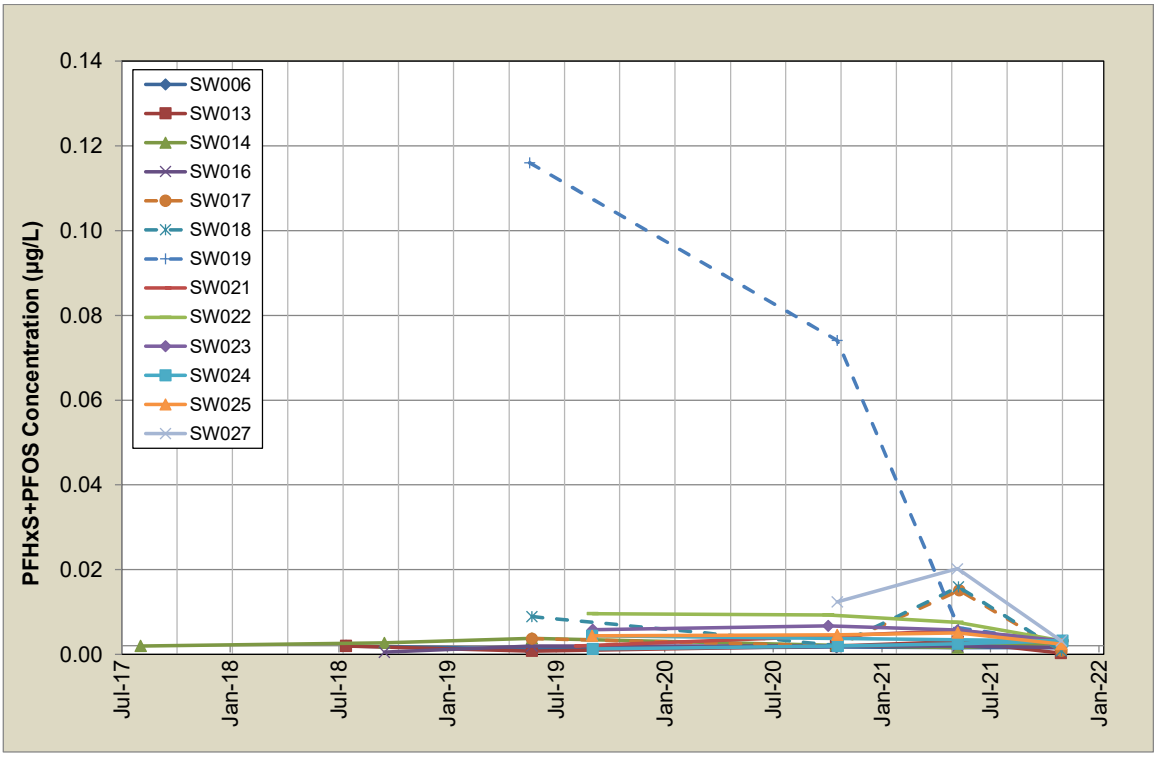


Chart 2 Sum of PFHxS and PFOS in selected sampling locations: 2017 to 2021

[1] As discussed in the DSI (AECOM, 2020), PFAS concentrations reported in a monitoring event conducted in March 2017 by a Defence contractor (Golder, 2017) have been discounted as they are considered anomalous and not representative of PFAS concentrations. Only results obtained during the environmental investigations (AECOM, 2019, AECOM, 2020) and OMP sampling events (AECOM, 2021b,c) have been considered.

8.6 Groundwater and Surface Water Geochemistry

A piper plot showing major ion results in groundwater and surface water from the WBTA Management Area in October 2020 is presented in **Chart 3**. The chart indicates that the groundwater and surface water samples are geochemically similar. The samples have a low salt content with sodium chloride the main type present. This is consistent with the findings of the DSI report (AECOM, 2020).

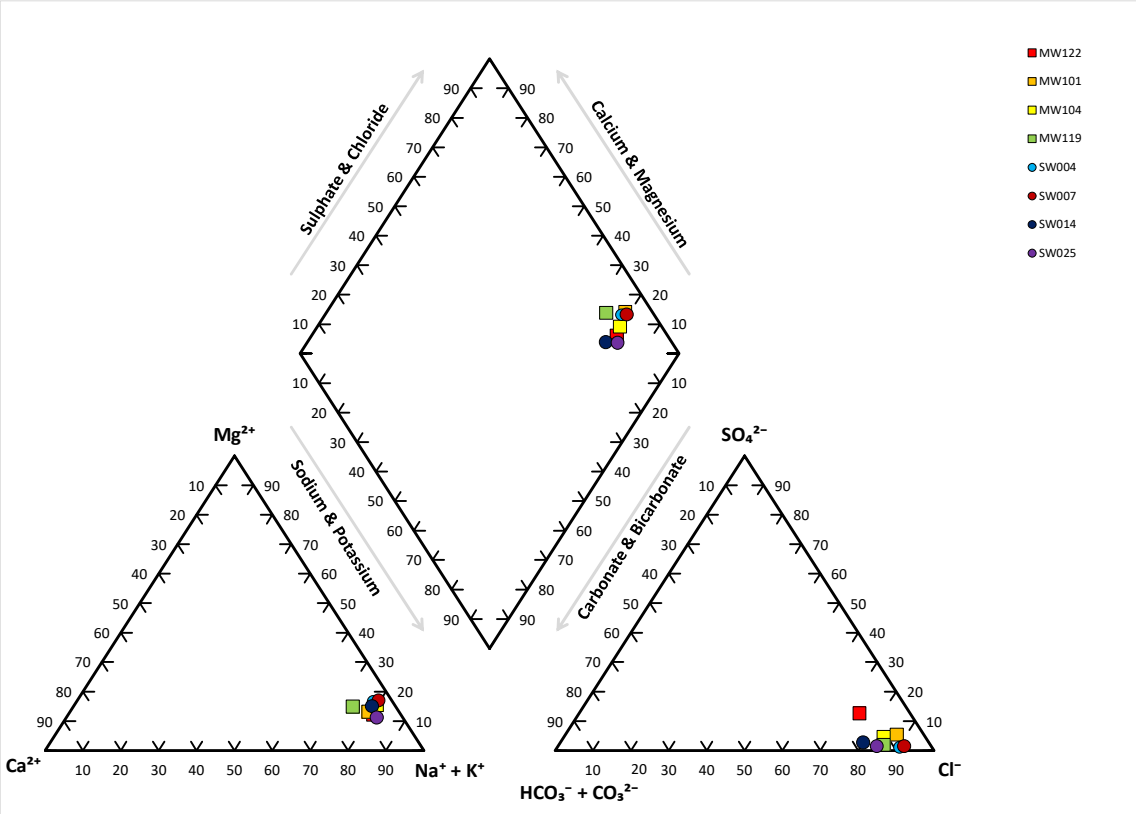


Chart 3 Piper plot of major ions in groundwater and surface water in October 2020

8.7 Sediment Results

8.7.1 Sediment results since 2017

For the period 2017 to 2021, seven sediment samples out of a total of 40 samples analysed have reported detectable concentrations of PFAS. The highest sum of PFHxS and PFOS concentration reported for sediment samples was 0.0012 mg/kg in an off-Base dam (SD021). A summary of sum of PFHxS and PFOS results for the different surface water features for the period 2018 to 2021 is shown in **Table 13**. Sum of PFHxS and PFOS concentrations in sediment samples in May 2021 are presented in **Figure 14**, **Appendix A**.

Table 13 Summary of Sediment Results: 2017 to 2021

Location	2017 to 2021		No. of samples exceeding the limit of reporting
	No. of samples	Range of sum of PFHxS+PFOS (mg/kg)	
On-Base Drainage Channels (Camp Kerr)	4	<0.0002 to 0.0008	1
Off-Base dams / waterways	7	<0.0002 to 0.0012	3
On-Base Creeks	29	<0.002 to 0.0003	2

9.0 Conceptual Site Model

The CSM was developed during the investigation stages (AECOM, 2020) and summarises the linkages between the sources, exposure pathways and receptors.

The three OMP sampling events completed since the DSI have provided additional data to further understand the changing conditions (concentration and shape) of the area of groundwater impacted by PFAS in the WBTA Management Area.

The data presented in this report on the PFAS primary and secondary sources, pathways and receptors does not change the understanding of the CSM. Future monitoring will continue to contribute to an evaluation of any potential change to the CSM understanding.

10.0 Discussion

10.1 Risk Profile

The data collected during the OMP over the monitoring period suggest that the risk profile to human health within the WBTA Management Area is unchanged, based on the following conclusions of the data assessment:

- The extent of PFAS in groundwater is similar to that presented in the DSI (AECOM, 2020).
- PFAS analytical results for individual wells are in accordance with historical ranges, in particular there have been no new detections of sum of PFHxS and PFOS and PFOA in wells within the Management Area. There were no first-time detections or exceedances of the groundwater human health guideline values.
- PFAS concentrations in surface water locations were generally similar to previous (historical) results. There was a first-time PFAS detection in a surface water sample from an off-Base dam in October 2020, which exceeded the PFOS ecological guideline value. PFAS has been previously detected in upstream and downstream locations. There were no first-time detections in the other sampling locations and no exceedances of human health guideline values during the monitoring period.
- No significant change was observed in PFAS concentration in off-Base sediment.

Based on the data, AECOM considers that the conclusions made regarding risk in the DSI (AECOM, 2020) are unchanged.

10.2 Triggers for OMP Review

Following a review of data collected during the current monitoring period, there has been no significant change to the understanding of risks associated with PFAS in the WBTA Management Area, spatial distribution of PFAS and the need for monitoring of additional media. Furthermore, there have been no changes in land use.

Due to the number of sample locations that have reported non-detection of PFAS in groundwater and surface water during the monitoring period, it is considered that there is scope to change or refine the monitoring network and frequency so the sampling program is targeted on the areas consistently reporting PFAS detections. This triggers the requirement to complete a review of the OMP.

11.0 Conclusions

Groundwater, surface water and sediment sampling was completed as part of the OMP between October 2020 and November 2021.

Concentrations of PFAS in groundwater were consistent with historical results. In particular:

- Elevated PFAS concentrations (exceeding human health guideline values) were only detected at two monitoring wells (MW121 and MW122) in the eastern portion of Camp Kerr close to the Base entrance road. The localised lateral extent of PFAS in this area is understood.
- In the western portion of Camp Kerr, the non-detection of PFAS in six of seven groundwater samples collected from monitoring wells indicates a low potential for off-Base migration of PFAS via a groundwater pathway between the Base and groundwater users in Wallu. The single off-Base detection (close to the limit of reporting) was in a monitoring well adjacent to the southern boundary (MW118). In November 2021, PFAS was not detected above the limit of reporting at MW118. The off-Base PFAS groundwater concentrations continue to remain below the HEPA (2020) drinking water guideline values. The potential for a complete source-pathway-receptor linkage to off-Base groundwater users is considered unlikely, and further assessment of the risk to human health is not required at the present time.
- Consistent with the results of the DSI (AECOM, 2020), PFAS were not detected in groundwater samples from bores at other locations across the southern portion of the WBTA Management Area, located near landfilling areas, the airfield where refuelling activities occurred and where groundwater may discharge to surface water. This indicates source areas of PFAS are unlikely to be present in these areas.

Concentrations of PFAS in surface water and sediment were consistent with historical results.

- In Camp Kerr and Wallu area, PFAS were detected in on-Base drainage features and off-Base dams and ephemeral watercourses indicating a line of evidence for the presence of an overland flow pathway for PFAS in surface water on-Base to migrate to surface features in Wallu. Concentrations detected during the monitoring period did not exceed human health guideline values. Ecological guidelines for PFOS were exceeded for surface water samples from on-Base drainage features and off-Base dams. As concentrations were consistent with historical data, further assessment of the risk to aquatic ecosystems is not required.
- Three surface water samples collected from tributaries of Kangaroo and Snapper Creeks in the southern portion of the Base reported detectable concentrations of PFOS in the monitoring period, which exceeded the ecological guideline for freshwater 99% species protection. These concentrations may indicate the potential for relatively minor source(s) of PFAS in the eastern portion of the Base. The presence of potential off-Base PFAS sources near Tin Can Bay including the waste transfer station, sewage treatment works and fire station, which are located to the east of the eastern Base boundary are considered to have the potential to contribute PFAS to the environment in the estuarine Snapper Creek system and Ramsar area. PFAS concentrations in the downstream surface water samples in the western portion of WBTA were consistent with historical results reported in the DSI (AECOM, 2020). Further assessment of the risk to ecological receptors is not required at the present time.

The CSM for WBTA was reviewed and no changes were identified to sources, pathways or receptors. Based on the data, no changes to the risk profile are recommended.

Due to the number of sample locations that have reported non-detection of PFAS in groundwater and surface water during the monitoring period, it is considered that there is scope to refine the monitoring network and frequency so the sampling program is targeted on the areas consistently reporting PFAS detections. This triggers the requirement to complete a review of the OMP.

12.0 References

AECOM, 2019. *PFAS Preliminary Site Investigation, Wide Bay Training Area*, July 2019.

AECOM, 2020. *PFAS Detailed Site Investigation, Wide Bay Training Area*, September 2020.

AECOM, 2021a. *PFAS OMP – WBTA Sampling and Analysis Plan*, Rev 4, 2021.

AECOM, 2021b. *Sampling Event Factual Report October 2020 – PFAS OMP – Wide Bay Training Area*, 2021.

AECOM, 2021c. *Sampling Event Factual Report, May 2021 – PFAS OMP – Wide Bay Training Area*, 2021.

AECOM, 2022. *Sampling Event Factual Report, November 2021 – PFAS OMP – Wide Bay Training Area*, 2022.

Bureau of Meteorology (BOM), 2022, Monthly Rainfall - 140010 - Bureau of Meteorology (bom.gov.au).

Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018) at https://www.waterquality.gov.au/anz-guidelines/guideline-values/default

Australian Government, 2019. *National Health and Medical Research Council (2019), Guidance on Per and Polyfluoroalkyl substances in Recreational Water*.

Defence, 2020. *PFAS Management Area Plan*, September 2020.

Defence, 2021. *OMP Annual Interpretive Report Guidance,* v0.3, November 2021 (Defence, 2021).

Department of Environment and Science, *Environmental Protection Act 1994.*

Department of Environment and Science, 2020a *Wildlife Online Database of flora and fauna.*

Department of Environment and Science, 2020b. *WetlandInfo – online fauna and flora records the Brisbane drainage basin.*

Department of Environment and Heritage Protection, 2016. *Draft Climate change in the Wide Bay – Burnett Region*, 2016.

Department of Health, 2019. *Health Based Guidance Values for PFAS for use in site investigations in Australia.* September 2019.

FSANZ, 2017. *Perfluorinated chemicals in food.* Food Standards Australia New Zealand and associated supporting documents.

Golder Associates, 2017. *Development of Investigation Areas for PFAS Detailed Site Investigation* Golder Associates, 2017.

HEPA, 2020. *PFAS National Environment Management Plan*, v2, January 2020.

NEPC, 2013. *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013) (ASC NEPM)*, National Environment Protection Council (NEPC) 2013.

US EPA, 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4: EPA/240/B-06/001),* February 2006.

List of Appendices

Appendix A

Figures

Appendix A Figures

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\60580555 F2 Investigation Area 08 01 2020 TO Rev B

AECOM Imagine it. Delivered.

LOCATION OF WBTA AND MANAGEMENT AREA

Annual Interpretative Report - 2021 -
PFAS OMP - WBTA, Queensland

FIGURE 1

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\605805555\PMAP_Figure 3 Site Features 08/05/2020 JP Rev 1

AECOM Imagine it. Delivered.

Definitions
UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SITE FEATURES

Annual Interpretative Report - 2021 -
PFAS OMP - WBTA, Queensland

FIGURE 2

Pioneer Point Boat Ramp
Tin Can Bay
Inskip
Pannikin Island
UOTF/EHTA
Demolition Range
SW/SD012
Old Boat Ramp/Sentry Post
White Sloop Creek
Airstrip UAV
24m Tower
Wide Bay Training Area
SW/SD005
SW/SD008
Hospital Creek
Barlow Creek
Griffin Creek
Forward Operating Base
SW/SD009
Carlo Island
AGR/SGR/DFSW
SW/SD004
Kauri Creek
Saddle Point
Tin Can Inlet
Snapper Point
Smooger Point
Easy Feature/MUFP/MCR/BIF
Tin Can Bay
Tin Can Bay Waste Transfer Station and Sewage Treatment Works
Quarry
Ammunition Storage
MW110
MW109
SW/SD013
SW/SD014
Toolara
Maryborough - Cooloola Road
SW/SD007
Range/ECR
MW104
MW107
MW105
MW108
SW/SD006
MW103
Landfill 1
SW/SD016
Teewah Point
North Cooloola Point
Tin Can Bay Road
MW111
MW106
Area shown in Figure 4
Wallu
Wallu Heights
Rainbow Beach Road
Snapper Creek
Cooloola Cove
South Cooloola Point
Poverty Point

KEY
- Wide Bay Training Area
- Investigation Area
- Great Sandy Strait Ramsar
- Parks and recreation reserves
- Major road
- Road
- Watercourse
- Surface water sample location
- Groundwater monitoring well location

0 2km

G:\ENV\GIS\Projects\60560580555 Wide Bay Training Area\FIGURES\60560555 F5 Sample Locations (Greater WBTA) 08 01 2020 TO Rev B

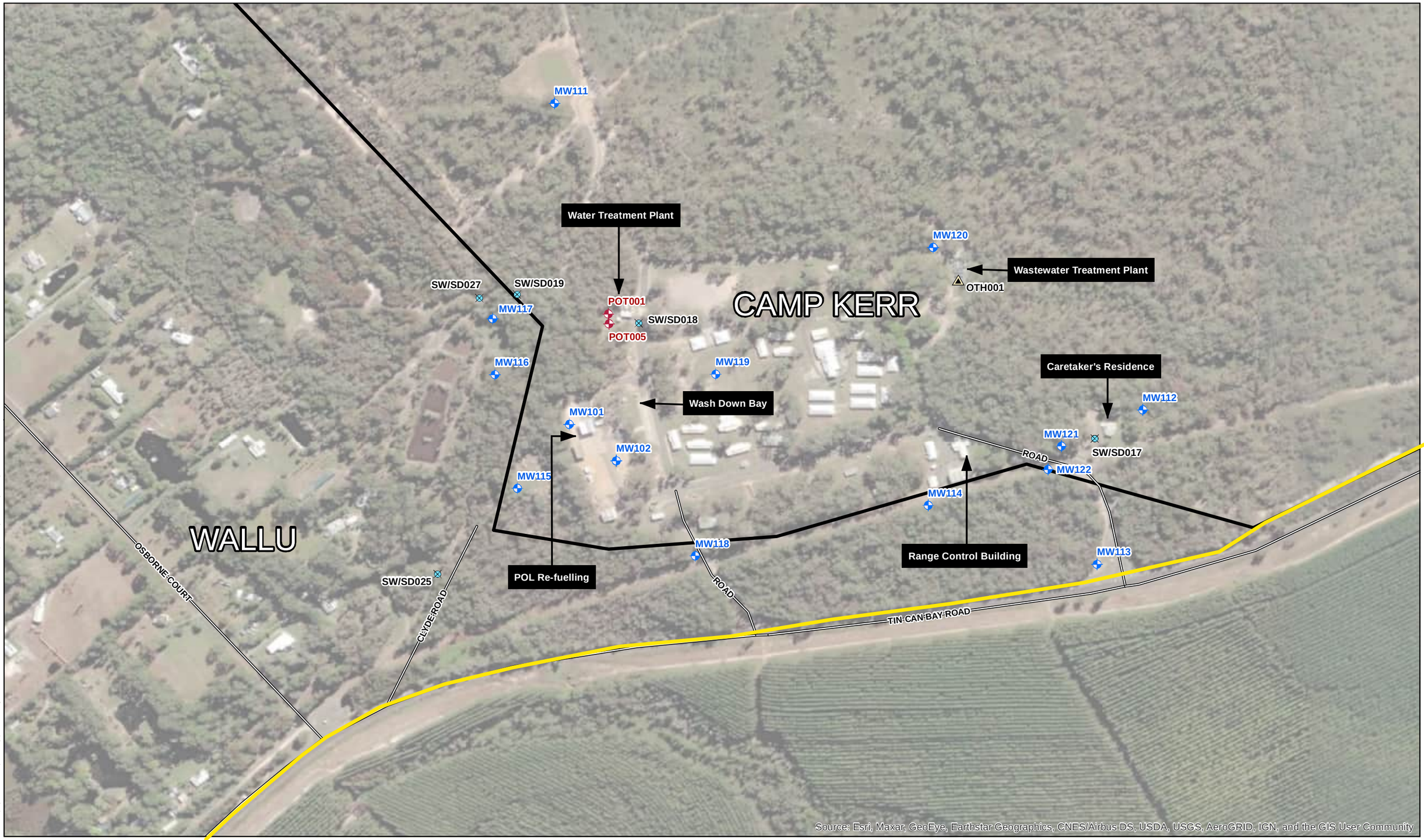
AECOM Imagine it. Delivered.

UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SAMPLING LOCATIONS (GREATER WIDE BAY TRAINING AREA)

Annual Interpretative Report - 2021 -
PFAS OMP - WBTA, Queensland

FIGURE 3



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX

0 50 100 200

metres

1:4,500 (when printed at A3)

LEGEND

- Waste Water Treatment Plant Sampling Location
- Abstraction Bore
- Groundwater sampling location
- Sediment / surface water sampling location
- Road
- WBTA Property Boundary
- WBTA Management Area

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Annual Interpretative Report - 2021 - PFAS OMP - WBTA, Queensland

SAMPLING LOCATIONS (CAMP KERR)

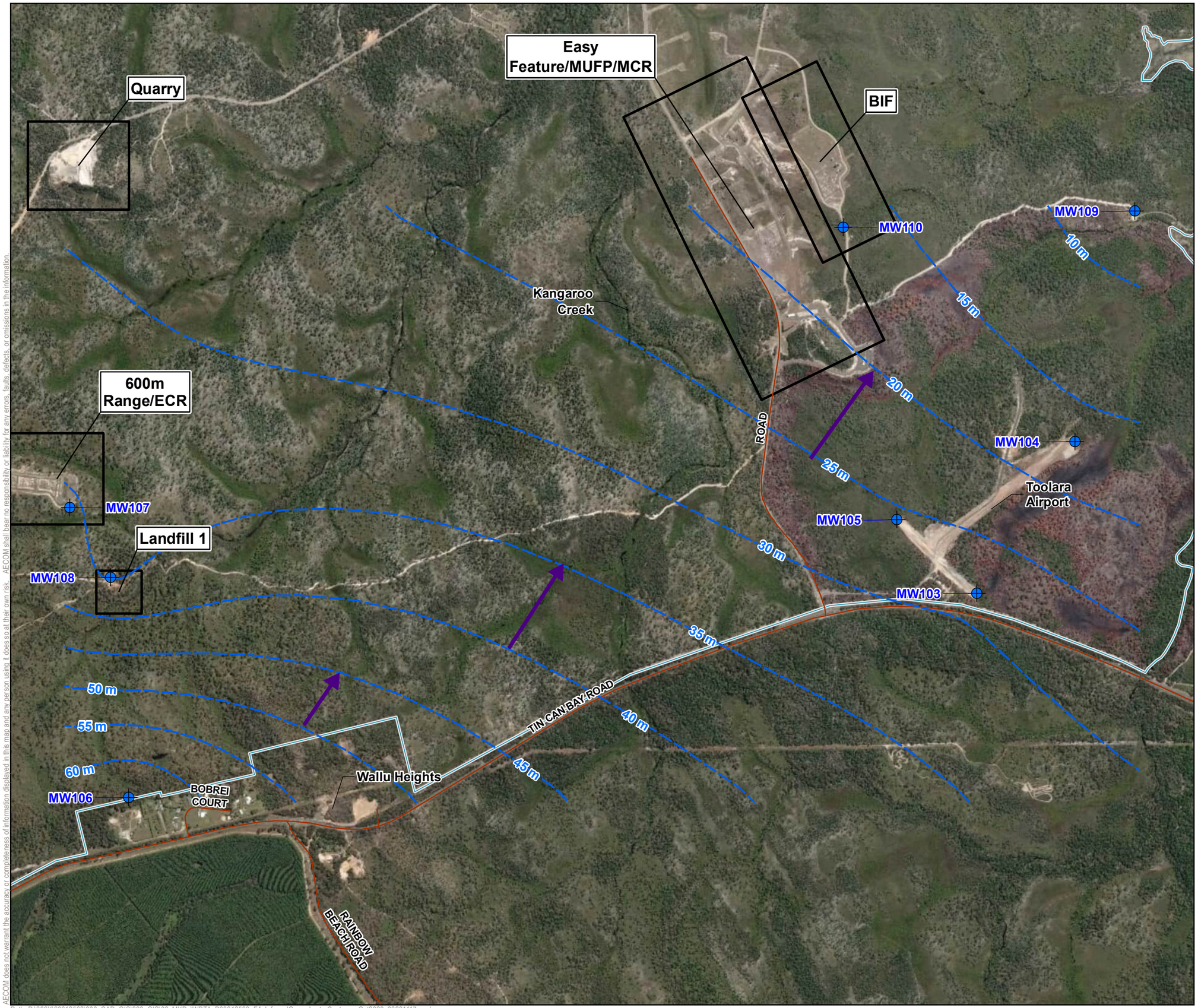
PROJECT ID	60612563
CREATED BY	PeacheyJ
LAST MODIFIED	SCS- 25/06/21
VERSION:	1

Figure

4

A3 size

Filename:\\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\20200817_JP_OMP_AnnualInterpretativeReport2020_PFAS_AACO\WBTA_P60612563_F3_OMP_Sampling_Locations_CampKerr_20210624 v3.mxd



Path: P:\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\WBTA_P60612563_F4_InferredGroundwaterContours_Oct2020_20201117.mxd

LEGEND

- Groundwater Well Location
- Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction
- Wide Bay Site Features
- Wide Bay Training Area

Groundwater data were collected between 28 and 30 October 2020

N

0 0.15 0.3 0.6 km

AECOM

SCALE 1:16,918

SIZE A3

SHEET **1 of 1**

COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

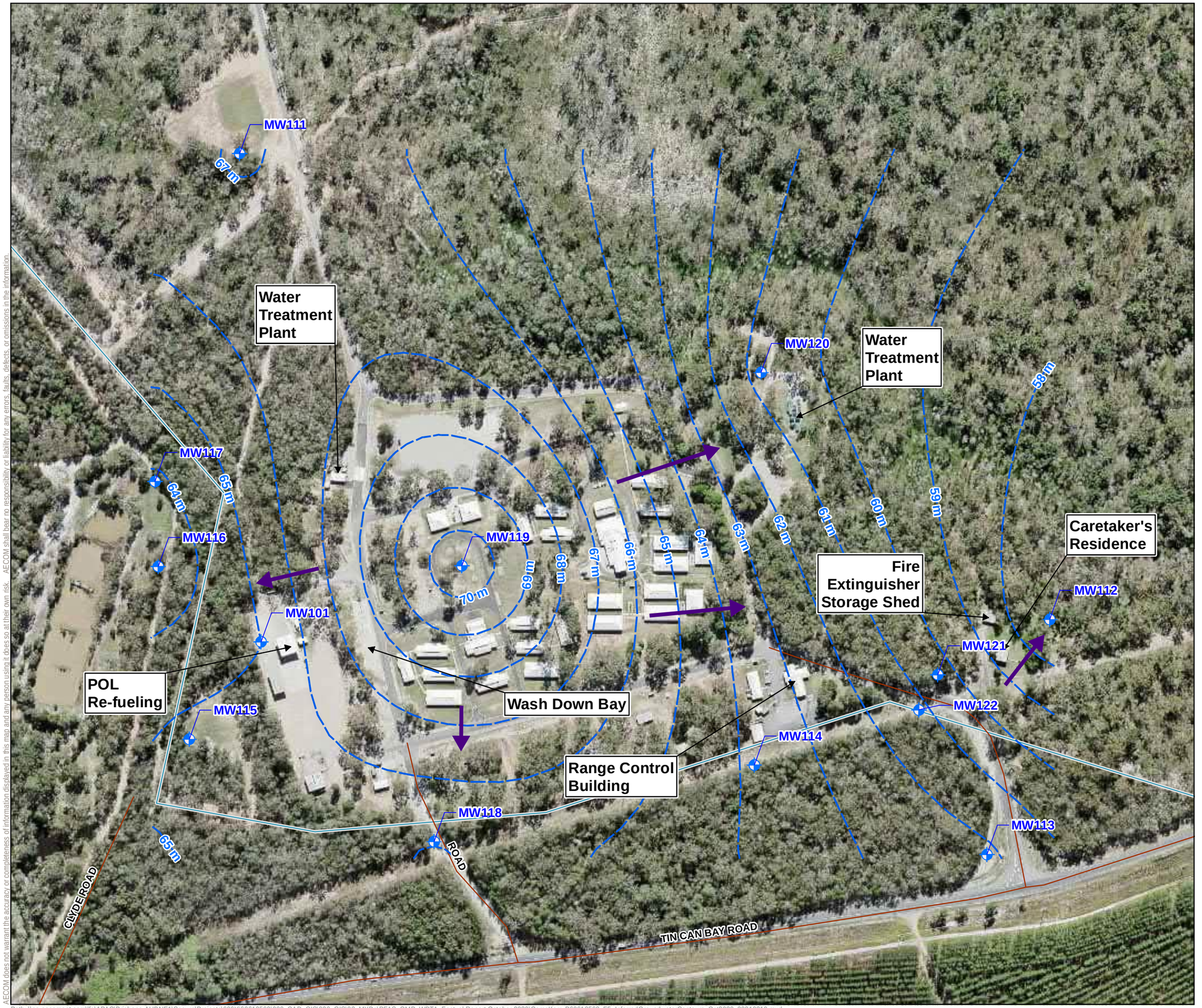
Figure 5: Inferred Groundwater Contours, Greater WBTA: October 2020

PROJECT

Annual Interpretative Report - 2021 - PFAS OMP - WBTA, Queensland

CLIENT

DEPARTMENT OF DEFENCE



LEGEND

- Monitoring Wells
- Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction
- Roads
- Wide Bay Training Area

Groundwater elevation data were collected between 28 and 29 October 2020

Meters
0 25 50 100

AECOM

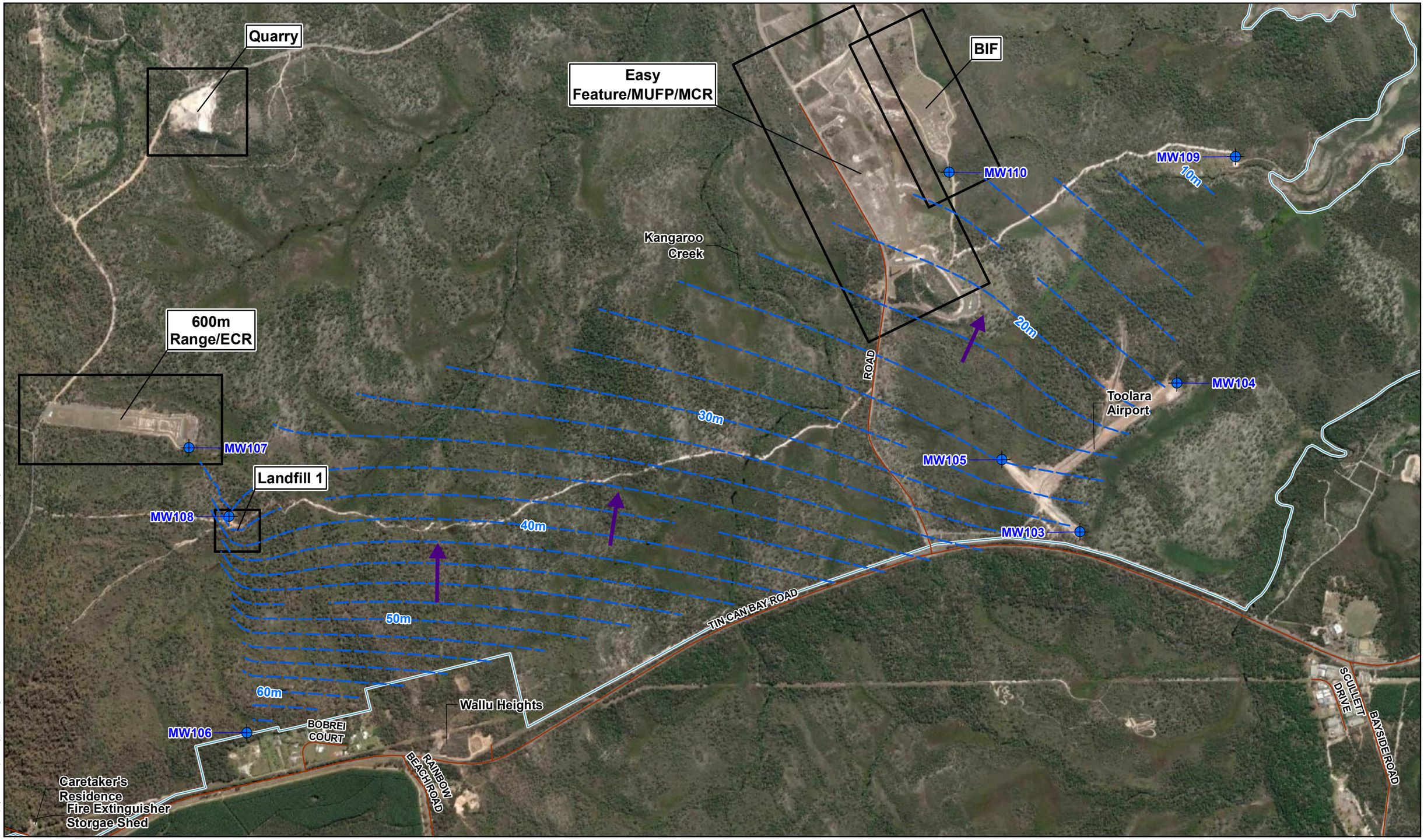
SCALE 1:3,000
SIZE A3
SHEET 1 of 1
COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE
Figure 6: Inferred Groundwater Contours, Camp Kerr: October 2020

PROJECT
Annual Interpretative Report - 2021 - PFAS OMP - WBTA, Queensland

CLIENT
DEPARTMENT OF DEFENCE

Path: \\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_Factual Report October 2020\CampKerr_P60612563_F5_InferredGroundwaterContours_Oct2020_20210210.mxd



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX.

0 200 400 800

metres

1:16,918 (when printed at A3)

LEGEND

- Groundwater Well Location
- Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction
- Wide Bay Site Features
- Wide Bay Training Area

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Annual Interpretative Report - 2021 - PFAS OMP - WBTA, Queensland

INFERRED GROUNDWATER CONTOURS, GREATER WBTA, MAY 2021

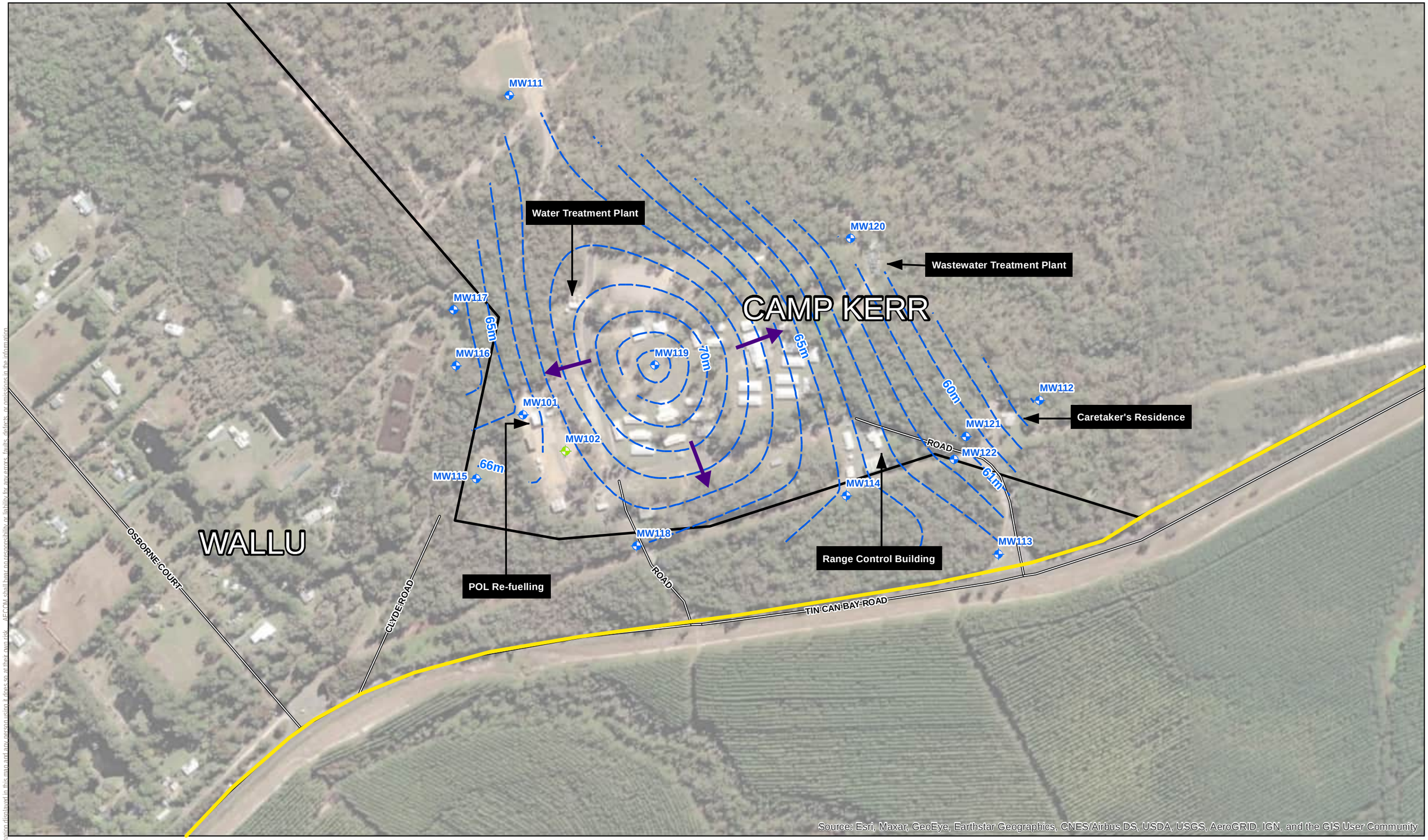
PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	SCS- 28/06/21
VERSION:	1

Figure

7

Filename:L:\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_Report May 2021\WBTA_P60612563_F4_InferredGroundwaterContours_May2021_20210624.mxd

A3 size



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX

0 50 100 200

metres

1:4,500 (when printed at A3)

LEGEND

- Groundwater sampling location not accessible
- Groundwater sampling location
- Road
- WBTA Property Boundary
- WBTA Management Area
- Inferred Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Annual Interpretative Report - 2021 - PFAS OMP - WBTA, Queensland

INFERRED GROUNDWATER CONTOURS (CAMP KERR) MAY 2021

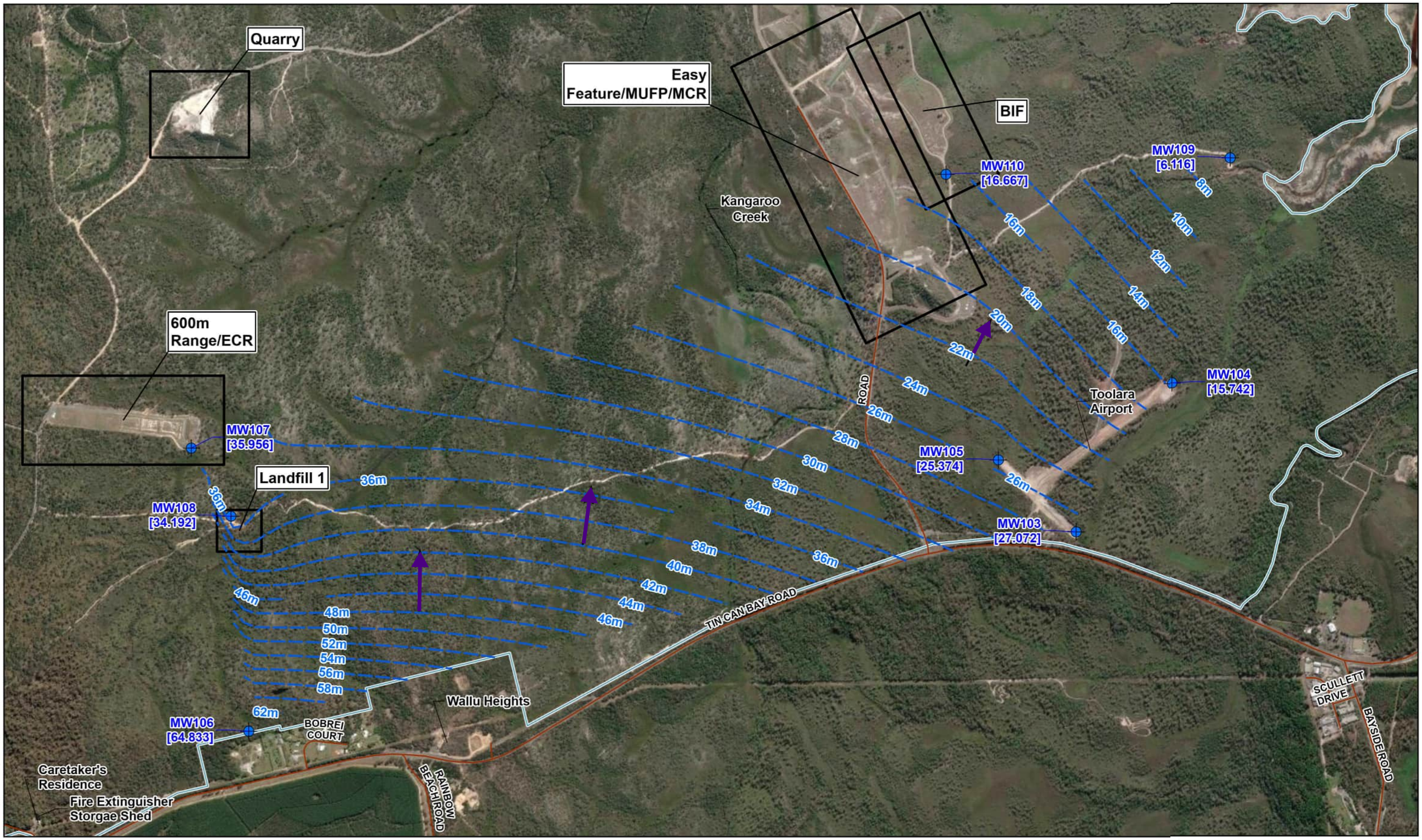
PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	SCS- 26/06/21
VERSION:	1

Figure

8

A3 size

Filename:\\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\20200817_JP_OMP_AnnualInterpretativeReport2020_PFAS_AACO\WBTA_P60612563_F5_OMP_InferredGWcontours_CampKerr_20210625v3.mxd



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX.

0 200 400 800

metres

1:17,000 (when printed at A3)

LEGEND

- Groundwater Well Location
- Groundwater Contours
- Inferred Groundwater Flow Direction
- Groundwater Contours
- Inferred Groundwater Flow Direction
- Wide Bay Site Features
- Wide Bay Training Area

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Annual Interpretative Report - 2021 - PFAS OMP - WBTA, Queensland

INFERRED GROUNDWATER CONTOURS, GREATER WBTA

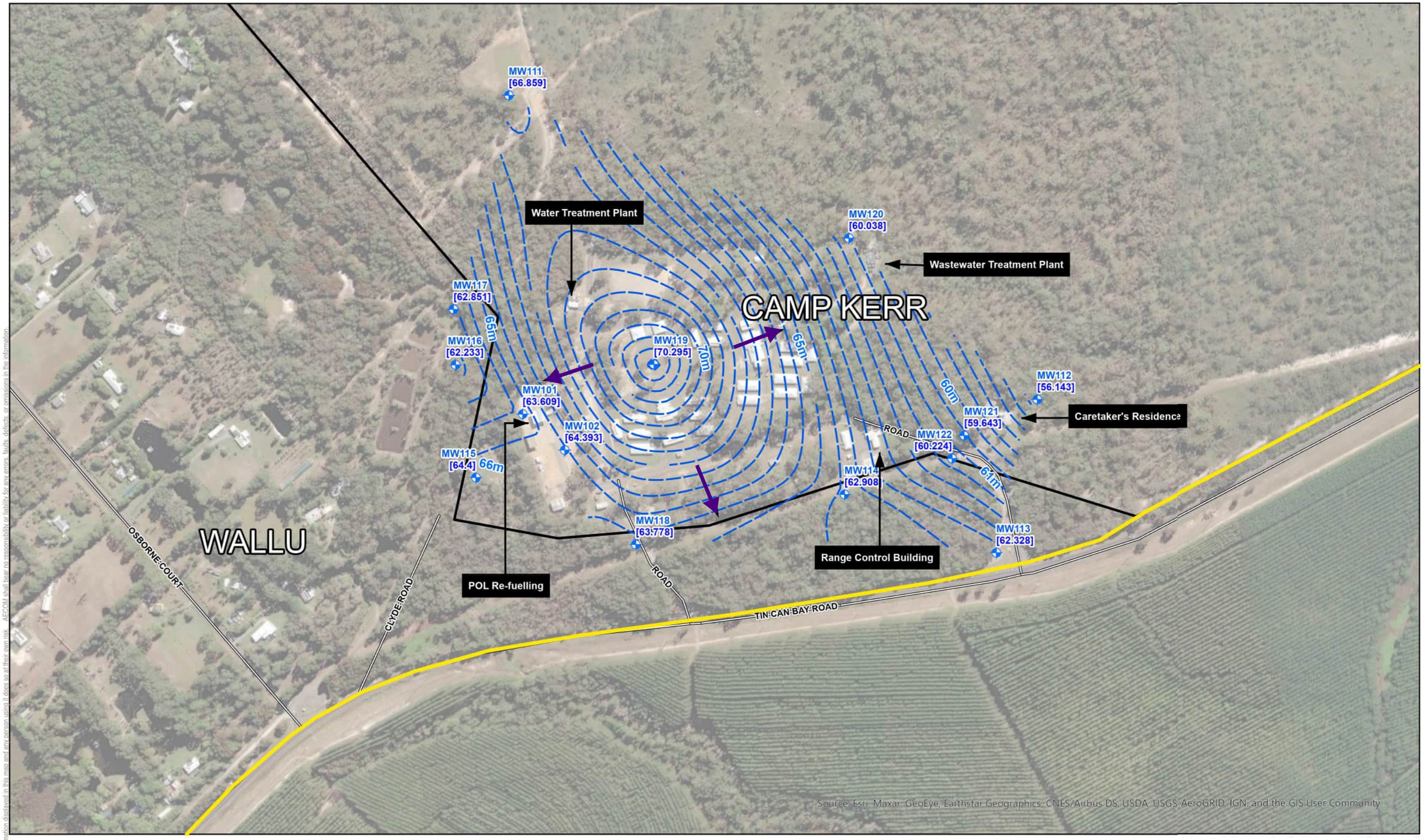
November 2021

PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	ScottA3- 01/12/21
VERSION:	2

Figure 9

A3 size

Filename:L:\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_AnnualInterpretative Report October 2021\WBTA_AnnualInterpretativeReport_Oct2021.aprx



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX

0 55 110 220

metres

1:4,500 (when printed at A3)

LEGEND

- Groundwater sampling location
- Road
- WBTA Property Boundary
- WBTA Management Area
- Inferred Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Annual Interpretative Report - 2021 - PFAS OMP - WBTA, Queensland

INFERRED GROUNDWATER CONTOURS (CAMP KERR)

November 2021

PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	ScottA3- 02/12/21
VERSION:	2

Figure 10

A3 size

Filename:L:\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_AnnualInterpretative Report October 2021\WBTA_AnnualInterpretativeReport_Oct2021.aprx

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\605805555\PMAP Figure 4 Sum of PFHxS and PFOS 08/05/2020 JP Rev 1

AECOM Imagine it. Delivered.

Definitions
UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SUM OF PFHxS AND PFOS IN GROUNDWATER AND SURFACE WATER OCTOBER 2020

Annual Interpretative Report - 2021 -
PFAS OMP - WBTA, Queensland

FIGURE 11

G:\ENV\GIS\Projects\605\60580555\Wide Bay Training Area\FIGURES\605805555PMAP Figure 4 Sum of PFHxS and PFOS 08/05/2020 JP Rev 1

AECOM Imagine it. Delivered.

Definitions
UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SUM OF PFHxS AND PFOS IN GROUNDWATER AND SURFACE WATER MAY 2021

Annual Interpretative Report - 2021 -
PFAS OMP - WBTA, Queensland

FIGURE 12

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\605805555\PMAP Figure 4 Sum of PFHxS and PFOS 08/05/2020 JP Rev 1

AECOM Imagine it. Delivered.

Definitions
UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SUM OF PFHxS AND PFOS IN GROUNDWATER AND SURFACE WATER NOVEMBER 2021

Annual Interpretative Report - 2021 -
PFAS OMP - WBTA, Queensland

FIGURE 13

Wide Bay Training Area

Pioneer Point Boat Ramp

UOTF/EHTA

Demolition Range

Old Boat Ramp/Sentry Post

Airstrip UAV

24m Tower

Forward Operating Base

AGR/SGR/DFSW

Quarry

Easy Feature/MUFP/MCR/BIF

Ammunition Storage

600m Range/ECR

Landfill 1

Tin Can Bay Waste Transfer Station and Sewage Treatment Works

SEE INSET

Tin Can Bay

Inskip

Toolara

Wallu

Wallu Heights

Cooloola Cove

TOOLARA STATE FOREST

Tin Can Bay
Inlet

Little Stony Creek

Mexmite Creek

Teelaw Creek

Griffin Creek

Kauri Creek

Kangaroo Creek

Snapper Creek

Tamarind Waterway

Maryborough - Cooloola Road

Tin Can Bay Road

Rainbow Beach Road

Pannikin Island

Carlo Island

Carlo Point

Snapper Point

Smooger Point

Teewah Point

North Cooloola Point

South Cooloola Point

Poverty Point

TOOLARA GOLF COURSE

TOOLARA AIRPORT

CARAVAN PARK

KEY

- Wide Bay Training Area
- Management Area
- Major road
- Road
- Watercourse

Sediment Analytical Results - PFOS + PFHxS (mg/kg)

- >0.07
- LOR - 0.07
- <LOR

0 2km

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\605805555\PMAP Figure 4 Sum of PFHxS and PFOS 08/05/2020 JP Rev 1

AECOM Imagine it. Delivered.

Definitions
UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SUM OF PFHxS AND PFOS IN SEDIMENT MAY 2021

Annual Interpretative Report - 2021 -
PFAS OMP - WBTA, Queensland

FIGURE 14

Appendix B

Tables

Appendix B Tables

Well ID	Sample Date	Screened Interval depth (mbgs)	Depth to Water (mbtoc)	TOC Elevation (mAHD)	Groundwater Elevation (mAHD)	Well Depth (mbtoc)	Condition of Stand up cover / Gatic	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Water Colour	Odour	Sheen	Sample Method / Comments
MW101	29/10/2020	11 to 15	16.06	14.324	79.264	64.940	Good	1.47	167	4.53	205.1	410.1	24.2	Medium	Other	No odour	No sheen	Hydrasleeve
MW101	20/05/2021	11 - 15	16.2	14.112	79.264	65.152	Good	1.92	133	4.3	239	444	21.6	Clear	Clear	No odour	No sheen	Hydrasleeve
MW101	10/11/2021	11 - 15	15.655	79.264	63.609	16.08	Good	2.38	140	6.74	102.5	307.5	23.7	Turbid	Red	No odour	No sheen	Hydrasleeve
MW102	28/10/2020	14 to 20	-	-	78.564	-	Not found	-	-	-	-	-	-	-	-	-	-	Unable to be located
MW102	21/05/2021	14-20	-	-	78.564	-	Not found	-	-	-	-	-	-	-	-	-	-	Unable to be located
MW102	09/11/2021	14-20	14.171	78.564	64.393	19.91	Good	1.86	114.7	7.19	95.1	300.1	24.3	Clear	Clear	No odour	No sheen	Hydrasleeve
MW103	30/10/2020	7.5 to 10.5	11.63	4.232	33.239	29.007	Good	3.2	157	5.58	157.8	362.8	23.5	Low	Clear	No odour	No sheen	Hydrasleeve
MW103	19/05/2021	7.5 - 10.5	10.85	2.958	33.239	30.281	Good	4.52	94.8	5.77	200.6	405.6	23.4	Clear	Clear	No odour	No sheen	Hydrasleeve
MW103	09/11/2021	7.5 - 10.5	6.167	33.239	27.072	11.6	Good	3.93	119.3	8.01	105.1	310.1	23.8	Low	Clear	No odour	No sheen	Hydrasleeve
MW104	30/10/2020	8 to 11	12.045	4.332	20.815	16.483	Good	2.04	154.9	5.04	178	383	24.8	Low	Clear	No odour	No sheen	Hydrasleeve
MW104	19/05/2021	8 - 11	10.84	3.468	20.815	17.347	Good	2.39	112.9	5.68	213	418	24.8	Clear	Clear	No odour	No sheen	Hydrasleeve
MW104	09/11/2021	8 - 11	5.073	20.815	15.742	12.035	Good	2.35	127.8	4.33	107.4	312.4	24.7	Low	Clear	No odour	No sheen	Hydrasleeve
MW105	30/10/2020	4.2 to 7.2	8.33	1.987	27.603	25.616	Good	0.3	611	5.97	121.4	326.4	23.1	Clear	Clear	No odour	No sheen	Hydrasleeve
MW105	20/05/2021	4.2 - 7.2	8.38	1.845	27.603	25.758	Good	1.76	541	6.18	169	374	22.5	Clear	Clear	No odour	No sheen	Hydrasleeve
MW105	09/11/2021	4.2 - 7.2	2.229	27.603	25.374	8.35	Good	0.14	659	9.44	85	290	23.4	Low	Clear	No odour	No sheen	Hydrasleeve
MW106	29/10/2020	4 to 10	11.095	4.101	69.468	65.367	Good	2.5	126.3	4.47	239	444	21.1	Medium	Other	No odour	No sheen	Hydrasleeve
MW106	20/05/2021	4 - 10	10.08	3.707	69.468	65.761	Good	4	81.1	4.26	284	489	21.9	Clear	Clear	No odour	No sheen	Hydrasleeve
MW106	09/11/2021	4 - 10	4.635	69.468	64.833	11.05	Good	2.94	90.7	7.95	146.7	351.7	22.4	Medium	Light brown	No odour	No sheen	Hydrasleeve
MW107	29/10/2020	2.8 to 5.8	6.8	2.165	37.789	35.624	Good	0.55	215.3	4.82	231.4	436.4	24.7	Clear	Clear	No odour	No sheen	Hydrasleeve
MW107	20/05/2021	2.8 - 5.8	5.66	1.813	37.789	35.976	Good	1.2	195	5.54	161	366	23.2	Clear	Clear	No odour	No sheen	Hydrasleeve
MW107	09/11/2021	2.8 - 5.8	1.833	37.789	35.956	6.31	Good	0.83	214.8	4.87	68.9	273.9	26.8	Low	Clear	No odour	No sheen	Hydrasleeve
MW108	29/10/2020	14.5 to 17.5	18.48	5.935	39.99	34.055	Good	0.36	517	6.34	157	362	24.9	Clear	Clear	No odour	No sheen	Hydrasleeve
MW108	20/05/2021	14.5 - 17.5	17.85	4.005	39.99	35.985	Good	0.38	448	6.94	-149	56	22.1	Clear	Clear	No odour	No sheen	Hydrasleeve
MW108	09/11/2021	14.5 - 17.5	5.798	39.99	34.192	18.475	Good	0.62	543	14.3	-15.6	189.4	23.7	Low	Light grey	No odour	No sheen	Hydrasleeve
MW109	28/10/2020	7 to 10	11.07	1.829	9.207	7.378	Good	0.34	214.5	5.6	159.3	364.3	22.8	Low	Other	No odour	No sheen	Hydrasleeve
MW109	19/05/2021	7 - 10	9.97	1.075	9.207	8.132	Good	0.55	292.3	7.1	116.5	321.5	21.8	Clear	Light Brown	No odour	No sheen	Hydrasleeve
MW109	08/11/2021	7 - 10	3.091	9.207	6.116	11.06	Good	0.89	180.6	6.73	75.9	280.9	23.6	Low	Clear	No odour	No sheen	Hydrasleeve
MW110	28/10/2020	0.5 to 4	4.54	1.043	17.967	16.924	Good	1.37	256.1	5.68	155.2	360.2	22.6	Low	Other	No odour	No sheen	Hydrasleeve
MW110	19/05/2021	0.5 - 4	3.45	1.17	17.967	16.797	Good	1.83	208.3	5.69	238	443	21.7	Clear	Clear	No odour	No sheen	Hydrasleeve
MW110	08/11/2021	0.5 - 4	1.29	17.967	16.677	4.535	Good	1.85	146.7	3.64	172.2	377.2	24.2	Low	Clear	No odour	No sheen	Hydrasleeve
MW111	29/10/2020	16.5 to 20.5	21.52	11.806	78.952	67.146	Good	0.16	256.9	5.41	167.2	372.2	24.3	Clear	Clear	No odour	No sheen	Hydrasleeve
MW111	20/05/2021	16.5 - 20.5	20.8	11.383	78.952	67.569	Good	0.77	229.5	6.23	-102	103	21.4	Clear	Clear	No odour	No sheen	Hydrasleeve
MW111	09/11/2021	16.5 - 20.5	12.093	78.952	66.859	21.535	Good	0.79	235.3	8.08	118.2	323.2	22.5	Low	Clear	No odour	No sheen	Hydrasleeve
MW112	29/10/2020	6 to 9	9.86	8.188	65.183	56.995	Good	0.63	155	4.53	230.5	435.5	22.7	Medium	Yellow / Brown	No odour	No sheen	Hydrasleeve
MW112	20/05/2021	6 - 9	8.865	8.504	65.183	56.679	Good	2.02	157	5.51	212	417	21.2	Clear	Clear	No odour	No sheen	Hydrasleeve
MW112	10/11/2021	6 - 9	9.04	65.183	56.143	9.87	Good	0.53	146.2	12.2	142	347	22.7	Turbid	Yellow / brown	No odour	No sheen	Hydrasleeve.
MW113	28/10/2020	6 to 9	9.07	5.496	67.717	62.221	Good	1.32	161.1	4.67	218.4	423.4	22.4	Clear	Clear	No odour	No sheen	Hydrasleeve
MW113	21/05/2021	6 - 9	7.81	4.298	67.717	63.419	Good	1.5	167	5.59	195	400	23.6	Clear	Clear	No odour	No sheen	Hydrasleeve
MW113	10/11/2021	6 - 9	5.389	67.717	62.328	9.015	Good	1.14	131.8	9.33	66	271	23.6	Low	Clear	No odour	No sheen	Hydrasleeve
MW114	28/10/2020	8.5 to 11.5	12.505	9.2	73.016	63.816	Good	2.54	93.2	4.66	221	426	22.4	Clear	Clear	No odour	No sheen	Hydrasleeve
MW114	21/05/2021	8.5 - 11.5	11.41	8.156	73.016	64.860	Good	2.34	67.3	4.9	230	435	24.3	Clear	Clear	No odour	No sheen	Hydrasleeve
MW114	10/11/2021	8.5 - 11.5	10.108	73.016	62.908	12.52	Good	1.91	53.9	8.29	76.8	281.8	24	Low	Clear	No odour	No sheen	Hydrasleeve
MW115	29/10/2020	13 to 16	17.045	11.3	76.659	65.359	Good	0.39	188.2	5.07	162.4	367.4	23.9	Low	Clear	No odour	No sheen	Hydrasleeve
MW115	20/05/2021	13 - 16	16.05	10.356	76.659	66.303	Good	0.69	133	4.97	227.2	432.2	22	Clear	Clear	No odour	No sheen	Hydrasleeve
MW115	10/11/2021	13 - 16	12.259	76.659	64.400	17.065	Good	0.89	146.8	9.76	126.6	331.6	23.8	Medium	Yellow / brown	No odour	No sheen	Hydrasleeve
MW116	28/10/2020	8 to 11	11.77	6.543	69.815	63.272	Good	0.72	444	6.18	136	341	23.5	Clear	Clear	No odour	No sheen	Hydrasleeve
MW116	19/05/2021	8 - 11	10.74	6.695	69.815	63.120	Good	0.6	394	6.07	138	343	21.9	Clear	Clear	No odour	No sheen	Hydrasleeve
MW116	10/11/2021	8 - 11	7.582	69.815	62.233	11.795	Good	0.63	468	9.53	11.6	216.6	23.1	Medium	Light yellow	No odour	No sheen	Hydrasleeve
MW117	28/10/2020	7 to 10	11.02	5.129	68.914	63.785	Good	0.98	450	6.11	129.6	334.6	24.5	Low	Light brown	No odour	No sheen	Hydrasleeve
MW117	18/05/2021	7 - 10	11.02	5.57	68.914	63.344	Good	1.85	379	6.34	20.5	225.5	19.6	Medium	Light Brown	No odour	No sheen	Hydrasleeve
MW117	10/11/2021	7 - 10	6.063	68.914	62.851	11.01	Good	0.83	454.8	9.72	12.7	217.7	22.1	Medium	Yellow / brown	No odour	No sheen	Hydrasleeve
MW118	28/10/2020	10 to 13	13.69	11.165	76.154	64.989	Good	3.71	144.5	4.84	187.3	392.3	22.7	Low	Clear	No odour	No sheen	Hydrasleeve
MW118	21/05/2021	10 - 13	12.35	10.139	76.154	66.015	Good	3.14	94	4.67	252	457	22.1	Clear	Clear	No odour	No sheen	Hydrasleeve
MW118	10/11/2021	10 - 13	12.376	76.154	63.778	13.59	Good	2.56	114.1	8.25	74.4	279.4	23.7	Medium	Pale red	No odour	No sheen	Hydrasleeve
MW119	29/10/2020	13 to 16	15.765	8.546	79.546	71.000	Good	2.68	269.5	5.09	167.1	372.1	25.1	Low	Clear	No odour	No sheen	Hydrasleeve
MW119	20/05/2021	13 - 16	14.8	6.625	79.546	72.921	Good	1.78	207	4.63	260	465	23.6	Clear	Clear	No odour	No sheen	Hydrasleeve
MW119	10/11/2021	13 - 16	9.251	79.546	70.295	15.76	Good	2.74	227	9.28	125.1	330.1	24.2	Medium	Other	No odour	No sheen	Hydrasleeve
MW120	29/10/2020	Not known	13.735	10.745	71.332	60.587	Good	0.76	177.3	4.37	213.4	418.4	25	Clear	Clear	No odour	No sheen	Hydrasleeve
MW120	20/05/2021	Not known	13.85	10.727	71.332	60.605	Good	0.93	237	4.81	228	433	21	Clear	Clear	No odour	No sheen	Hydrasleeve
MW120	09/11/2021	Not known	11.294	71.332	60.038	14.5	Good	0.82	216.6	6.78	63.2	268.2	22.9	Clear	Clear	No odour	No sheen	Hydrasleeve
MW121	29/10/2020	Not known	15.07	9.972	70.405	60.433	Good	1.05	140.5	4.69	199.3	404.3	23.4	Clear	Clear	No odour	No sheen	Hydrasleeve

Well ID	Sample Date	Screened Interval depth (mbgs)	Depth to Water (mbtoc)	TOC Elevation (mAHD)	Groundwater Elevation (mAHD)	Well Depth (mbtoc)	Condition of Stand up cover / Gatic	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Water Colour	Odour	Sheen	Sample Method / Comments
MW121	20/05/2021	Not known	15.2	9.72	70.405	60.685	Good	1.05	193	6.1	166	371	20.6	Clear	Clear	No odour	No sheen	Hydrasleeve
MW121	09/11/2021	Not known	10.762	70.405	59.643	14.4	Good	1.23	111.9	10.8	106.2	311.2	23.3	Clear	Clear	No odour	No sheen	Hydrasleeve
MW122	29/10/2020	Not known	20.1	9.373	70.575	61.202	Good	0.69	105.6	4.38	189.6	394.6	24.5	Medium	Other	No odour	No sheen	Hydrasleeve
MW122	20/05/2021	Not known	20.04	8.91	70.575	61.665	Good	0.85	69.4	4.84	230	435	21.5	Clear	Clear	No odour	No sheen	Hydrasleeve
MW122	09/11/2021	Not known	10.351	70.575	60.224	19.4	Good	0.96	74.9	8.17	73.9	278.9	24.2	Clear	Clear	No odour	No sheen	Hydrasleeve
POT001	28/10/2020	18 to 78.4	-	-	-	-	-	2.03	593	6.39	117.2	322.2	24.2	Clear	Clear	No odour	No sheen	Tap
POT001	20/05/2021	18 - 78.4	-	-	-	-	-	1.16	498	6.55	77	282	22.9	Clear	Clear	No odour	No sheen	Tap
POT001	10/11/2021	18 - 78.4	-	-	-	-	-	3.77	576	8.76	71.6	276.6	26.1	Clear	Clear	No odour	No sheen	Tap
POT005	28/10/2020	30 to 51.5	-	-	-	-	-	1.79	481.3	6.67	79.1	284.1	24.1	Clear	Clear	No odour	No sheen	Tap
POT005	20/05/2021	30 - 51.5	-	-	-	-	-	3.05	440	6.72	87	292	22.1	Clear	Clear	No odour	No sheen	Tap
POT005	10/11/2021	30 - 51.5	-	-	-	-	-	0.53	545	6.22	-3.4	201.6	27	Clear	Clear	No odour	No sheen	Tap

Notes
mbgs is metres below ground surface
mbtoc is metres below top of casing
mAHD is metres above Australian height datum
DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential
Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)
Temp is Temperature
µS/cm is microsiemens per centrimetre
ºC is degrees Celcius
mV is millivolts
` - No data

Location ID	Sample Date	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Odour	Sheen
SW004	27/10/2020	4.75	253.9	7.51	79.4	284.4	25.1	Clear	No odour	No sheen
SW004	19/05/2021	7.01	155.5	5.35	201	406	17.9	Clear	No odour	No sheen
SW004	10/11/2021	6.13	103.4	4.73	70.9	275.9	23.8	Medium	No odour	No sheen
SW005	27/10/2020	3.13	232.4	6.17	74.9	279.9	24.6	Clear	No odour	Slight organic sheen
SW005	19/05/2021	5.68	132.7	5.85	108.5	313.5	18.8	Clear	No odour	No sheen
SW005	11/11/2021	5.65	134	4.67	92.3	297.3	23.5	Low	No odour	No sheen
SW006	27/10/2020	4.56	202.8	6.33	120.4	325.4	24.9	Clear	No odour	Slight organic sheen
SW006	20/05/2021	3.07	86.7	5.89	140	345	17.1	Clear	No odour	No sheen
SW006	9/11/2021	2.83	184.8	8.79	111.2	316.2	23.7	Low	No odour	No sheen
SW007	26/10/2020	4.2	195.7	5.95	131.9	336.9	25.5	Clear	No odour	No sheen
SW007	20/05/2021	9.28	99.5	4.27	277	482	16.5	Clear	No odour	No sheen
SW007	8/11/2021	3.23	160.1	4.62	104.5	309.5	25.9	Low	No odour	No sheen
SW008	27/10/2020	3.08	41392	6.82	84.2	289.2	26.2	Clear	No odour	No sheen
SW008	19/05/2021	5.61	2959	6.31	149.7	354.7	19.5	Clear	No odour	No sheen
SW009	26/10/2020	0.26	225.9	5.51	51	256	21.5	Clear	No odour	Slight organic sheen
SW009	19/05/2021	4.11	232	6.93	166.7	371.7	17.5	Clear	No odour	No sheen
SW009	8/11/2021	1.47	213.9	5.03	100.4	305.4	22.4	Low	No odour	No sheen
SW012	26/10/2020	5.31	46198	7.18	49.1	254.1	27.7	Clear	No odour	No sheen
SW012	19/05/2021	5.16	9667	6.91	122	327	19.3	Medium	No odour	No sheen
SW013	26/10/2020	6.02	41260	7.29	41.1	246.1	23.6	Clear	No odour	No sheen
SW013	19/05/2021	5.77	9461	6.17	130.8	335.8	21.1	Clear	No odour	No sheen
SW014	26/10/2020	4.87	220.1	7.83	52	257	22.3	Low	No odour	No sheen
SW014	19/05/2021	5.7	121.4	6.8	151.2	356.2	17.8	Clear	No odour	No sheen
SW014	8/11/2021	2.58	463.6	8.88	49.7	254.7	24.7	Clear	No odour	No sheen
SW016	26/10/2020	4.48	174.3	7.7	93.4	298.4	23.1	Clear	No odour	No sheen
SW016	19/05/2021	8.1	87	5.16	240	445	17.3	Clear	No odour	No sheen
SW016	9/11/2021	6.84	140.8	4.9	109.3	314.3	22.5	Low	No odour	No sheen
SW017	27/10/2020	5.91	169.9	7.16	97.9	302.9	23.2	Clear	No odour	No sheen
SW017	21/05/2021	3.42	932	6.85	146	351	19.2	Clear	No odour	No sheen
SW017	9/11/2021	4.89	53.9	8.64	133.7	338.7	23.2	Medium	No odour	No sheen
SW018	27/10/2020	5.79	117.9	7.23	101	306	24	Clear	No odour	No sheen
SW018	20/05/2021	6.34	434	6.9	149	354	22.0	Turbid	No odour	No sheen
SW018	9/11/2021	5.52	15.1	7.42	157.8	362.8	22.7	Turbid	No odour	No sheen
SW019	28/10/2020	4.03	206.7	5.9	179.6	384.6	24.5	Low	No odour	No sheen
SW019	20/05/2021	9.56	189	6.09	139	344	20.0	Clear	No odour	No sheen
SW019	9/11/2021	5.73	25.9	7.58	180.8	385.8	22.7	Medium	No odour	No sheen
SW020	29/10/2020	4.31	117.9	4.9	215.2	420.2	25.1	Clear	No odour	No sheen
SW020	21/05/2021	Not sampled- stakeholder could not be contacted to obtain access permission.								
SW020	18/05/2021	Not sampled- stakeholder could not be contacted to obtain access permission.								
SW021	13/10/2020	4.6	182	-	155	360	20.4	-	No odour	No sheen
SW021	18/05/2021	0.96	115	5.9	16.9	221.9	16.9	Clear	Slight organic odour	No sheen
SW021	11/11/2021	1.25	157.4	3.75	23.8	228.8	25.3	Low	No odour	No sheen
SW022	13/10/2020	4.77	135	-	243	448	26.1	-	No odour	No sheen
SW022	18/05/2021	2.81	92	7.12	112	317	17.9	Turbid	No odour	No sheen
SW022	11/11/2021	2.18	68.5	4.41	105.3	310.3	25.8	Medium	No odour	No sheen
SW023	13/10/2020	6.27	125	-	247	452	26.2	-	No odour	No sheen
SW023	18/05/2021	5.05	69	6.81	70	275	19.2	Turbid	No odour	No sheen
SW023	11/11/2021	5.33	81.5	5.45	64.1	269.1	27.7	Medium	No odour	No sheen
SW024	29/10/2020	1.91	174.4	5.39	167.1	372.1	22.8	Clear	No odour	No sheen
SW024	19/05/2021	1.1	126	5.5	184	389	19.2	Clear	No odour	No sheen
SW024	11/11/2021	5.48	170.2	5.12	52.9	257.9	26.8	Turbid	No odour	No sheen
SW025	28/10/2020	3.85	187.1	5.62	158.4	363.4	23.5	Clear	No odour	No sheen
SW025	19/05/2021	1.74	118	5.62	195	400	17.9	Clear	Organic odour	No sheen
SW025	9/11/2021	4.42	128.9	5.83	150.1	355.1	23.5	Medium	No odour	No sheen
SW026	28/10/2020	1.82	224.2	6.45	150.3	355.3	22	Turbid	No odour	No sheen
SW027	18/05/2021	3.46	173	5.97	100	305	16.8	Turbid	No odour	No sheen
SW027	9/11/2021	3.53	93.7	9.63	110.7	315.7	22.8	Turbid	No odour	No sheen

Notes
DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential
Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r$
Temp is Temperature
µS/cm is microsiemens per centrimetre
ºC is degrees Celcius
mV is millivolts
` - No data

				Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carbonic Acids												Perfluoroalkyl Sulfonamides							Fluorotelomer Sulfonic Acids				
			Sum of PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFHxDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	FOSA	MeFOSA	EtFOSA	MeFOSE	EtFOSE	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FtS	8:2 FTS	10:2 FTS	Sum of PFAS
	Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.01	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.005	0.002	0.005	0.005	0.005	0.005	0.002	0.002	0.005	0.005	0.005	0.005	0.002
NEMP (HEPA, 2020) Human Health Drinking Water			0.07											0.56																			
NHMRC (HEPA, 2020) Human Health Recreational Water			**2.0**											**10**																			
NEMP (HEPA, 2020) Ecological Freshwater 99% Species Protection								0.00023						19																			

Location	Alt ID	Date	Lab Report	Type																														
MW101	MW101	24/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW101	MW101	4/06/2019	EB1914500	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW101	MW101	29/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW101	MW101	21/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW101	MW101	11/11/2021	EB2132641	Normal	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.4	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09		<0.09	<0.09	<0.09	<0.22	<0.09	<0.22	<0.22	<0.22	<0.22	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
MW102	MW102	24/09/2018	EB1823571	Normal	0.019	<0.002	<0.002	0.007	<0.002	0.012	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.019
MW102	MW102	29/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW102	MW102	28/05/2019	EB1913917	Field_D	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW102	MW102	29/05/2019	RN1235762	Interlab_D	<0.002	<0.001	<0.001	<0.01	<0.001	<0.002	<0.001	0.0053	0.005	<0.01	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.001	<0.01	<0.001	<0.001	<0.002
MW102	MW102	11/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW103	MW103	25/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW103	MW103	30/05/2019	EB1913917	Normal	0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.002
MW103	MW103	30/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW103	MW103	19/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW103	MW103	9/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW104	MW104	25/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW104	MW104	30/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW104	MW104	30/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW104	MW104	19/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW104	MW104	9/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW105	MW105	25/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW105	MW105	30/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW105	MW105	30/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW105	MW105	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW105	MW105	10/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW106	MW106	26/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW106	MW106	28/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW106	MW106	29/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW106	MW106	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW106	MW106	9/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW107	MW107	26/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW107	MW107	27/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW107	MW107	29/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW107	MW107	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW107	MW107	9/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW108	MW108	26/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW108	MW108	27/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW108	MW108	29/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW108	MW108	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW108	MW108	9/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW109	MW109	25/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW109	MW109	4/06/2019	EB1914500	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW109	MW109	28/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW109	MW109	19/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW109	MW109	8/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW110	MW110	25/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW110	MW110	4/06/2019	EB1914500	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	0.026	<0.005	<0.005	0.026
MW110	MW110	25/09/2018	EB1823571	Field_D	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW110	MW110	25/09/2018	RN1210825	Interlab_D	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.05	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW110	MW110	28/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW110	MW110	19/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW110	MW110	8/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW111	MW111	25/09/2018	EB1823571	Normal	0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.002
MW111	MW111	28/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW111	MW111	29/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW111	MW111	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW111	MW111	8/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW112	MW112	9/09/2019	EB1924154	Normal	0.004	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.004
MW112	MW112	29/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW112	MW112	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW112	MW112	10/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW113	MW113	9/09/2019	EB1924154	Normal	0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.002
MW113	MW113	28/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW113	MW113	21/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW113	MW113	10/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW114	MW114	11/09/2019	EB1924154	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW114	MW114	28/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW114	MW114	21/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW114	MW114	10/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW115	MW115	10/09/

				Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carbonic Acids												Perfluoroalkyl Sulfonamides							Fluorotelomer Sulfonic Acids				
			Sum of PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFHxDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	FOSA	MeFOSA	EtFOSA	MeFOSE	EtFOSE	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FtS	8:2 FTS	10:2 FTS	Sum of PFAS
	Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR		0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.01	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.005	0.002	0.005	0.005	0.005	0.005	0.002	0.002	0.005	0.005	0.005	0.005	0.002
NEMP (HEPA, 2020) Human Health Drinking Water			0.07											0.56																			
NHMRC (HEPA, 2020) Human Health Recreational Water			**2.0**											**10**																			
NEMP (HEPA, 2020) Ecological Freshwater 99% Species Protection								0.00023						19																			
Location	**Alt ID**	**Date**	**Lab Report**	**Type**																													
MW117	MW117	28/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW117	MW117	18/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW117	MW117	10/11/2021	EB2132641	Normal	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.06	<0.02	<0.06	<0.06	<0.06	<0.06	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02
MW118	MW118	10/09/2019	EB1924154	Normal	0.021	<0.002	<0.002	0.012	<0.002	0.009	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.021
MW118	MW118	28/10/2020	EB2028561	Normal	0.01	<0.02	<0.02	<0.02	<0.02	0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.01
MW118	MW118	21/05/2021	EB2114447	Normal	0.03	<0.02	<0.02	0.02	<0.02	0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03
MW118	MW118	10/11/2021	EB2132641	Normal	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.06	<0.02	<0.06	<0.06	<0.06	<0.06	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02
MW118	MW118	10/11/2021	EB2132641	Field_D	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.06	<0.02	<0.06	<0.06	<0.06	<0.06	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02
MW118	MW118	10/11/2021	EB2132641	Interlab_D																														
MW119	MW119	9/09/2019	EB1924154	Normal	0.011	<0.002	<0.002	<0.002	<0.002	0.011	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.011
MW119	MW119	9/09/2019	EB1924154	Field_D	0.012	<0.002	<0.002	<0.002	<0.002	0.012	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.012
MW119	MW119	9/09/2019	RN1247904	Interlab_D	0.0116	<0.001	<0.001	0.0021	<0.001	0.0095	<0.001	<0.005	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.002	<0.002	<0.001	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.0116
MW119	MW119	29/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW119	MW119	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW119	MW119	10/11/2021	EB2132641	Normal	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.06	<0.02	<0.06	<0.06	<0.06	<0.06	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02
MW120	MB1.1	14/08/2017	EB1716701	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	-	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
MW120	MB1.1	26/09/2018	EB1823571	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002
MW120	MB1.1	28/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
MW120	MB1.1	29/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW120	MB1.1	21/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW120	MB1.1	11/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW121	MB2.1	7/03/2017	EB1704612	Normal	0.26	<0.02	<0.02	0.18	<0.02	<0.01	-	-	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.26
MW121	MB2.1	14/08/2017	EB1716701	Normal	0.14	<0.02	<0.02	0.08	<0.02	0.06	-	-	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.14
MW121	MB2.1	26/09/2018	EB1823571	Normal	0.152	0.013	0.013	0.107	0.006	0.045	-	-	-	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.188
MW121	MB2.1	28/05/2019	EB1913917	Normal	0.071	0.007	0.006	0.056	0.002	0.015	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.086
MW121	MB2.1	29/10/2020	EB2028561	Normal	0.13	<0.02	<0.02	0.09	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13
MW121	MB2.1	21/05/2021	EB2114447	Normal	0.09	<0.02	<0.02	0.07	<0.02	0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.09
MW121	MB2.1	11/11/2021	EB2132641	Normal	0.11	<0.02	<0.02	0.07	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11
MW121	MB2.1	11/11/2021	EB2132641	Field_D	0.1	<0.02	<0.02	0.07	<0.02	0.03	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.1
MW121	MB2.1	11/11/2021	EB2132641	Interlab_D																														
MW122	MB3.1	24/09/2018	EB1823571	Normal	0.284	0.028	0.031	0.252	0.01	0.032	-	-	-	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.353
MW122	MB3.1	28/05/2019	EB1914877	Normal	0.188	0.017	0.021	0.169	0.008	0.019	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.234
MW122	MB3.1	29/10/2020	EB2028561	Normal	0.16	0.02	<0.02	0.16	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.18
MW122	MB3.1	21/05/2021	EB2114447	Normal	0.2	<0.02	<0.02	0.17	<0.02	0.03	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.2
MW122	MB3.1	11/11/2021	EB2132641	Normal	0.12	<0.02	<0.02	0.1	<0.02	0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.12
MW122	MB3.1	11/11/2021	EB2132641	Field_D	0.14	<0.02	<0.02	0.12	<0.02	0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.14
MW122	MB3.1	11/11/2021	EB2132641	Interlab_D																														
POT001	WS01	6/07/2017	EB1713783	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT001	WS01	27/09/2018	EB1823571	Normal	0.043	0.004	0.004	0.037	<0.002	0.006	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.051
POT001	WS01	29/05/2019	EB1913917	Normal	0.022	0.002	<0.002	0.022	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.024
POT001	WS01	28/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT001	WS01	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT001	WS01	10/11/2021	EB2132641	Normal	0.02	<0.02	<0.02	0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02
POT002	WS02	6/07/2017	EB1713783	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT002	WS02	27/09/2018	EB1823571	Normal	0.02	<0.002	0.002	0.018	<0.002	0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.022
POT002	WS02	29/05/2019	EB1913917	Normal	0.01	<0.002	<0.002	0.01	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.01
POT003	WS03	6/07/2017	EB1713783	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT003	WS03	27/09/2018	EB1823571	Normal	0.014	<0.002	<0.002	0.014	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.014
POT003	WS03	5/06/2019	EB1914500	Normal	0.008	<0.002	<0.002	0.008	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.008
POT003	WS03	5/06/2019	EB1914500	Field_D	0.008	<0.002	<0.002	0.008	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.008
POT003	WS03	5/06/2019	RN1235906	Interlab_D	0.0087	<0.001	<0.001	0.0087	<0.001	<0.002	<0.001	<0.005	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.0087
POT004	WS04	6/07/2017	EB1713783	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT004	WS04	27/09/2018	EB1823571	Normal	0.013	<0.002	<0.002	0.013	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.013
POT004	WS04	29/05/2019	EB1913917	Normal	0.01	<0.002	<0.002	0.01	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.010
POT005	WS05	27/09/2018	EB1823571	Normal	0.01	<0.002	<0.002	0.01	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.013
POT005	WS05	29/05/2019	EB1913917	Normal	0.007	<0.002	<0.002	0.007	<0.002	<0.002	<0.002	<0.01	<0.002	0.009	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	0.01	<0.005	<0.005	0.026
POT005	WS05	28/10/2020	EB2028561	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT005	WS05	20/05/2021	EB2114447	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT005	WS05	10/11/2021	EB2132641	Normal	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT006	RN156623	29/05/2019	EB1913917	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
POT002	WS02	29/05/2019	EB1913917	Normal	0.01	<0.002	<0.002	0.01	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.01
POT101	GW01	15/08/2019	EB1921486	Normal	<0.002	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.006
POT102	GW02	15/08/2019	EB1921486	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
POT103	GW03	15/08/2019	EB1921486	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
POT104	GW04	13/09/2019	EB1924153	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
POT105	GW05	13/09/2019	EB1924164	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
POT106	GW06	13/09/2019	EB1924163	Normal	0.004	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	0.004
POT107	GW07	13/09/2019	EB1924162	Normal	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
POT108	GW08	24/10/2019	EB1928343	Normal	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0003
POT108	GW08	24/10/2019	EB1928343	Field_D	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0003
POT108	GW08	24/10/2019	RN1251547	Interlab_D	<0.002	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.005	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.001	<0.001	<0.002
OTH001	WWTP	29/05/2019	EB1913917	Normal	0.0089	0.0094	-	0.0078	-	0.0011	-	<0.002	0.0077	0.0058	0.0025	0.0063	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	0.0406
OTH001	WWTP	28/05/2019	EB1913917	Field_D	0.0091	0.0075	-	0.0079	-	0.0012	-	<0.002	0.0082	0.0066	0.0024	0.0064	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	0.0402
OTH001	WWTP	29/05/2019	RN1235762	Interlab_D	0.011	0.0049	0.0013	0.011	<0.001	<0.002	<0.001	0.0093	0.015	0.0056	0.0036	0.0068	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.0403
OTH001	WWTP	28/10/2020	EB2028561	Normal	<0.01

				Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carbonic Acids											Perfluoroalkyl Sulfonamides							Fluorotelomer Sulfonic Acids				
		Sum of PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	FOSA	MeFOSA	EtFOSA	MeFOSE	EtFOSE	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FtS	8:2 FTS	10:2 FTS	Sum of PFAS
	Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.0003	0.0005	0.0005	0.0005	0.0005	0.0003	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0003
NHMRC (2019) Recreational Contact with Waters		2.0											10																		
NEMP (HEPA, 2018) Ecological Freshwater 99% Species Protection							0.00023						19																		
Batley et al (2018) Ecological Freswater 99% Species Protection							*0.051*																								

ID	Setting	Location	Date																													
SW001	Freshwater	Kauri Creek	8/03/2017	<0.01	-	-	<0.01	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
SW002	Freshwater	Mosquito Creek	16/08/2017	<0.01	-	-	<0.01	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
SW003	Estuarine	Mosquito Creek	8/03/2017	<0.05	-	-	<0.05	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05
SW004	Freshwater	Kauri Creek	15/08/2017	<0.01	-	-	<0.01	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
SW004	Freshwater	Kauri Creek	27/09/2018	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.002
SW004	Freshwater	Kauri Creek	29/05/2019	<0.0003	<0.0005	-	<0.0005	-	<0.0003	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.0003
SW004	Freshwater	Kauri Creek	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW004	Freshwater	Kauri Creek	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0045	<0.0016	<0.004	<0.005	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW004	Freshwater	Kauri Creek	11/11/2021	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.202	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0019	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0008	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.0008
SW005	Freshwater	Mosquito Creek	8/03/2017	<0.01	-	-	<0.01	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
SW005	Freshwater	Mosquito Creek	29/05/2019	<0.0003	<0.0005	-	<0.0005	-	<0.0003	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.0003
SW005	Freshwater	Mosquito Creek	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW005	Freshwater	Mosquito Creek	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.002	0.0051	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0051
SW005	Freshwater	Mosquito Creek	11/11/2021	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.012	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0020	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0008	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.0008
SW006	Freshwater	Tributary of Kangaroo Creek	8/03/2017	4.62	-	-	0.69	-	3.93	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.14
SW006	Freshwater	Tributary of Kangaroo Creek	26/07/2018	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.05	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW006	Freshwater	Tributary of Kangaroo Creek	27/05/2019	0.0013	<0.0005	-	0.0008	-	0.0005	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	0.0013
SW006	Freshwater	Tributary of Kangaroo Creek	27/10/2020	0.0017	<0.0016	<0.0016	0.0017	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0017
SW006	Freshwater	Tributary of Kangaroo Creek	20/05/2021	0.0016	<0.0016	<0.0016	0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0035	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0016
SW006	Freshwater	Tributary of Kangaroo Creek	9/11/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0008	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0016
SW006A	Freshwater	Tributary of Kangaroo Creek	26/07/2018	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.05	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW007	Freshwater	Kangaroo Creek	16/08/2017	<0.01	-	-	<0.01	-	<0.01	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
SW007	Freshwater	Kangaroo Creek	27/09/2018	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0003
SW007	Freshwater	Kangaroo Creek	28/05/2019	<0.0003	<0.0005	-	<0.0005	-	<0.0003	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.0003
SW007	Freshwater	Kangaroo Creek	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW007	Freshwater	Kangaroo Creek	20/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW007	Freshwater	Kangaroo Creek	9/11/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0008	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0016
SW008	Estuarine	Kauri Creek	26/07/2018	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.05	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW008	Estuarine	Kauri Creek	28/09/2018	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002
SW008	Estuarine	Kauri Creek	30/05/2019	<0.0003	<0.0005	-	<0.0005	-	<0.0003	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.0003
SW008	Estuarine	Kauri Creek	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW008	Estuarine	Kauri Creek	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.002	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW008	Estuarine	Kauri Creek	10/11/2021	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.012	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0020	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0008	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.0008
SW009	Freshwater	Kangaroo Creek	9/03/2017	0.07	-	-	<0.02	-	0.07	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.07
SW009	Freshwater	Kangaroo Creek	26/07/2018	<0.01	-	-	<0.01	-	<0.02	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02
SW009	Freshwater	Kangaroo Creek	30/05/2019	<0.0003	<0.0005	-	<0.0005	-	<0.0003	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.0003
SW009	Freshwater	Kangaroo Creek	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW009	Freshwater	Kangaroo Creek	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.006	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.108	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW009	Freshwater	Kangaroo Creek	8/11/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0008	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0016
SW010	Freshwater	Mosquito Creek	16/08/2017	<0.01	-	-	<0.01	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
SW012	Estuarine	Kauri Creek	9/03/2017	0.16	-	-	<0.05	-	0.16	-	-	-	-	-	<0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.16
SW012	Estuarine	Kauri Creek	26/07/2018	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.05	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW012	Estuarine	Kauri Creek	29/05/2019	<0.0003	<0.0005	-	<0.0005	-	<0.0003	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.0003
SW012	Estuarine	Kauri Creek	26/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW012	Estuarine	Kauri Creek	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.01	<0.0035	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW012	Estuarine	Kauri Creek	8/11/2021	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.001	<0.001	<0.001	<0.0003
SW013	Estuarine	Snapper Creek	9/03/2017	1.16	-	-	0.08	-	1.08	-	-	-	-	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.16
SW013	Estuarine	Snapper Creek	26/07/2018	<0.02	<0.01	<0.01	<0.01	<0.01	<0.02	<0.01	<0.05	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW013	Estuarine	Snapper Creek	3/06/2019	0.0008	<0.0005	<0.0005	0.0005	<0.0005	0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0008
SW013	Estuarine	Snapper Creek	26/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW013	Estuarine	Snapper Creek	19/05/2021	0.003	<0.0016	<0.0016	0.003	<0.0016	<0.0016	<0.0016	<0.002	0.0027	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0057
SW013	Estuarine	Snapper Creek	8/11/2021	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.001	<0.001	<0.001	<0.0003
SW014	Freshwater	Tributary of Snapper Creek	15/08/2017	<0.01	-	-	<0.02	-	<0.01	-	-	-	-	-	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
SW014	Freshwater	Tributary of Snapper Creek	28/09/2018	0.0027	<0.0005	<0.0005	0.0017	<0.0005	0.001	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0027
SW014	Freshwater	Tributary of Snapper Creek	3/06/2019	0.0038	<0.0005	<0.0005	0.0023	<0.0005	0.0015	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0038
SW014	Freshwater	Tributary of Snapper Creek	26/10/2020	0.0021	<0.0016	<0.0016	0.0021	<0.0016	<0.0016	<0.0016	<0.008	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0021
SW014	Freshwater	Tributary of Snapper Creek	19/05/2021	0.0016	<0.0016	<0.0016	0.0016	<0.0016	<0.0016	<0.0016	<0.002	0.0068	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0055	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0084
SW014	Freshwater	Tributary of Snapper Creek	8/11/2021	0.0027	<0.0016	<0.0016	0.0027	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0008	<0.0008	<0.002	<0.002	<0.002	<0.002	0.0027
SW015	Freshwater	Kangaroo Dam	28/09/2018	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0003
SW015	Freshwater	Kangaroo Dam	28/05/2019	<0.0003	<0.0005	-	<0.0005	-	<0.0003	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.0003
SW016	Freshwater	Tributary of Snapper Creek	28/09/2018	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0005
SW016	Freshwater	Tributary of Snapper Creek	3/06/2019	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0003
SW016	Freshwater	Tributary of Snapper Creek	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW016	Freshwater	Tributary of Snapper Creek	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.002	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0705	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW016	Freshwater	Tributary of Snapper Creek	9/11/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.0008	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0016
SW017	Rainwater	Unlined stormwater channel	3/06/2019	0.0037	0.0012	<0.0005	0.0037	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	0.0008	0.0024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0081
SW017	Rainwater	Unlined stormwater channel	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.012	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW017	Rainwater	Unlined stormwater channel	21/05/2021	0.0151	0.0169	0.0022	0.0151	<0.0016	<0.003	<0.0016	<0.008	0.017	0.0059	<0.0016	0.0072	<0.0016	0.0029	<0.0016	<0.0016	<0.0016	<0.006	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0672
SW017	Rainwater	Unlined stormwater channel	9/11/2021	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0020	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0008	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.0008
SW018	Rainwater	Unlined stormwater channel	3/06/2019	0.0089	<0.0005	<0.0005	0.0042	<0.0005	0.0047	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0098
SW018	Rainwater	Unlined stormwater channel	27/10/2020	0.0021	<0.0016	<0.0016	0.0021	<0.0016	<0.0049	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	0.0038	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0059
SW018	Rainwater	Unlined stormwater channel	20/05/2021	0.0159	<0.0079	<0.0079	0.0159	<0.0079	<0.0079	<0.0079	<0.04	<0.0079	0.0143	<0.0079	<0.0079	<0.0079	<0.0079	<0.0079	<0.0079	<0.0079	<0.0198	<0.0079	<0.02	<0.02	<0.02	<0.02	<0.0079	<0.0079	<0.008	0.013	<0.008	<0.008	0.0432
SW018	Rainwater	Unlined stormwater channel	9/11/2021	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0020	<0.0008	<0.002	<0.002	<0.002	<0.002	<0.0008	<0.0008	<0.001	<0.001	<0.001	<0.001	<0.0008
SW019	Rainwater	Ponded water along track	30/05/2019	0.116	0.004	-	0.0665	-	0.05	-	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	0.1205
SW019	Rainwater	Ponded water along track	28/10/2020	0.0741	0.0025	0.0019	0.0433	<0.0016	0.0308	<0.0016	<0.008	<0.004	0.0027	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016

		Sum of PFHxS and PFOS	Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carbonic Acids											Perfluoroalkyl Sulfonamides							Fluorotelomer Sulfonic Acids				Sum of PFAS
			PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	FOSA	MeFOSA	EtFOSA	MeFOSE	EtFOSE	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FtS	8:2 FTS	10:2 FTS	
	Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.0003	0.0005	0.0005	0.0005	0.0005	0.0003	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0003
NHMRC (2019) Recreational Contact with Waters		2.0											10																		
NEMP (HEPA, 2018) Ecological Freshwater 99% Species Protection							0.00023						19																		
Batley et al (2018) Ecological Freswater 99% Species Protection							*0.051*																								
ID	**Setting**	**Location**	**Date**																												
SW020	Freshwater	Private dam	29/10/2020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	0.0021	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0024	<0.001	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.0032
SW021	Freshwater	Private dam	15/08/2019	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.03	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	0.03
SW021	Freshwater	Private dam	13/10/2020	0.0043	<0.0016	<0.0016	<0.0016	<0.0016	0.0043	<0.0016	<0.008	0.0043	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0086
SW021	Freshwater	Private dam	18/05/2021	0.0056	<0.0016	<0.0016	0.0016	<0.0016	0.004	<0.0016	<0.008	<0.004	0.0021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.112	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0077
SW021	Freshwater	Private dam	11/11/2021	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0080	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.003	<0.003	<0.003	<0.003	<0.0032
SW022	Freshwater	Private dam	13/09/2019	0.0096	0.0008	<0.0005	0.0048	<0.0005	0.0048	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0114
SW022	Freshwater	Private dam	13/10/2020	0.0093	<0.0016	<0.0016	0.0036	<0.0016	0.0057	<0.0016	<0.008	0.0052	0.0022	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0167
SW022	Freshwater	Private dam	18/05/2021	0.0076	<0.0016	<0.0016	0.003	<0.0016	0.0046	<0.0016	<0.016	0.0133	0.0024	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0085	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0233
SW022	Freshwater	Private dam	11/11/2021	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0080	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.003	<0.003	<0.003	<0.003	<0.0032
SW023	Freshwater	Private dam	13/09/2019	0.0058	<0.0005	<0.0005	0.0032	<0.0005	0.0026	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0065
SW023	Freshwater	Private dam	13/10/2020	0.0067	<0.0016	<0.0016	0.0028	<0.0016	0.0039	<0.0016	<0.008	0.0053	0.0019	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0139
SW023	Freshwater	Private dam	18/05/2021	0.0057	<0.0016	<0.0016	0.0027	<0.0016	0.003	<0.0016	<0.012	0.0177	0.0032	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0266
SW023	Freshwater	Private dam	11/11/2021	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0080	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.003	<0.003	<0.003	<0.003	<0.0032
SW024	Freshwater	Private dam	13/09/2019	0.0013	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	0.0027	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.004
SW024	Freshwater	Private dam	29/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.005	<0.0016	<0.0016	0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.002
SW024	Freshwater	Private dam	19/05/2021	0.0025	<0.0016	<0.0016	<0.0016	<0.0016	0.0025	<0.0016	<0.012	<0.005	<0.003	<0.0016	0.0025	0.0016	<0.0016	<0.0016	<0.0016	<0.0025	<0.035	<0.0016	<0.004	<0.004	<0.004	<0.005	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0066
SW024	Freshwater	Private dam	11/11/2021	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0080	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.003	<0.003	<0.003	<0.003	<0.0032
SW025	Freshwater	Unnamed Waterway in Wallu	12/09/2019	0.0044	<0.0005	<0.0005	0.0015	<0.0005	0.0029	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.005
SW025	Freshwater	Unnamed Waterway in Wallu	28/10/2020	0.0046	<0.0016	<0.0016	0.0016	<0.0016	0.003	<0.0016	<0.008	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0046
SW025	Freshwater	Unnamed Waterway in Wallu	19/05/2021	0.0051	<0.0016	<0.0016	0.0017	<0.0016	0.0034	<0.0016	<0.008	<0.0045	0.0017	<0.0016	0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0084
SW025	Freshwater	Unnamed Waterway in Wallu	9/11/2021	0.0024	<0.0016	<0.0016	<0.0016	<0.0016	0.0024	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0024
SW027	Freshwater	Discharge point from Base	28/10/2020	0.0124	<0.0032	<0.0032	0.0057	<0.0032	0.0067	<0.0032	<0.016	<0.0065	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.003	<0.003	<0.003	<0.003	0.0124
SW027	Freshwater	Discharge point from Base	18/05/2021	0.0202	0.0021	<0.0016	0.0125	<0.0016	0.0077	<0.0016	<0.02	0.0072	0.0066	<0.0016	0.0021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0382
SW027	Freshwater	Discharge point from Base	9/11/2021	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0080	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.003	<0.003	<0.003	<0.003	<0.0032

LOR is limit of reporting
µg/L is micrograms per litre
'-' denotes no analysis undertaken
'<' denotes concentration is less than
The LOR for PFOS is higher than the NEMP (2020) ecological guideline value for 99% species protection. PFOS concentrations reported as below the LOR have the potential to exceed the NEMP (2020) ecological guideline value.
Blue shading indicates first time detection.

	Analyte	PFHxS + PFOS	Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carbonic Acids											Perfluoroalkyl Sulfonamides							Fluorotelomer Sulfonic Acids				Sum of PFAS
			PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnA	PFDoDA	PFTrDA	PFTeDA	FOSA	MeFOSA	EtFOSA	MeFOSE	EtFOSE	MeFOSA A	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	
	Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	LOR	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002
ID	Sample Date																														
SD001	8/03/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD002	16/08/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD003	8/03/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD004	16/08/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD004	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD005	15/08/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD005	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD006	9/03/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD006	28/09/2018	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD006	18/05/2021	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.001	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0007
SD007	16/08/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD007	27/09/2018	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD007	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD008	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD009	9/03/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD009	27/09/2018	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD009	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0004	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0012	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
SD010	16/08/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD012	9/03/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD012	28/09/2018	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD012	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD013	9/03/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD013	15/08/2017	<0.0002	-	-	-	-	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
SD013	28/09/2018	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD013	18/05/2021	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0002
SD014	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD015	28/09/2018	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD016	28/09/2018	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD016	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD017	30/05/2019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD017	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0003
SD018	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0003
SD019	18/05/2021	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008
SD021	18/05/2021	0.0012	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0013	<0.0005	<0.0013	<0.0013	<0.0013	<0.0013	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012
SD022	18/05/2021	0.0009	<0.0002	<0.0002	<0.0002	<0.0002	0.0009	<0.0002	<0.001	<0.0002	0.0007	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0016
SD023	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD024	19/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0002
SD025	12/09/2019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD025	18/05/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD027	18/05/2021	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005

LOR is limit of reporting
mg/kg is milligrams per kilogram
-' denotes no analysis undertaken
<' denotes concentration is less than
Blue shading indicates first time detection.

	Alkalinity (total) as CaCO3	Carbonate as CaCO3	Alkalinity (Bicarbonate as CaCO3)	Fluoride	Chloride	Sulfate as SO4	Alkalinity (Hydroxide) as CaCO3	Calcium (Filtered)	Potassium (Filtered)	Magnesium (Filtered)	Sodium (Filtered)	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Reactive Phosphorus as P	Anions Total	Cations Total	Total Suspended Solids	Total Dissolved Solids	Dissolved Organic Carbon	Nitrite + Nitrate as N
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	mg/L	mg/L	mg/L	mg/L
LOR	1	1	1	0.1	1	1	1	1	1	1	1	0.01	0.01	0.01	0.01	0.01	0.01	5	10	1	0.01
Location ID	**Sample ID**	**Lab Report No**	**Sample Date**																			
MW101	0224_MW101_201029	EB2028561	29/10/2020	3	<1	3	<0.1	36	3	<1	2	<1	2	22	<0.01	<0.01	<0.01	<0.01	1.14	1.22	427	80	8	<0.01
MW104	0224_MW104_201030	EB2028561	30/10/2020	4	<1	4	<0.1	27	2	<1	<1	<1	2	19	<0.01	0.1	<0.01	<0.01	0.88	0.99	149	89	5	0.1
MW119	0224_MW119_201029	EB2028561	29/10/2020	14	<1	14	<0.1	65	2	<1	5	<1	4	37	<0.01	0.57	<0.01	<0.01	2.15	2.19	282	147	8	0.57
MW122	0224_MW122_201029	EB2028561	29/10/2020	2	<1	2	<0.1	13	3	<1	<1	<1	1	12	<0.01	0.2	<0.01	<0.01	0.47	0.6	1150	58	4	0.2

LOR is limit of reporting
mg/L is milligrams per litre
meq/l is milliequivalents per litre
-' denotes no analysis undertaken
<' denotes concentration is less than

				Alkalinity (total) as CaCO3	Carbonate as CaCO3	Alkalinity (Bicarbonate as CaCO3)	Fluoride	Chloride	Sulfate as SO4	Alkalinity (Hydroxide) as CaCO3	Calcium (Filtered)	Potassium (Filtered)	Magnesium (Filtered)	Sodium (Filtered)	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Reactive Phosphorus as P	Cations Total	Anions Total	Total Suspended Solids	Total Dissolved Solids	Dissolved Organic Carbon	Nitrite + Nitrate as N
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	mg/L	mg/L	mg/L	mg/L
			LOR	1	1	1	0.1	1	1	1	1	1	1	1	0.01	0.01	0.01	0.01	0.01	0.01	5	10	1	0.01
Location ID	**Sample ID**	**Lab Report No.**	**Sample Date**																					
SW004	0224_SW004_201027	EB2028561	27/10/2020	8	1	8	0.1	62	1	1	2	1	4	35	0.01	0.01	0.01	0.01	1.98	1.93	<5	141	8	<0.01
SW007	0224_SW007_201027	EB2028561	27/10/2020	4	1	4	0.1	45	1	1	1	1	3	26	0.01	0.01	0.01	0.01	1.43	1.35	8	114	8	<0.01
SW014	0224_SW014_201026	EB2028561	26/10/2020	14	1	14	0.1	43	2	1	2	1	3	29	0.01	0.01	0.01	0.01	1.61	1.53	24	113	11	<0.01
SW025	0224_SW025_201028	EB2028561	28/10/2020	10	1	10	0.1	41	1	1	2	1	2	27	0.01	0.01	0.01	0.01	1.44	1.36	12	129	17	<0.01

LOR is limit of reporting
mg/L is milligrams per litre
meq/l is milliequivalents per litre
-' denotes no analysis undertaken
<' denotes concentration is less than

Appendix C

Infrastructure Projects at Wide Bay Training Area 2020 to 2021

Appendix C Infrastructure Projects at Wide Bay Training Area 2020 to 2021

Date	Location	Activity
June-August 2020	Wide Bay Training Area Road Remediation Project.	Remediation works to main access roads and other tracks within the WBTA. The works included placement of rock fill and road to scoured areas and minor creek crossing and grade main routes 10 and 20. Asphalt repairs to Route 20 and pavement scour repairs to batter and shoulders in Camp Kerr. The Environmental Sustainability Manager (ESM) identified that stockpile material was brought back to Camp Kerr and stored in the 'old tip area' against ECC conditions or ESM knowledge. It was then redistributed to various locations.
2021	EMOS ADP Multiple Tracks and Toilets Project.	Currently in design phase. A number of tracks in the WBTA, and up to eight enviro toilets will be placed within the training area. Will involve grading, repair of tracks; soil disturbance potential temp stockpiling; changes to water inputs from the toilets when land irrigation areas or selected/tank systems selected.
2021	EMOS AE547 – MUFP Replenishment Project.	This project is to replenish movers and firing range mounds at the MUFP.
2021	EMOS AE547 – ECR Reshaping Project.	This project is to reshape the 600m ECR and replenishment of 100m and 200m firing mounds.
2021	EST08878 EMOS Roads Grade and Roll Project.	This project is to grade roads.
2021	EST08100 TA Ranges Refurbishment Project (AGR/SGR and DFSW).	The purpose of this project is to bring up to current safety standards/requirements of Ranges. The project will involve cleaning out of current bio-basin, changes to drainage/sub-surface irrigation off the throwing bay into newly devised sedimentation structure. Soil contamination testing will be completed to understand what contamination risks are coming from the throwing bay. The project will capture device/structure/system that suitably collects/contains/reduces its impacts to the surrounding environment and water ways.
2021	6ESR construction activity.	These unit works, undertaken in May 2021 included safety works to the White Quarry and altering benching.
2022	EST08192 – WBTA Roads Refurbishments (Route 5, Gate 12 to Route 20) Project.	This is expected to take place between March and June 2022. The EST08193 SDM WBTA TA Fencing works (Gate 9-Gate 14) has been bundled as part of this project.

Appendix D

Sampling Event Factual Reports

AECOM Imagine it. Delivered.

Department of Defence
23-Apr-2021

Sampling Event Factual Report, October 2020

PFAS OMP - Wide Bay Training Area

Sampling Event Factual Report, October 2020

PFAS OMP - Wide Bay Training Area

Client: Department of Defence

ABN: 68706814312

Prepared by

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3553 2000 F +61 7 3553 2050 www.aecom.com
ABN 20 093 846 925

23-Apr-2021

Job No.: 60612563

Quality Information

Document	Sampling Event Factual Report, October 2020
Ref	60612563
Date	23-Apr-2021
Prepared by	Camden McCosker
Reviewed by	James Peachey

Revision History

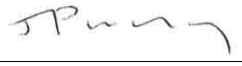
Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	24-Nov-2020	Draft	James Peachey Associate Director	
B	11-Feb-2021	Draft	James Peachey Associate Director	
C	09-Mar-2021	Draft	James Peachey Associate Director	
0	16-Mar-2021	Final	James Peachey Associate Director	
1	23-Apr-2021	Final	James Peachey Associate Director	

Table of Contents

List of Tables (in Text)

List of Figures (in Appendix A)

List of Tables (in Appendix B)

Abbreviations

Abbreviation	
AHD	Australian Height Datum
ASC NEPM	Assessment of Site Contamination National Environment Protection Measure 1999 (as amended 2013)
CEC	Cation Exchange Capacity
COC	Chain of Custody
CPSA	Confirmed Primary Source Area
Defence	Department of Defence
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
EC	Electrical Conductivity
HEPA	Heads of Environmental Protection Agencies
LOR	Limit of Reporting
mbtoc	Metres below top of casing
MUFR	Multiuser Firing Point Range
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan
NHMRC	National Health and Medical Research Council
NMI	National Measurement Institute
OMP	Ongoing Management Plan
ORP	Oxidation Reduction Potential
PFAS	Per- and Poly-fluorinated Alkyl Substances
PFHxS	Perfluorohexane Sulfonate
PFOA	Perflurooctanoic Acid
PFOS	Perflurooctanesulfonic Acid
PMAP	PFAS Management Area Plan
QA/QC	Quality Assurance / Quality Control
RPD	Relative Percent Difference
SAQP	Sampling Analysis and Quality Plan
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TSS	Total Suspended Solids
WBTA	Wide Bay Training Area
WWTP	Wastewater Treatment Plant

1.0 Introduction

1.1 General

AECOM Australia Pty Ltd (AECOM) has been engaged by the Department of Defence (Defence) to implement the per- and poly-fluoroalkyl substances (PFAS) Ongoing Monitoring Program (OMP) (Defence, 2020) at the Wide Bay Training Area (WBTA) (the 'Site') and the WBTA Management Area in the South Queensland Region. The locations of the Site and the Management Area are shown in **Figure 1** in **Appendix A**. The OMP for WBTA (Defence, 2020) includes the following sampling events:

- Biannual sampling events in October 2020, April 2021, October 2021, April 2022, October 2022 and April 2023 including:
  - groundwater sampling of 17 on-Site groundwater monitoring wells and five off-Site groundwater monitoring wells
  - surface water sampling of creeks and dams at 15 on-Site and five off-Site sampling locations
  - Tap sampling of the two on-Site extraction bores
  - Tap sampling of the treated wastewater from the outlet tap of the Camp Kerr wastewater treatment plant (WWTP)
- Sediment samples (co-located with the surface water samples) at creeks and dams to be collected once per year in April 2021, April 2022 and April 2023.
- Up to two event-based sampling of the WWTP during times of high site usage.

Following each sampling event, a sampling event factual report will be prepared. Annual interpretative reports will be prepared following the completion of each 12-month sampling period.

This sampling event factual report has been prepared to report the results of the biannual sampling event completed in October 2020, specifically highlighting any first-time detections and/or first-time exceedances of human health or ecological (freshwater species) screening criteria for PFHxS+PFOS and / or PFOA. Sediment sampling was not required as part of the October 2020 sampling event. Event-based sampling of the WWTP was not conducted during this sampling event.

This report has been prepared in accordance with the *Defence (2020) PFAS OMP factual reports – guidance for preparation,* v0.2, March 2020 (Defence, 2020).

1.2 Objectives

The objectives of the OMP program are to:

- Implement the OMP prepared as part of the PFAS Management Area Plan (PMAP); and
- Collect data that will enable Defence to maintain an up to date understanding of the distribution, concentration and transport of PFAS at the Site and WBTA Management Area.

The data will assist in the timely identification of risks and inform Defence's approach to the management of PFAS, including updates and revisions to the PMAP.

The objective of this phase of works is to implement the scope of works for the biannual October 2020 sampling event (identified in **Section 2.0**) in accordance with the sampling and analysis quality plan (SAQP) (AECOM, 2020a).

2.0 Scope of Work

The biannual sampling event at WBTA was completed in general accordance with the SAQP (AECOM, 2020a). In summary, the scope of works for this sampling event included:

- Obtaining access to private properties where some surface water locations are situated.
- Gauging of groundwater level at 22 locations including 17 on-Site and five off-Site monitoring wells (located on Council / State land) prior to collection of samples (refer to **Table 1** below, and **Figure 2** and **Figure 3** in **Appendix A** for specific locations).
- Tap sampling of the two on-Site extraction bores (refer to **Table 1** below and **Figure 3** in **Appendix A** for specific locations)
- Tap sampling of the treated wastewater from the outlet tap of the Camp Kerr WWTP (refer to **Table 2** below and **Figure 3** in **Appendix A** for specific location).
- Collection of surface water samples at 20 locations including 15 on-Site and five off-Site locations (refer to **Table 3** below, and **Figure 2** and **Figure 3** in **Appendix A**).
- Collecting field quality control samples including:
  - field duplicate and triplicate samples at a rate of 1 in 10 primary samples and collecting one rinsate sample per fieldwork day as per the SAQP. In addition, field blanks were also collected each day as well as one trip blank.
- Analysis of all groundwater samples for the PFAS suite at the standard limit of reporting (LOR). Analysis of 20% of groundwater samples for major cations (sodium, calcium, magnesium and potassium) and anions (chloride, sulphate, bicarbonate, carbonate), fluoride, total dissolved solids (TDS), total suspended solids (TSS), dissolved organic carbon (DOC), nitrate, nitrite, ammonia and phosphate.
- Analysis of all surface water samples for the PFAS suite at trace levels of detection. Analysis of 20% of surface water samples for major cations (sodium, calcium, magnesium and potassium) and anions (chloride, sulphate, bicarbonate, carbonate), fluoride, TDS, TSS, DOC, nitrate, nitrite, ammonia and phosphate.
- Analysis of WWTP outlet sample for the PFAS suite at the standard LOR.
- Data management of all OMP field and laboratory data in the Defence ESdat database.
- Preparation of results letters for off-Site stakeholders.
- Preparation of this Sampling Event Factual Report.

Table 1 Groundwater Sampling Locations

Location	Monitoring Well (* denotes samples analysed for non-PFAS suite)
POL Refuelling point	MW101*, MW102, MW115
Airfield	MW103, MW104*, MW105
Southern site boundary	MW106
Electronic Classification Range	MW107
Landfill 1	MW108
Eastern site boundary	MW109
Multiuser Firing Point Range (MUFR)	MW110
Possible demonstration area	MW111
WWTP discharge areas	MW112, MW113, MW114, MW120, MW121, MW122*
Down-gradient / cross-gradient of Camp Kerr	MW116, MW117, MW118, MW119*, POT001, POT005

Table 2 Tapwater Sampling Locations

Description	Tapwater Sampling Locations
Wastewater treatment plant outlet	OTH001

Table 3 Surface Water Sampling Locations

Area	Description	Surface Water Sampling Locations (* denotes samples analysed for non-PFAS suite)
Creek	Kauri Creek	SW004*, SW008, SW012
	Mosquito Creek	SW005
	Kangaroo Creek	SW006, SW07*, SW009
	Snapper Creek	SW013, SW014*, SW016
Drainage Channel	Site entrance (receives runoff from WWTP discharge areas)	SW017
	Vehicle wash point drainage channel	SW018
	Ponded water from surface water flows flowing overland from Camp Kerr	SW019
	Drainage pipe at Clyde Road discharging runoff from Camp Kerr to residential dam	SW027
	Ephemeral waterway draining residential dams in Wallu	SW025*
Dams	Residential dams in Wallu	SW020, SW021, SW022, SW023, SW024

3.0 Methodology

The methodology used for the targeted October 2020 sampling event was in accordance with the SAQP (AECOM, 2020a) and is summarised below.

3.1 Groundwater Sampling Methodology

Table 4 Groundwater Sampling Methodology

Item	Details
Groundwater gauging	The depth to groundwater was measured in each monitoring well immediately prior to collection of groundwater samples using an interface probe. Due to ongoing training activities in different areas of the Base at the time of the fieldworks, areas of the Base were only accessible at specific times/days. Consequently, groundwater gauging data were collected over several days, between 27 and 30 October 2020.
Field parameters	Temperature, electrical conductivity (EC), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH and observations of water quality were recorded for all groundwater samples. Equipment calibration certificates are provided in **Appendix F**.
Sampling methodology	Groundwater samples were collected from all monitoring wells using no-purge methodology HydraSleeves™, which were installed within the screened interval of each well, approximately 1 m above the base of the well (the target depth is shown in **Table T1** in **Appendix A**), for a minimum of 24 hours prior to the sampling round. Once sampling was completed, new HydraSleeves™ were deployed at the screened interval depth in preparation for the next sampling round. Tap samples from extraction bores were collected by opening the tap / valve and allowing the water to run prior to sample collection. Water samples were collected by placing the laboratory provided sample bottle beneath the tap outlet.
Sample analysis	All primary samples were submitted for PFAS suite using the standard levels of detection. Additionally, approximately 20% of selected primary samples were submitted for major ions, TSS, DOC, nitrate, nitrite, ammonia and phosphate. ALS Environmental (ALS) Brisbane, Queensland was used as the primary laboratory. The National Measurement Institute (NMI) of Sydney, NSW was used as the secondary laboratory. ALS and NMI methods for groundwater analyses were certified by the National Association of Testing Authorities (NATA). Chain of custody (COC) forms and laboratory certificates are presented in **Appendix D** and **Appendix E** respectively.
QA/QC Samples	Field QA/QC samples collected included intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and rinsate samples. Field and trip blanks were also collected during this sampling event. Refer to **Appendix C** for assessment of QA/QC sample data.

3.2 Surface Water Sampling Methodology

Table 5 Surface Water Sampling Methodology

Item	Details
Field parameters	Temperature, electrical conductivity, dissolved oxygen, oxidation-reduction potential, pH and observations of water quality were recorded for all surface water samples. Equipment calibration certificates are provided in **Appendix F**.
Sampling methodology	Samples were collected from immediately below the water surface to minimise collection of sediment or floating materials in the samples. At each location, a new, laboratory-supplied container was lowered into the water with the cap immediately applied once the container was full.
Sample analysis	All primary samples were submitted for PFAS suite using the standard levels of detection. Additionally, approximately 20% of selected primary samples were submitted for major ions, TSS, DOC and nitrate, nitrite, ammonia and phosphate. ALS Brisbane, Queensland was used as the primary laboratory. The NMI of Sydney, NSW was used as the secondary laboratory. ALS and NMI methods for groundwater analyses were certified by the NATA. COC forms and laboratory certificates are presented in **Appendix D** and **Appendix E** respectively.
QA/QC Samples	Field QA/QC samples collected included intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and rinsate samples. Field and trip blanks were also collected during this sampling event. Refer to **Appendix C** for assessment of QA/QC sample data.

3.3 Wastewater Treatment Plant Sampling Methodology

Table 6 WWTP Sampling Methodology

Item	Details
Locations sampled	OTH001 was collected from an outlet at the WWTP.
Sampling methodology	The tap/valve was opened and water allowed to run prior to a sample being collected. A laboratory provided sample bottle was placed beneath the tap outlet. The sample bottle was filled to the top to ensure no headspace and the cap was immediately applied. The sample bottle was immediately placed in a cooler with cooling media.
Sample analysis	The sample was submitted for PFAS suite using the standard levels of detection.

3.4 Adopted Screening Criteria

Adopted screening criteria references national guidance in the form of the PFAS National Environmental Management Plan, Defence estate and environmental strategies, and Defence PFAS-specific strategies and guidance. Guidance documents used to assess the dataset includes the following:

- PFAS National Environmental Management Plan (NEMP), (HEPA 2020)
- Department of Health, 2019. Health Based Guidance Values for PFAS for use in site investigations in Australia, September 2019
- National Health and Medical Research Council (NHMRC), 2019. Guidance on PFAS in Recreational Water. August 2019 (NHMRC 2019)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B1, as amended in 2013 (ASC NEPM)

The adopted PFAS screening criteria to assess the data generated as part of the OMP are presented in **Table 7** below.

Table 7 Summary of Adopted Screening Criteria

Pathway	Compound	Criteria	Comment / Reference
Human Health Receptors			
Drinking water - groundwater	PFOS + PFHxS	0.07 µg/L	The values are from the PFAS NEMP (HEPA, 2020). *All groundwater results will be compared to these criteria.*
	PFOA	0.56 µg/L	
Recreational use – surface water	PFOS + PFHxS	2 µg/L	The values are from NHMRC (2019). *All surface water results will be compared to these criteria.*
	PFOA	10 µg/L	
Ecological Receptors			
Freshwater (99% species protection values)	PFOS	0.00023 µg/L	The values are from the PFAS NEMP (HEPA, 2020). The 99% level of protection has been applied for slightly to moderately disturbed ecosystems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. For the purposes of preliminary screening of analytical water results, the laboratory LOR will be adopted rather than sole use of the criteria value. *All surface water and groundwater results will be compared to these criteria.*
	PFOA	19 µg/L	
Freshwater (95% species protection values)	PFOS	0.13 µg/L	Surface water in the ephemeral waterway south of Clyde Road (SW025) should be screened against freshwater ecological guidelines for slight to moderately disturbed ecosystems (95% species protection).
	PFOA	220 µg/L	

There are no human health or ecological guideline values available for sediment.

3.5 Data Quality Objectives and Data Validation

The data quality objectives and data quality indicators adopted for these works are presented in the SAQP (AECOM, 2020a).

Data validation assessment is provided in **Appendix C**.

The data validation procedure employed in the assessment of the field and laboratory QA/QC data indicated that the reported analytical results are representative of the sample locations and that the overall quality of the analytical data produced is acceptably reliable for the purpose of this report.

All data collected during this event has been reviewed and uploaded to the Defence ESdat database in accordance with Defence Contamination Management Manual (Defence, 2018) requirements.

3.6 Deviations from the SAQP

Table 8 lists the deviations from the SAQP (AECOM, 2020a) during this sampling event.

Table 8 Deviations from the SAQP during October 2020 Sampling Event

SAQP	October 2020 Sampling Event
Groundwater sampling of monitoring well MW102	Groundwater well MW102 was unable to be located and is likely to be buried under road base.
Non-PFAS analysis of surface water sample SW022	Non-PFAS analysis was switched from SW022 to SW025 for logistical reasons. Non-PFAS analysis on surface water samples was conducted for characterisation and future research purposes. As the surface water sampling locations are close to each other, there will be minimal impact to the understanding of surface water conditions due to this change.

4.0 Field Observations and Results

The October 2020 biannual sampling event was completed on 13 October and between 26 and 30 October 2020. The results are summarised in following sections.

4.1 Groundwater Observations and Field Measurements

Table 9 Groundwater Observations and Field Measurements

Compound	Criteria
Access	All monitoring wells and bores were accessible except for monitoring well MW102, which was unable to be located and is likely to be buried under road base.
Monitoring Well Network	Covers to the groundwater monitoring wells were noted to be in good condition at the time of sampling.
Field Observations	No visible or olfactory indications of contamination were observed during the sampling of the 21 accessible groundwater monitoring wells. Field observations are presented **Table T1** in **Appendix B**.
Depth to Groundwater	Depth to groundwater in the monitoring wells was between 1.04 metres below top of casing (mbtoc) and 14.32 mbtoc. Groundwater elevations in these bores were between 7.38 mAHD and 71.000 mAHD. Groundwater gauging data are presented in **Table T1** in **Appendix B**.
Groundwater Flow Direction	Inferred groundwater contours and groundwater flow directions in the greater WBTA area in October 2020 are shown on **Figure 4** in **Appendix A**. The inferred local groundwater flow direction is generally from the southwest to the northeast, towards Tin Can Bay. Inferred groundwater contours and groundwater flow directions within and immediately adjacent to Camp Kerr between 26 and 30 October 2020 are shown on **Figure 5** in **Appendix A**. A groundwater divide appears to be present in the central portion of Camp Kerr with groundwater to the east of the groundwater divide flowing towards the east. Groundwater to the west of the groundwater divide appears to be flowing to the west and southwest towards Wallu, and towards the south. The observed groundwater divide is consistent with that observed in previous investigations (AECOM, 2020a).
Geochemical Parameters	Groundwater geochemical parameters were measured prior to collecting groundwater samples. The readings are presented in **Table T1** in **Appendix B** and are summarised below: • Electrical conductivity ranged from 93.2 µS/cm (MW114) to 611 µS/cm (MW105) indicating fresh conditions. • pH ranged from 4.37 (MW120) to 6.67 (POT005). pH results generally indicated slightly acidic to near neutral conditions. • Corrected redox ranged from 284.1 mV (POT005) to 444.0 mV (MW106) indicating mildly reducing conditions. • Temperature ranged from 21.1°C (MW106) to 25.1°C (MW119). • The dissolved oxygen results ranged between 0.16 mg/L (MW111) and 3.71 mg/L (MW118) indicating poorly to slightly oxygenated conditions.

4.1.1 PFAS Groundwater Analytical Results

The PFAS groundwater analytical results from this sampling event are presented in **Table T2** in **Appendix B**. There were no first-time detections or first-time exceedances of the human health guideline values in the October 2020 sampling event for PFOA and sum of PFHxS+PFOS. Two groundwater samples exceeded the HEPA (2020) drinking water guideline value for sum of PFHxS and PFOS. Two groundwater samples reported PFOS above the limit of reporting at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of freshwater species. There were no exceedances of the human health or ecological guidelines values for PFOA.

PFAS were not detected at concentrations that exceeded the limit of reporting in groundwater samples from either of the two extraction bores, Bore 1 (POT001) and Bore 2 (POT005). There were no exceedances of the human health or ecological guideline values for sum of PFHxS+PFOS, PFOS and PFOA.

4.1.2 Non-PFAS Groundwater Analytical Results

The non-PFAS groundwater analytical results from this sampling event are presented in **Table T3** in **Appendix B.**

4.2 Surface Water Observations and Field Measurements

Table 10 Surface Water Observations and Field Measurements

Compound	Criteria
Access	All surface water sampling locations were accessible during the October 2020 sampling event. Prior to conducting sampling on private properties, access permissions were obtained from stakeholders.
Field Observations	Organic sheen appearance was noted at SW005, SW006 and SW009. No visual or olfactory indications of contamination were observed during the sampling of the other surface water sampling locations. Field observations are presented in **Table T4** in **Appendix B**.
Geochemical Parameters	Surface water geochemical parameters were measured prior to collecting surface water samples. The readings are presented in **Table T4** in **Appendix B** and are summarised below: • Dissolved oxygen ranged from 0.26 mg/L (SW009) to 6.27 mg/L (SW023). The measurements generally indicated moderately oxygenated conditions. • With the exception of SW008, SW012 and SW013, electrical conductivity ranged from 125 µS/cm (SW023) to 254 µS/cm (SW004) indicating fresh conditions in inland creeks and dams. The three surface water samples from estuarine environments had between 41260 µS/cm (SW013) and 46,198 µS/cm (SW012) indicating saline conditions. • pH ranged from 4.9 (SW020) to 7.83 (SW014). pH results generally indicated near neutral conditions. • Corrected redox ranged from 246 mV (SW013) to 452 mV (SW023) indicating mildly reducing conditions. • Temperature ranged from 20.4°C (SW021) and 27.7°C (SW012).
Weather conditions	Weather conditions varied between sunny conditions and overcast storm conditions. Rainfall events occurred on several days including 28 October 2020 (42.2 mm), 29 October 2020 (6.8 mm) and 30 October 2020 (0.2 mm).

4.2.1 PFAS Surface Water Analytical Results

The PFAS surface water analytical results from this sampling event are presented in **Table T5** in **Appendix B**. First-time detections of sum of PFHxS+PFOS was reported in the samples from SW021 (0.0043 µg/L) and SW027 (0.0124 µg/L). This was the first time SW027 has been sampled and the second time SW021 has been sampled. There were no first-time exceedances of the human health guideline values in the October 2020 sampling event for PFOA and sum of PFHxS+PFOS. Five surface water samples reported PFOS above the limit of reporting at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of fresh / marine water species. No surface water samples reported PFOA at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of fresh / marine water species.

First-time detections from the historical dataset are recorded in **Table 11** below and are shown on **Figure 6**, **Appendix A**.

Table 11 First-time Detections or Exceedances in the Surface Water Dataset

First-time detections / exceedances	Surface Water Sampling Locations	Sum of PFHxS+PFOS concentration (µg/L)		PFOA concentration (µg/L)	
		October 2020	Historical maximum	October 2020	Historical maximum
First time detections of Sum of PFHxS+PFOS or PFOA in surface water	SW021	0.0043	<LOR	<LOR	<LOR
	SW027	0.0124	Not sampled previously	<LOR	Not sampled previously
First time exceedance of the NHMRC (2019) recreational use guidelines	There were no first-time exceedances of the NHMRC (2019) recreational use guideline values.				

4.2.2 Non-PFAS Surface Water Analytical Results

The non-PFAS surface water analytical results from this sampling event are presented in **Table T6** in **Appendix B.**

4.3 Wastewater Analytical Results

The PFAS surface water analytical results from this sampling event are presented in **Table T7** in **Appendix B**. There were no first-time detections of PFAS or exceedances of the human health guideline values in the October 2020 sampling event for PFOA and sum of PFHxS+PFOS. None of the compounds with HEPA (2020) human health and ecological guideline values (PFHxS, PFOS and PFOA) were detected at concentrations that exceeded the limit of reporting.

5.0 Summary and Next Sampling Event

5.1 Summary of Monitoring Event

A biannual groundwater, surface water and wastewater monitoring event was completed at the Site and WBTA Management Area on 13 October and between 26 and 30 October 2020. The program included sampling of groundwater from 21 monitoring wells, two extraction bores, one WWTP tap outlet and 20 surface water sampling locations.

Table 12 summarises the findings of the biannual October 2020 sampling event and the recommended actions.

Table 12 Summary of Sampling Event

Item	Comment	Recommended Actions
Access to sampling locations	21 out of 22 monitoring well/bore locations were accessible and able to be sampled. MW102 was not accessible as it was buried beneath road base, which is stored in this area. All extraction bores, WWTP tap outlet and surface water sample locations were accessible and able to be sampled.	Monitoring well MW102 to be reinspected during the April 2021 sampling event.
Monitoring well network condition	No issues were identified in the 21 monitoring wells sampled.	The SAQP should be updated to include monitoring well construction details.
Analytical Results	PFAS concentrations in the 23 groundwater samples (21 monitoring wells and two extraction bores) and one WWTP tap outlet sampled were consistent with historical results. PFAS concentrations detected within 19 of the 20 surface water were consistent with historical results. Sum of PFHxS and PFOS concentrations exceeded the HEPA (2020) drinking water guidelines value in two groundwater samples. PFOS concentrations in five surface water samples exceeded the HEPA (2020) ecological guideline value (99% species protection).	Ongoing monitoring in accordance with the OMP. QA/QC samples should target locations where PFAS are expected to be present at detectable concentrations. The SAQP should be updated to address this recommendation.
First-time detections of Sum of PFHxS+PFOS or PFOA	There were no first-time detections of sum of PFHxS+PFOS or PFOA in the 23 groundwater samples and WWTP sample. Two out of 20 surface water samples (SW021 and SW027) recorded a first-time detection of sum of PFHxS+PFOS. However, sampling location SW027 had not been previously sampled and SW021 was sampled for the second time.	Ongoing monitoring in accordance with the OMP.
First time exceedance of NEMP (HEPA, 2020) drinking water or recreational use guidelines	There were no first-time exceedances of the NEMP (HEPA, 2020) drinking water guidelines or NHMRC (2019) recreational use guidelines.	Ongoing monitoring in accordance with the OMP.

5.2 Upcoming Sampling Events

The next biannual sampling event is scheduled for April 2021.

5.3 Upcoming Annual Interpretive Report

The next annual interpretative report is scheduled for September 2021.

6.0 References

AECOM, 2020, *PFAS OMP - WBTA Sampling and Analysis Quality Plan*, Revision 0, 16 October 2020.

ASC NEPM, 2013. *Schedule B2. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B2 Guideline on Site Characterisation*.

ASC NEPM, 2013. *Schedule B4. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B4 Guideline on Site-Specific Health Risk Assessment Methodology*.

ASC NEPM, 2013. *Schedule B7. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B7 Guideline on Derivation of Health-Based Investigation Levels*.

Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

Department of Defence, 2020. *Wide Bay Training Area – PFAS Management Area Plan*, Version 7, September 2020.

Department of Defence, July 2018, Amended August 2019, *Defence Contamination Management Manual.*

Department of Defence, March 2020. *PFAS OMP Factual Reports –Guidance for Preparation*

Department of Health, 2019. *Health Based Guidance Values for PFAS for use in site investigations in Australia*, September 2019.

Heads of EPAs Australia and New Zealand, 2018. *PFAS National Environmental Management Plan*. January 2020.

National Health and Medical Research Council, 2019. *Guidance on PFAS in Recreational Water. August 2019*. August 2019.

Appendix A

Figures

Appendix A Figures

Wide Bay Training Area

Australian Government Department of Defence

TOOLARA STATE FOREST

Tin Can Bay

Inskip

Pannikin Island

Little Stony Creek

Teelaw Creek

Griffin Creek

Carlo Island

Carlo Point

Mosquito Creek

Kauri Creek

Kingyan Creek

Judd Point

Snapper Point

Tin Can Inlet

Smooger Point

CARAVAN PARK

Tin Can Bay

CARAVAN PARK

TIN CAN BAY STATE SCHOOL

TOOLARA GOLF COURSE

Toolara

TOOLARA AIRPORT

Teewah Point

North Cooloola Point

Marybrough - Cooloola Road

Tin Can Bay Road

CAMP KERR

Wallu

Wallu Heights

Rainbow Beach Road

Unnamed Creek

Snapper Creek

Cooloola Cove

South Cooloola Point

Poverty Point

KEY

- Wide Bay Training Area
- Management Area
- Parks and recreation reserves
- Major road
- Road
- Watercourse

0 2km

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\60580555 F2 Investigation Area 08 01 2020 TO Rev B

AECOM Imagine it. Delivered.

LOCATION OF WBTA AND MANAGEMENT AREA

October 2020 Sampling Event

Wide Bay Training Area, Queensland

FIGURE 1

Pioneer Point Boat Ramp
Tin Can Bay
Inskip
Pannikin Island
UOTF/EHTA
Demolition Range
SW012
Old Boat Ramp/Sentry Post
Little Sandy Creek
Airstrip UAV
24m Tower
Wide Bay Training Area
SW005
SW008
Mosquito Creek
Tookar Creek
Griffin Creek
Forward Operating Base
SW009
Carlo Island
AGR/SGR/DFSW
SW004
Kauri Creek
Kingfisher Creek
Easy Feature/MUFP/MCR/BIF
Tin Can Bay
Tin Can Bay Waste Transfer Station and Sewage Treatment Works
Quarry
Ammunition Storage
MW110
MW109
SW013
SW014
Maryborough - Cooloola Road
MW107
MW108
SW06
Landfill 1
Range/ECR
SW07
MW105
MW104
MW103
SW016
Tin Can Bay Road
MW111
MW106
Wallu
Wallu Heights
Rainbow Beach Road
Snapper Creek
Tinnanul Creek
Area shown in Figure 3
Toolara
Teewah Point
North Cooloola Point
Cooloola Cove
South Cooloola Point
Poverty Point
Tin Can Inlet
Snapper Point
Smooger Point
Judd Point
Toolara Golf Course
Toolara Airport
Tin Can Bay State School
Caravan Park

KEY
- Wide Bay Training Area
- Management Area
- Great Sandy Strait Ramsar
- Parks and recreation reserves
- Major road
- Road
- Watercourse
- Surface water sample location
- Groundwater monitoring well location

0 2km

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\60580555 F5 Sample Locations (Greater WBTA) 08 01 2020 TO Rev B

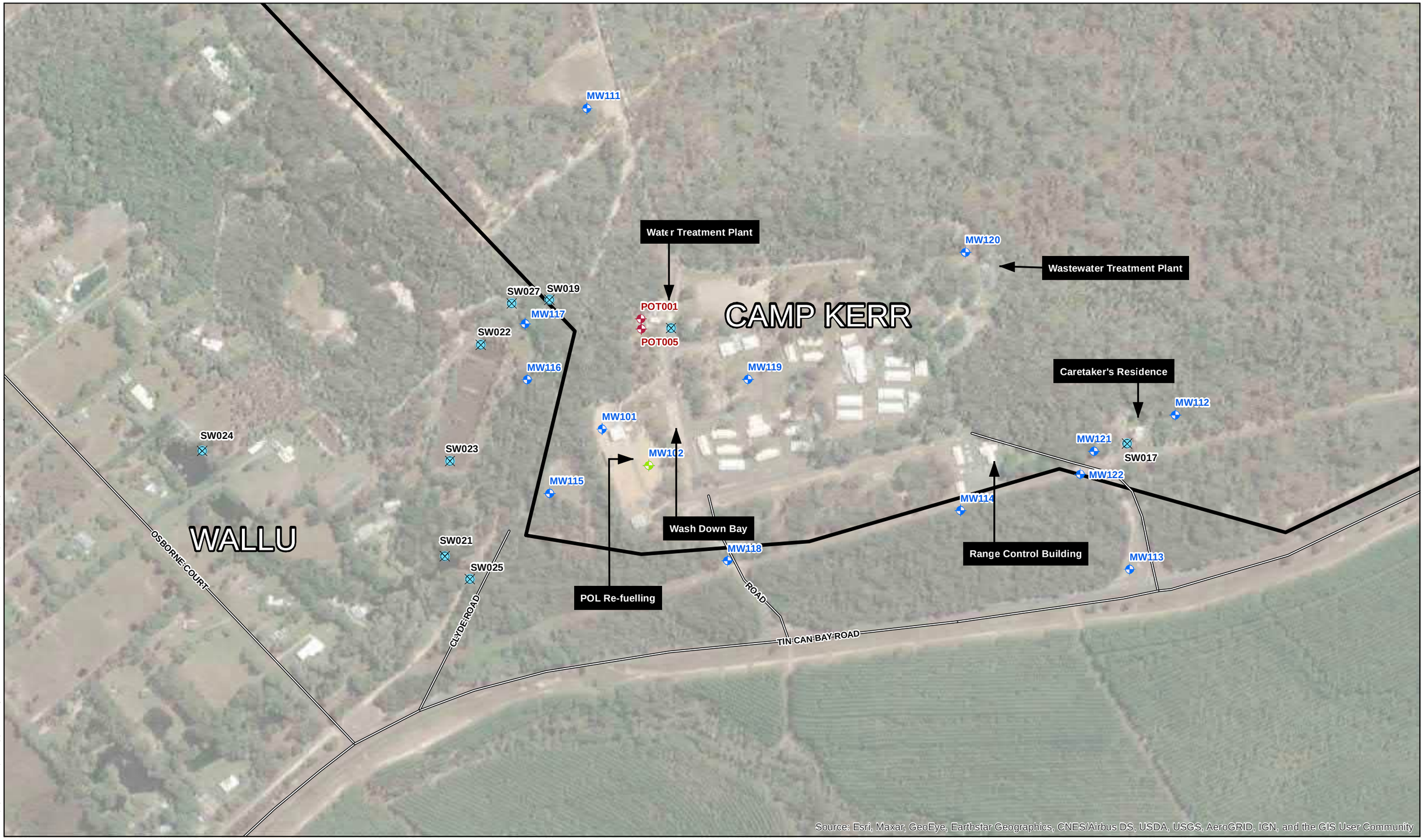
AECOM Imagine it. Delivered.

UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SAMPLING LOCATIONS (GREATER WIDE BAY TRAINING AREA)

October 2020 Sampling Event
Wide Bay Training Area, Queensland

FIGURE F2



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX

0 55 110 220

metres

1:4,500 (when printed at A3)

LEGEND

- Abstraction Bore
- Groundwater sampling location
- Sediment / surface water sampling location
- Groundwater sampling location not accessible
- Road
- Wide Bay Training Area

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Wide Bay Training Area, Queensland

SAMPLING LOCATIONS (CAMP KERR)

October 2020 Sampling Event

PROJECT ID	60580555
CREATED BY	PeacheyJ
LAST MODIFIED	
VERSION:	JP- 10/02/21

Figure

3

Filename:\\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_Factual Report October 2020\60612563_F3_OMP_Sampling_Locations_CampKerr_20210211.mxd

A3 size

Easy Feature/MUFP/MCR
Quarry
BIF
MW110
MW109
10 m
15 m
Kangaroo Creek
600m Range/ECR
20 m
ROAD
MW104
25 m
Toolara Airport
MW107
MW105
Landfill 1
30 m
MW108
MW103
35 m
50 m
55 m
TIN CAN BAY ROAD
40 m
60 m
Wallu Heights
MW106
BOBREI COURT
45 m
RAINBOW BEACH ROAD

Path: P:\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\WBTA_P60612563_F4_InferredGroundwaterContours_Oct2020_20201117.mxd

LEGEND

- Groundwater Well Location
- Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction
- Wide Bay Site Features
- Wide Bay Training

Groundwater data were collected between 28 and 30 October 2020

N

0 0.15 0.3 0.6 km

AECOM

SCALE 1:16,918

SIZE A3

SHEET **1 of 1**

COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

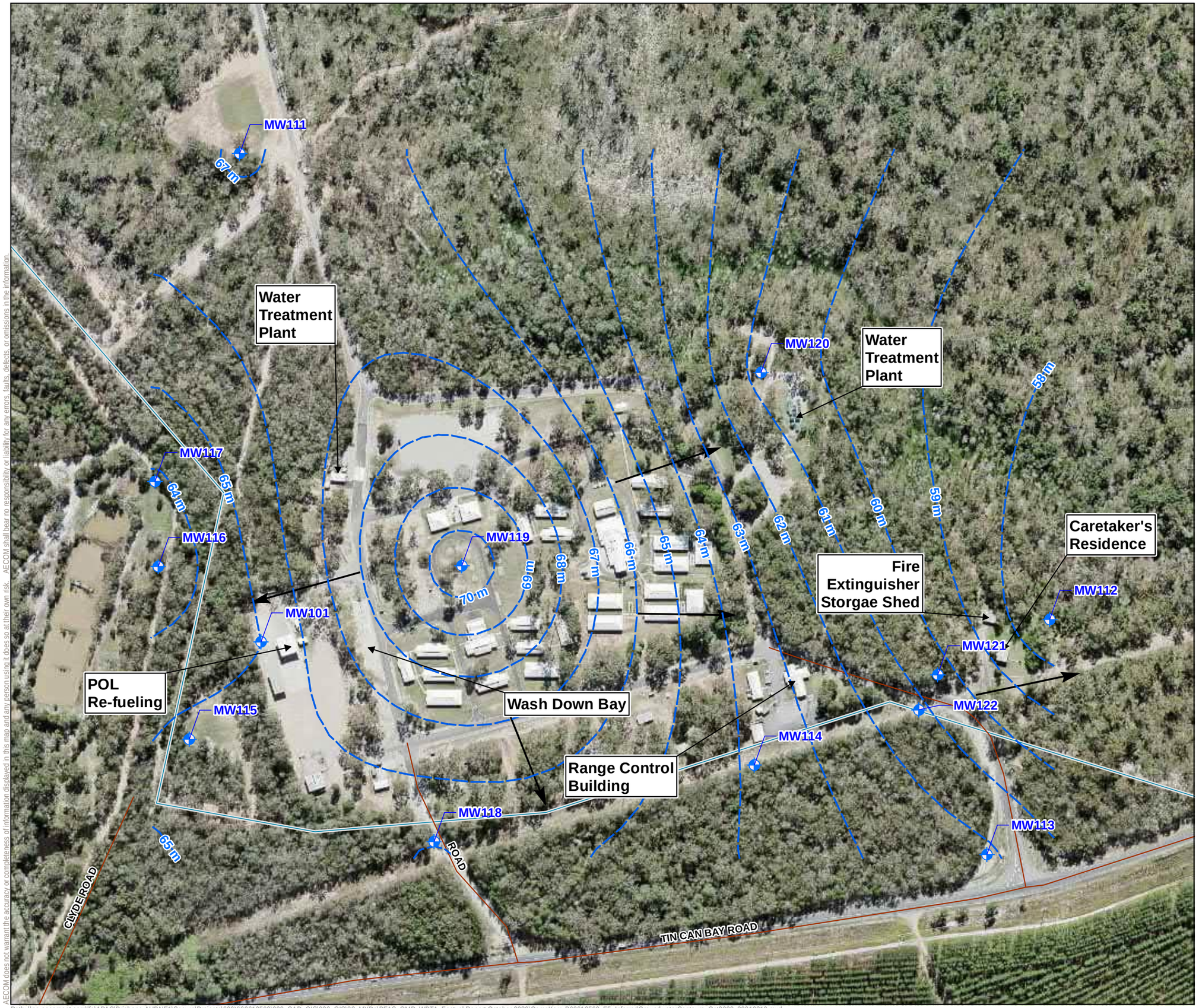
Figure 4: Inferred Groundwater Contours, Greater WBTA: October 2020

PROJECT

PFAS OMP OCTOBER 2020 SAMPLING EVENT

CLIENT

DEPARTMENT OF DEFENCE



LEGEND

- Monitoring Wells
- Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction
- Roads
- Wide Bay Training Area

Groundwater elevation data were collected between 28 and 29 October 2020

Meters
0 25 50 100

AECOM

SCALE 1:3,000
SIZE A3

SHEET 1 of 1
COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE
Figure 5: Inferred Groundwater Contours, Camp Kerr: October 2020

PROJECT
PFAS OMP WBTA SAMPLING EVENT
FACTUAL REPORT: OCTOBER 2020

CLIENT
DEPARTMENT OF DEFENCE

Path: \\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_Factual Report October 2020\CampKerr_P60612563_F5_InferredGroundwaterContours_Oct2020_20210210.mxd

Path: \\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\CampKerr_P60612563_F6_GWResults_DevFromHist_20201117.mxd

LEGEND

- First time detection of PFHxS+PFOS or PFOA

N

0 25 50 100 Meters

AECOM

SCALE 1:3,000

SIZE A3

SHEET **1 of 1**

COORDINATE SYSTEM GDA 1994 MGA Zone 56

TITLE

Figure 6: Groundwater Results: Deviations from Historical Data

PROJECT

PFAS OMP WBTA SAMPLING EVENT
FACTUAL REPORT: OCTOBER 2020

CLIENT

DEPARTMENT OF DEFENCE

Appendix B

Tables

Appendix B Tables

Table T1 Groundwater Gauging and Quality Parameter Results

Property ID	Well ID	Sample Date	Screened Interval depth (mbgs)	Well Depth (mbtoc)	Depth to Water (mbtoc)	TOC Elevation (mAHD)	Groundwater Elevation (mAHD)	Condition of Stand up cover / Gatic	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Water Colour	Odour	Sheen	Sample Method / Comments	Hydrasleeve target depth (mbtoc)	Hydrasleeve install date	Hydrasleeve install time	Hydrasleeve removal date	Hydrasleeve removal time
0224	MW101	29/10/2020	11 to 15	16.06	14.324	79.264	64.940	Good	1.47	167	4.53	205.1	410.1	24.2	Medium	Other	No odour	No sheen	Hydrasleeve	15.0	28/10/2020	9:50 AM	29/10/2020	1:23 PM
0224	MW102	28/10/2020	14 to 20	-	-	78.564	-	Good	-	-	-	-	-	-	-	-	-	-	Unable to be located	-	-	-	-	-
0224	MW103	30/10/2020	7.5 to 10.5	11.63	4.232	33.239	29.007	Good	3.2	157	5.58	157.8	362.8	23.5	Low	Clear	No odour	No sheen	Hydrasleeve	10.5	26/10/2020	11:45 AM	30/10/2020	7:49 AM
0224	MW104	30/10/2020	8 to 11	12.045	4.332	20.815	16.483	Good	2.04	154.9	5.04	178	383	24.8	Low	Clear	No odour	No sheen	Hydrasleeve	11.0	26/10/2020	12:18 PM	30/10/2020	8:20 AM
0224	MW105	30/10/2020	4.2 to 7.2	8.33	1.987	27.603	25.616	Good	0.3	611	5.97	121.4	326.4	23.1	Clear	Clear	No odour	No sheen	Hydrasleeve	7.0	26/10/2020	12:00 PM	30/10/2020	8:02 AM
0224	MW106	29/10/2020	4 to 10	11.095	4.101	69.468	65.367	Good	2.5	126.3	4.47	239	444	21.1	Medium	Other	No odour	No sheen	Hydrasleeve	10.0	27/10/2020	3:05 PM	29/10/2020	7:39 AM
0224	MW107	29/10/2020	2.8 to 5.8	6.8	2.165	37.789	35.624	Good	0.55	215.3	4.82	231.4	436.4	24.7	Clear	Clear	No odour	No sheen	Hydrasleeve	5.8	27/10/2020	11:43 AM	29/10/2020	10:43 AM
0224	MW108	29/10/2020	14.5 to 17.5	18.48	5.935	39.99	34.055	Good	0.36	517	6.34	157	362	24.9	Clear	Clear	No odour	No sheen	Hydrasleeve	17.5	27/10/2020	12:14 PM	29/10/2020	11:14 AM
0224	MW109	28/10/2020	7 to 10	11.07	1.829	9.207	7.378	Good	0.34	214.5	5.6	159.3	364.3	22.8	Low	Other	No odour	No sheen	Hydrasleeve	10.0	26/10/2020	12:46 PM	28/10/2020	8:09 AM
0224	MW110	28/10/2020	0.5 to 4	4.54	1.043	17.967	16.924	Good	1.37	256.1	5.68	155.2	360.2	22.6	Low	Other	No odour	No sheen	Hydrasleeve	3.5	26/10/2020	2:07 PM	28/10/2020	7:34 AM
0224	MW111	29/10/2020	16.5 to 20.5	21.52	11.806	78.952	67.146	Good	0.16	256.9	5.41	167.2	372.2	24.3	Clear	Clear	No odour	No sheen	Hydrasleeve	20.5	27/10/2020	1:00 PM	29/10/2020	11:46 AM
0224	MW112	29/10/2020	6 to 9	9.86	8.188	65.183	56.995	Good	0.63	155	4.53	230.5	435.5	22.7	Medium	Yellow / Brown	No odour	No sheen	Hydrasleeve	9.0	27/10/2020	2:10 PM	29/10/2020	3:15 PM
0224	MW113	28/10/2020	6 to 9	9.07	5.496	67.717	62.221	Good	1.32	161.1	4.67	218.4	423.4	22.4	Clear	Clear	No odour	No sheen	Hydrasleeve	8.0	26/10/2020	3:55 PM	28/10/2020	2:36 PM
0224	MW114	28/10/2020	8.5 to 11.5	12.505	9.2	73.016	63.816	Good	2.54	93.2	4.66	221	426	22.4	Clear	Clear	No odour	No sheen	Hydrasleeve	11.5	26/10/2020	4:27 PM	28/10/2020	2:13 PM
0224	MW115	29/10/2020	13 to 16	17.045	11.3	76.659	65.359	Good	0.39	188.2	5.07	162.4	367.4	23.9	Low	Clear	No odour	No sheen	Hydrasleeve	16.0	28/10/2020	7:10 PM	29/10/2020	12:59 PM
0224	MW116	28/10/2020	8 to 11	11.77	6.543	69.815	63.272	Good	0.72	444	6.18	136	341	23.5	Clear	Clear	No odour	No sheen	Hydrasleeve	11.0	26/10/2020	4:44 PM	28/10/2020	12:59 PM
0224	MW117	28/10/2020	7 to 10	11.02	5.129	68.914	63.785	Good	0.98	450	6.11	129.6	334.6	24.5	Low	Light brown	No odour	No sheen	Hydrasleeve	10.0	26/10/2020	4:53 PM	28/10/2020	12:30 PM
0224	MW118	28/10/2020	10 to 13	13.69	11.165	76.154	64.989	Good	3.71	144.5	4.84	187.3	392.3	22.7	Low	Clear	No odour	No sheen	Hydrasleeve	12.7	26/10/2020	4:13 PM	28/10/2020	1:46 PM
0224	MW119	29/10/2020	13 to 16	15.765	8.546	79.546	71.000	Good	2.68	269.5	5.09	167.1	372.1	25.1	Low	Clear	No odour	No sheen	Hydrasleeve	14.7	28/10/2020	8:52 AM	29/10/2020	12:32 PM
0224	MW120	29/10/2020	Not known	13.735	10.745	71.332	60.587	Good	0.76	177.3	4.37	213.4	418.4	25	Clear	Clear	No odour	No sheen	Hydrasleeve	12.7	27/10/2020	1:20 PM	29/10/2020	2:05 PM
0224	MW121	29/10/2020	Not known	15.07	9.972	70.405	60.433	Good	1.05	140.5	4.69	199.3	404.3	23.4	Clear	Clear	No odour	No sheen	Hydrasleeve	14.0	27/10/2020	12:40 PM	29/10/2020	2:32 PM
0224	MW122	29/10/2020	Not known	20.1	9.373	70.575	61.202	Good	0.69	105.6	4.38	189.6	394.6	24.5	Medium	Other	No odour	No sheen	Hydrasleeve	19.0	27/10/2020	1:55 PM	29/10/2020	2:46 PM
0224	POT001	28/10/2020	18 to 78.4	-	-	-	-	-	2.03	593	6.39	117.2	322.2	24.2	Clear	Clear	No odour	No sheen	Grab	-	-	-	-	-
0224	POT005	28/10/2020	30 to 51.5	-	-	-	-	-	1.79	481.3	6.67	79.1	284.1	24.1	Clear	Clear	No odour	No sheen	Grab	-	-	-	-	-

mbgs is metres below ground surface
mbtoc is metres below top of casing
mAHD is metres above Australian height datum
DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential
Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)
Temp is Temperature
µS/cm is microsiemens per centrimetre
ºC is degrees Celcius
mV is millivolts
`- No data
At the time of preparing this report, Defence are searching for the well construction records for monitoring wells MW120, MW121 and MW122.

Table T2 Groundwater PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFDoDA	PFTeDA	PFTrDA	PFUnDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.05	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.05	0.01
NEMP (2020) Human Health Drinking Water		**0.07**											**0.56**																		
NHMRC (2019) PFAS Recreational Water		2											10																		
NEMP (2020) Ecological Freshwater 99% Species Protection							**0.00023**						*19*																		
Location ID	**Sample ID**	**Lab Report Number**	**Sample Date**																													
MW101	0224_MW101_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW103	0224_MW103_201030	EB2028561	30/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW104	0224_MW104_201030	EB2028561	30/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW105	0224_MW105_201030	EB2028561	30/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW106	0224_MW106_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW107	0224_MW107_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW108	0224_MW108_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW109	0224_MW109_201028	EB2028561	28/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW110	0224_MW110_201028	EB2028561	28/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW111	0224_MW111_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW112	0224_MW112_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW113	0224_MW113_201028	EB2028561	28/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW114	0224_MW114_201028	EB2028561	28/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW115	0224_MW115_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW116	0224_MW116_201028	EB2028561	28/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW117	0224_MW117_201028	EB2028561	28/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW118	0224_MW118_201028	EB2028561	28/10/2020	0.01	<0.02	<0.02	<0.02	<0.02	**0.01**	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.01
MW119	0224_MW119_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW120	0224_MW120_201029	EB2028561	29/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW121	0224_MW121_201029	EB2028561	29/10/2020	**0.13**	<0.02	<0.02	0.09	<0.02	**0.04**	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13
MW122	0224_MW122_201029	EB2028561	29/10/2020	**0.16**	0.02	<0.02	0.16	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.18
POT001	0224_POT001_201028	EB2028561	28/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
POT005	0224_POT005_201028	EB2028561	28/10/2020	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01

LOR is limit of reporting
µg/L is micrograms per litre
'-' denotes no analysis undertaken
'<' denotes concentration is less than
NEMP is National Environmental Mangement Plan
NHMRC is National Health Medical Research Council
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values

Table T3 Groundwater Non-PFAS Analytical Results

				Sodium (Filtered)	Calcium (Filtered)	Magnesium (Filtered)	Potassium (Filtered)	Anions Total	Chloride	Sulfate as SO4	Alkalinity (Bicarbonate as CaCO3)	Carbonate as CaCO3	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Cations Total	Fluoride	Total Suspended Solids	Total Dissolved Solids	Dissolved Organic Carbon	Ammonia as N	Nitrate (as N)	Nitrite + Nitrate as N	Nitrite (as N)	Reactive Phosphorus as P
			Units	mg/L	mg/L	mg/L	mg/L	meq/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			LOR	1	1	1	1	0.01	1	1	1	1	1	1	0.01	0.1	5	10	1	0.01	0.01	0.01	0.01	0.01
Location ID	**Sample ID**	**Lab Report Number**	**Sample Date**																					
MW101	0224_MW101_201029	EB2028561	29/10/2020	22	2	2	<1	1.14	36	3	3	<1	<1	3	1.22	<0.1	427	80	8	<0.01	<0.01	<0.01	<0.01	<0.01
MW104	0224_MW104_201030	EB2028561	30/10/2020	19	<1	2	<1	0.88	27	2	4	<1	<1	4	0.99	<0.1	149	89	5	<0.01	0.1	0.1	<0.01	<0.01
MW119	0224_MW119_201029	EB2028561	29/10/2020	37	5	4	<1	2.15	65	2	14	<1	<1	14	2.19	<0.1	282	147	8	<0.01	0.57	0.57	<0.01	<0.01
MW122	0224_MW122_201029	EB2028561	29/10/2020	12	<1	1	<1	0.47	13	3	2	<1	<1	2	0.6	<0.1	1150	58	4	<0.01	0.2	0.2	<0.01	<0.01

LOR is limit of reporting
mg/L is milligrams per litre
meq/l is milliequivalents per litre
-' denotes no analysis undertaken
<' denotes concentration is less than

Table T4 Surface Water Quality Parameter Results

Property ID	ID	Sample Date	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Odour	Sheen
0224	SW004	27/10/2020	4.75	253.9	7.51	79.4	284.4	25.1	Clear	No odour	No sheen
0224	SW005	27/10/2020	3.13	232.4	6.17	74.9	279.9	24.6	Clear	No odour	Slight organic sheen
0224	SW006	27/10/2020	4.56	202.8	6.33	120.4	325.4	24.9	Clear	No odour	Slight organic sheen
0224	SW007	26/10/2020	4.2	195.7	5.95	131.9	336.9	25.5	Clear	No odour	No sheen
0224	SW008	27/10/2020	3.08	41392	6.82	84.2	289.2	26.2	Clear	No odour	No sheen
0224	SW009	26/10/2020	0.26	225.9	5.51	51	256	21.5	Clear	No odour	Slight organic sheen
0224	SW012	26/10/2020	5.31	46198	7.18	49.1	254.1	27.7	Clear	No odour	No sheen
0224	SW013	26/10/2020	6.02	41260	7.29	41.1	246.1	23.6	Clear	No odour	No sheen
0224	SW014	26/10/2020	4.87	220.1	7.83	52	257	22.3	Low	No odour	No sheen
0224	SW016	26/10/2020	4.48	174.3	7.7	93.4	298.4	23.1	Clear	No odour	No sheen
0224	SW017	27/10/2020	5.91	169.9	7.16	97.9	302.9	23.2	Clear	No odour	No sheen
0224	SW018	27/10/2020	5.79	117.9	7.23	101	306	24	Clear	No odour	No sheen
0224	SW019	28/10/2020	4.03	206.7	5.9	179.6	384.6	24.5	Low	No odour	No sheen
0224	SW020	29/10/2020	4.31	117.9	4.9	215.2	420.2	25.1	Clear	No odour	No sheen
0224	SW021	13/10/2020	4.6	182	-	155	360	20.4	-	-	-
0224	SW022	13/10/2020	4.77	135	-	243	448	26.1	-	-	-
0224	SW023	13/10/2020	6.27	125	-	247	452	26.2	-	-	-
0224	SW024	29/10/2020	1.91	174.4	5.39	167.1	372.1	22.8	Clear	No odour	No sheen
0224	SW025	28/10/2020	3.85	187.1	5.62	158.4	363.4	23.5	Clear	No odour	No sheen
0224	SW027	28/10/2020	1.82	224.2	6.45	150.3	355.3	22	Turbid	No odour	No sheen

DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential

Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)

Table T5 Surface Water PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFDA	PFDoDA	PFNA	PFTeDA	PFTrDA	PFUnDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.0016	0.0005	0.0005	0.0005	0.0005	0.0003	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0016
NHMRC (2019) PFAS Recreational Water		2											10																		
NEMP (2020) Ecological Freshwater 99% Species Protection							**0.00023**						**19**																		
NEMP Ecological Freshwater 95% Species Protection (SW025 only)							**0.13**						**220**																		

Location ID	Sample ID	Lab Report Number	Sample Date																													
SW004	0224_SW004_201027	EB2028561	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW005	0224_SW005_201027	EB2028561	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW006	0224_SW006_201027	EB2028561	27/10/2020	0.0017	<0.0016	<0.0016	0.0017	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0017
SW007	0224_SW007_201027	EB2028561	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW008	0224_SW008_201027	EB2028561	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW009	0224_SW009_201027	EB2028561	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW012	0224_SW012_201026	EB2028561	26/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW013	0224_SW013_201026	EB2028561	26/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW014	0224_SW014_201026	EB2028561	26/10/2020	0.0021	<0.0016	<0.0016	0.0021	<0.0016	<0.0016	<0.0016	<0.008	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0021
SW016	0224_SW016_201027	EB2028561	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW017	0224_SW017_201027	EB2028561	27/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.012	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW018	0224_SW018_201027	EB2028561	27/10/2020	0.0021	<0.0016	<0.0016	0.0021	<0.0016	<0.0049	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	0.0038	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0059
SW019	0224_SW019_201028	EB2028561	28/10/2020	0.0741	0.0025	0.0019	0.0433	<0.0016	**0.0308**	<0.0016	<0.008	<0.004	0.0027	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0812
SW020	0224_SW020_201029	EB2028565	29/10/2020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	0.0021	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0024	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0032
SW021	0224_SW021_201013	EB2026884-AB	13/10/2020	0.0043	<0.0016	<0.0016	<0.0016	<0.0016	**0.0043**	<0.0016	<0.008	0.0043	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0086
SW022	0224_SW022_201013	EB2026884-AA	13/10/2020	0.0093	<0.0016	<0.0016	0.0036	<0.0016	**0.0057**	<0.0016	<0.008	0.0052	0.0022	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0167
SW023	0224_SW023_201013	EB2026884-AA	13/10/2020	0.0067	<0.0016	<0.0016	0.0028	<0.0016	**0.0039**	<0.0016	<0.008	0.0053	0.0019	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0139
SW024	0224_SW024_201029	EB2028569	29/10/2020	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.005	<0.0016	<0.0016	0.002	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.002
SW025	0224_SW025_201028	EB2028561	28/10/2020	0.0046	<0.0016	<0.0016	0.0016	<0.0016	0.003	<0.0016	<0.008	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0046
SW027	0224_SW027_201028	EB2028561	28/10/2020	0.0124	<0.0032	<0.0032	0.0057	<0.0032	**0.0067**	<0.0032	<0.016	<0.0065	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.0032	<0.0032	<0.008	<0.008	<0.008	<0.008	<0.0032	<0.0032	<0.003	<0.003	<0.003	<0.003	0.0124

LOR is limit of reporting
µg/L is micrograms per litre
-' denotes no analysis undertaken
<' denotes concentration is less than
NEMP is National Environmental Management Plan
NHMRC is National Health Medical Research Council
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values

Table T6 Surface Water Non-PFAS Analytical Results

				Calcium (Filtered)	Magnesium (Filtered)	Potassium (Filtered)	Sodium (Filtered)	Cations Total	Chloride	Sulfate as SO4	Fluoride	Carbonate as CaCO3	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Anions Total	Total Suspended Solids	Total Dissolved Solids	Dissolved Organic Carbon	Ammonia as N	Nitrate (as N)	Nitrite + Nitrate as N	Nitrite (as N)	Reactive Phosphorus as P
			Units	mg/L	mg/L	mg/L	mg/L	meq/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			LOR	1	1	1	1	0.01	1	1	0.1	1	1	1	1	0.01	5	10	1	0.01	0.01	0.01	0.01	0.01
Location ID	**Sample ID**	**Lab Report No.**	**Sample Date**																					
SW004	0224_SW004_201027	EB2028561	27/10/2020	2	4	1	35	1.98	62	1	<0.1	<1	8	<1	8	1.93	<5	141	8	<0.01	<0.01	<0.01	<0.01	<0.01
SW007	0224_SW007_201027	EB2028561	27/10/2020	1	3	<1	26	1.43	45	<1	<0.1	<1	4	<1	4	1.35	8	114	8	<0.01	<0.01	<0.01	<0.01	<0.01
SW014	0224_SW014_201026	EB2028561	26/10/2020	2	3	<1	29	1.61	43	2	<0.1	<1	14	<1	14	1.53	24	113	11	<0.01	<0.01	<0.01	<0.01	<0.01
SW025	0224_SW025_201028	EB2028561	28/10/2020	2	2	<1	27	1.44	41	<1	<0.1	<1	10	<1	10	1.36	12	129	17	<0.01	<0.01	<0.01	<0.01	<0.01

LOR is limit of reporting
mg/L is milligrams per litre
meq/l is milliequivalents per litre
-' denotes no analysis undertaken
<' denotes concentration is less than

Table T7 Wastewater PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHpA	PFHxA	PFOA	PFNA	PFDA	PFTeDA	PFTrDA	PFUnDA	PFDoDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.05	0.02	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.05	0.01
PFAS NEMP Ecological Freshwater 99% Species Protection							*0.00023*						*19*																		
Location ID	**Sample ID**	**Lab Report Number**	**Sample Date**																													
OTH001	0224_OTH001_201028	EB2028561	28/10/2020	<0.01	<0.04	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02

LOR is limit of reporting
µg/L is micrograms per litre
-' denotes no analysis undertaken
<' denotes concentration is less than
NEMP is National Environmental Mangement Plan
NHMRC is National Health Medical Research Council
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values

Appendix C

Analytical Data Validation

Appendix C Analytical Data Validation

DATA VALIDATION REPORT

Project No.:	60612563	**Validation by:** Camden McCosker	**Date:**	17/11/20
Client:	Department of Defence			
Site:	Wide Bay Training Area			
Matrix type:	Groundwater, surface water, waste water	**Data verified by:** James Peachey	**Date:**	23/11/20
No. of primary samples:	21 groundwater, 20 surface water, 2 potable/ 1 other water			
Laboratory:	ALS (Brisbane), NMI (Sydney)	**Project Manager:** James Peachey		
Lab reference:	EB2026884; EB2028561; EB2028565; EB2028569; AECO06_201016; AECO06_201103			

Key Issues:	No QA/QC issues were identified in the field or laboratory datasets that could have a material implication on data interpretation and therefore decision-making on the project. The data are therefore considered appropriate for use to meet the project objectives.

Field QA/QC

Sampling personnel	Sampling was conducted by Sebastian Knight on 13 October 2020 and Brent Hammond between 26 and 30 October 2020.
Sampling Methodology	Samples were collected using appropriate methods as identified within the main body of the report.
Hydrasleeve sampling	All Hydrasleeves were left in the monitoring wells for a minimum of 24 hours prior to being sampled. Installation and retrieval times and dates are shown in Table T1.
Daily Equipment Calibration	Daily equipment calibration was completed during the sampling event; however, the records were misplaced and are not available for inclusion in this report.
Chain of Custody (COC)	COC documents were completed as per AECOM procedures.
Rinsate Blank (refer to **Table C3**)	Rinsate blank samples were collected at a frequency of approximately one per day of sampling (five in total). All rinsates were collected from the decontaminated interface probe. Concentrations reported below the LOR for all analytes tested.
Field Blank (refer to **Table C3**)	Field blank samples were collected at a frequency of approximately one per day of sampling (four in total) by filling sample containers with laboratory supplied deionised water in the field. All field blanks reported concentrations below the LOR. Note that the SAQP did not specify field blanks to be collected, however, these were collected.
Trip Blank (refer to **Table C3**)	Trip blank samples were collected at a frequency of one per medium per sampling event (one in total) by placing laboratory prepared trip blank containers into the esky. All trip blanks reported concentrations below the LOR. Note that the SAQP did not specify a trip blank to be collected, however, this was included.
Frequency of field QC	Field duplicate (inter-laboratory duplicates) and triplicates (inter-laboratory duplicates) were collected for samples analysed for PFAS in at a frequency of one in ten primary samples (three pairs for groundwater and three pairs for surface water). The frequency of field QC (14%) achieves the expected frequency for each sample type. No field

	duplicates or triplicates were collected for the other analytes (major ions, nitrates, TDS, TSS, DOC), which was conducted to provide information on aquifer conditions and for future research purposes. The non-collection of these quality samples does not affect the understanding of PFAS contamination in environmental media.
Handling and preservation	Primary, duplicate and triplicate samples were received preserved and chilled at the laboratory. Sample receipt temperature was within the recommended range (<6°C) for all batches. All samples were received at the laboratory in appropriate sample containers with no sample container / preservation non-compliances noted.
Laboratory QA/QC	
Tests requested/reported	Samples were analysed and reported as requested on the COC.
Holding time compliance	Samples were extracted and analysed within recommended holding times, except for the following on batch number EB2028561: • Total Dissolved Solids (TDS) in 0224_SW014_201026 (analysis 1 day overdue); • Total Suspended Solids (TSS) in 0224_SW014_201026 (analysis 1 day overdue); • Nitrite as N in 0224_SW014_201026 (analysis 2 days overdue), 0224_SW007_2010237 and 0224_SW004_201027 (analysis 1 day overdue); • Reactive Phosphorus as P in 0224_SW014_201026 (analysis 2 days overdue), 0224_SW007_2010237 and 0224_SW004_201027 (analysis 1 day overdue); The exceedances are due to the shortness of the hold times and the distance between the sampling site and the laboratory. As the holding time non-compliances are minimal, this is not expected to impact data quality.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Brisbane) a National Association of Testing Authorities (NATA) accredited laboratory. The triplicate samples were analysed at the National Measurement Institute (Sydney), also a NATA accredited laboratory.
Frequency of laboratory QC	The laboratory reported a sufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision, except: • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in EB2026884 (4 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in EB2026884 (4 samples in batch) • Laboratory duplicates for PFAS (8.82%) below the expected rate of 10.00% in EB2028561 (34 samples in batch) • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in EB2028561 (19 samples in batch) • Matrix spikes for PFAS (2.94%) below the expected rate of 5.00% in EB2028561 (34 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in EB2028561 (19 samples in batch) • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in EB2028565 (9 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in EB2028565 (9 samples in batch) • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in EB2028569 (8 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in EB2028569 (8 samples in batch) The reason for insufficient matrix spikes and laboratory duplicates for these batches is unknown as the laboratory was provided with sufficient sample volume, however as all other QC results including primary and duplicate field QC samples met control limits this is not expected to impact data quality.
Method Blank	No method blank non-conformances were reported in the batches.

Laboratory duplicate RPDs	Laboratory duplicate relative percentage differences (RPD) were within control limits for all samples.
Laboratory control spike recovery	Laboratory Control Spikes (LCS) recovery outliers were reported for FOSA for EB2028561, EB2028565 and EB2028565 with the recovery recorded as less than the upper control limit. This is not expected to affect data quality.
Matrix spike recovery	All Matrix Spike (MS) recoveries were within control limits, except: • EB2026884: PFOS in an anonymous sample where MS recovery was not determined due to background level greater than or equal to four times spike level • EB2028561: Sulfate as SO4- Turbidimetric in an anonymous sample where MS recovery was not determined due to background level greater than or equal to four times spike level • EB2028561: Chloride in an anonymous sample where MS recovery was not determined due to background level greater than or equal to four times spike level These non-conformances are not expected to impact data quality.
Surrogate spike recovery	Surrogate spike recoveries were within control limits.
QA/QC Data Evaluation	
Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Data transcription	A random 10% check of the laboratory results identified no anomalies within the electronic data, the laboratory reports, and tables generated by AECOM.
Limits of reporting	Limits of Reporting (LORs) were sufficiently low to enable assessment against adopted screening levels except for PFOS for NEMP (HEPA, 2020) ecological guideline values for the 99% protection of freshwater species. The potential exists for concentrations of PFOS to be above the adopted guideline, but below the laboratory LOR. This should be taken into consideration when interpreting and using this data quantitatively where results are reported below LOR.
Field duplicate RPDs (refer to **Tables C1** and **C2**)	Field duplicate RPDs were reported within control limits for all primary and duplicate samples.
Field triplicate RPDs (refer to **Tables C1** and **C2**)	Field triplicate RPDs were reported within control limits with the exception of the following (the sample with the higher concentration is in bold): • **0224_SW019_201028** and 0224_QC203_201028 for PFHxS (46%) The difference between the primary and triplicate samples are considered to be due to different extraction methods between laboratories. PFHxS does have adopted guidelines however it is noted that the primary sample reported the higher concentration.
Other	
Other observations	Due to access constraints, the groundwater gauging event was undertaken over four days (27 to 30 October 2020). During this period several rainfall events occurred with approximately 50 mm rainfall. Due to the depth to groundwater across the majority of the Base, it not considered likely that groundwater elevations would respond to short-term events as infiltrating groundwater would not reach the groundwater table in such a short period. This is supported by the consistency of the groundwater contour maps for October 2020 with previous results.

Table C1 Groundwater Duplicate and Triplicate Analytical Results

AECOM

	Lab Report No.	EB2028561	EB2028561	RPD	RN1293194	RPD	EB2028561	EB2028561	RPD	RN1293194	RPD	EB2028561	EB2028561	RPD	RN1293194	RPD
	Sample ID	0224_MW110_201028	0224_QC102_201028		0224_QC202_201028		0224_MW117_201028	0224_QC104_201028		0224_QC204_201028		0224_MW111_201029	0224_QC105_201029		0224_QC205_201029	
	Sample Date	28/10/2020	28/10/2020		28/10/2020		28/10/2020	28/10/2020		28/10/2020		29/10/2020	29/10/2020		29/10/2020	
	Sample Type	Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate	
Chemical	**Units**	**LOR**														
10:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.01	0	<0.05	<0.05	0	<0.01	0	<0.05	<0.05	0	<0.01	0
4:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.01	0	<0.05	<0.05	0	<0.01	0	<0.05	<0.05	0	<0.01	0
6:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.01	0	<0.05	<0.05	0	<0.01	0	<0.05	<0.05	0	<0.01	0
8:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.01	0	<0.05	<0.05	0	<0.01	0	<0.05	<0.05	0	<0.01	0
EtFOSA	µg/L	0.05 : 0.02 (Interlab)	<0.05	<0.05	0	<0.02	0	<0.05	<0.05	0	<0.02	0	<0.05	<0.05	0	<0.02	0
EtFOSAA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
EtFOSE	µg/L	0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	0	<0.05	0
MeFOSA	µg/L	0.05 : 0.02 (Interlab)	<0.05	<0.05	0	<0.02	0	<0.05	<0.05	0	<0.02	0	<0.05	<0.05	0	<0.02	0
MFOSAA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
MeFOSE	µg/L	0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	0	<0.05	0
PFBS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFBA	µg/L	0.1 : 0.05 (Interlab)	<0.1	<0.1	0	<0.05	0	<0.1	<0.1	0	<0.05	0	<0.1	<0.1	0	<0.05	0
PFDS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFDoDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFHpS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFHpA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFHxA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFNA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
FOSA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFPeS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFPeA	µg/L	0.02	<0.02	<0.02	0	<0.02	0	<0.02	<0.02	0	<0.02	0	<0.02	<0.02	0	<0.02	0
PFTeDA	µg/L	0.05 : 0.02 (Interlab)	<0.05	<0.05	0	<0.02	0	<0.05	<0.05	0	<0.02	0	<0.05	<0.05	0	<0.02	0
PFTrDA	µg/L	0.02	<0.02	<0.02	0	<0.02	0	<0.02	<0.02	0	<0.02	0	<0.02	<0.02	0	<0.02	0
PFUnDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0
PFOS	µg/L	0.01 : 0.02 (Interlab)	<0.01	<0.01	0	<0.02	0	<0.01	<0.01	0	<0.02	0	<0.01	<0.01	0	<0.02	0
PFOA	µg/L	0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	0	<0.01	0
PFHxS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0	<0.02	<0.02	0	<0.01	0

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 81 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Table C2 Surface Water Duplicate and Triplicate Analytical Results

Lab Report Number		EB2026884-AA	EB2026884-AA		RN1291697		EB2028561	EB2028561		RN1293194		EB2028561	EB2028561		RN1293194	
Sample ID		0224_SW023_201013	0224_QC101_201013	RPD	0224_QC201_201013	RPD	0224_SW009_201027	0224_QC101_201027	RPD	0224_QC201_201027	RPD	0224_SW019_201028	0224_QC103_201028	RPD	0224_QC203_201028	RPD
Sample Date		13/10/2020	13/10/2020		13/10/2020		27/10/2020	27/10/2020		27/10/2020		28/10/2020	28/10/2020		28/10/2020	
Sample Type		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate	
Chemical	**Units**	**LOR**														
10:2 FTS	µg/L	0.001	<0.002	<0.002	0	<0.01	0	<0.002	<0.002	0	<0.001	0	<0.002	<0.002	0	<0.001	0
4:2 FTS	µg/L	0.001	<0.002	<0.002	0	<0.01	0	<0.002	<0.002	0	<0.001	0	<0.002	<0.002	0	<0.001	0
6:2 FTS	µg/L	0.001	<0.002	<0.002	0	<0.01	0	<0.002	<0.002	0	<0.001	0	<0.002	<0.002	0	<0.001	0
8:2 FTS	µg/L	0.001	<0.002	<0.002	0	<0.01	0	<0.002	<0.002	0	<0.001	0	<0.002	<0.002	0	<0.001	0
EtFOSA	µg/L	0.001	<0.004	<0.004	0	<0.02	0	<0.004	<0.004	0	<0.002	0	<0.004	<0.004	0	<0.002	0
EtFOSAA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.002	0	<0.0016	<0.0016	0	<0.002	0
EtFOSE	µg/L	0.001	<0.004	<0.004	0	<0.05	0	<0.004	<0.004	0	<0.005	0	<0.004	<0.004	0	<0.005	0
MeFOSA	µg/L	0.001	<0.004	<0.004	0	<0.02	0	<0.004	<0.004	0	<0.002	0	<0.004	<0.004	0	<0.002	0
MFOSAA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.002	0	<0.0016	<0.0016	0	<0.002	0
MeFOSE	µg/L	0.001	<0.004	<0.004	0	<0.05	0	<0.004	<0.004	0	<0.005	0	<0.004	<0.004	0	<0.005	0
PFBS	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	0.0025	0.0025	0	0.0017	38
PFBA	µg/L	0.002	<0.008	<0.008	0	<0.05	0	<0.008	<0.008	0	<0.005	0	<0.008	<0.008	0	<0.005	0
PFDS	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
PFDA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
PFDoDA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
PFHpS	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
PFHpA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
PFHxA	µg/L	0.0005	0.0019	<0.0016	17	<0.01	0	<0.0016	<0.0016	0	<0.001	0	0.0027	0.002	30	0.0014	63
PFNA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
FOSA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
PFPeS	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	0.0019	<0.0016	17	0.002	5
PFPeA	µg/L	0.0005	0.0053	0.0052	2	<0.02	0	<0.002	<0.002	0	<0.002	0	<0.004	<0.004	0	0.0022	0
PFTeDA	µg/L	0.0005	<0.0039	<0.004	0	<0.02	0	<0.004	<0.004	0	<0.002	0	<0.004	<0.0039	0	<0.002	0
PFTrDA	µg/L	0.0005	<0.0016	<0.0016	0	<0.02	0	<0.0016	<0.0016	0	<0.002	0	<0.0016	<0.0016	0	<0.002	0
PFUnDA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
PFOS	µg/L	0.0003	0.0039	0.0041	5	<0.02	0	<0.0016	<0.0016	0	<0.002	0	0.0308	0.0304	1	0.024	25
PFOA	µg/L	0.0005	<0.0016	<0.0016	0	<0.01	0	<0.0016	<0.0016	0	<0.001	0	<0.0016	<0.0016	0	<0.001	0
PFHxS	µg/L	0.0005	0.0028	<0.0016	55	<0.01	0	<0.0016	<0.0016	0	<0.001	0	0.0433	0.037	16	**0.027**	46

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

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 81 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))

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

Table C3
Field Blank, Trip Blank and
Rinsate Analytical Results

AECOM

	Lab Report Number		EB2028561037	EB2028561038	EB2028561039	EB2028561040	EB2028561027	EB202861029	EB2028561033	EB2028561035	EB2028561036	EB2028561026
	Sample ID		0224_QC401_201026	0224_QC402_201027	0224_QC403_201028	0224_QC404_201029	0224_QC301_201026	0224_QC302_201027	0224_QC303_201028	0224_QC304_201029	0224_QC305_201030	0224_QC501_201026
	Sample Date		26/10/2020	27/10/2020	28/10/2020	29/10/2020	26/10/2020	27/10/2020	28/10/2020	29/10/2020	30/10/2020	26/10/2020
	Sample Type		Field Blank	Field Blank	Field Blank	Field Blank	Rinsate	Rinsate	Rinsate	Rinsate	Rinsate	Trip Blank
Analyte	**Units**	**LOR**										
10:2 FTS	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 FTS	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 FTS	µg/L	0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EtFOSA	µg/L	0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EtFOSAA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
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
MeFOSA	µg/L	0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MFOSAA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
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
PFBS	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFBA	µg/L	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
PFDS	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFDA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFDoDA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFHpS	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFHpA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFHxA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFNA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
FOSA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
PFPeS	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
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
PFTeDA	µg/L	0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
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
PFUnDA	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
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	<0.01
PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PFOS	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
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
PFHxS	µg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Appendix D

Chain of Custody Forms

Appendix D Chain of Custody Forms

21/10.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

[redacted]

CLIENT: AECOM	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: BRISBANE	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes No N/A
PROJECT: ~~60580555~~ 60580555 PROJECT NO.:	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	Free Ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	COC: (1) 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: [redacted] CONTACT PH: [redacted]		OF: 1 (2) 3 4 5 6 7	Other comment:
SAMPLER: [redacted] SAMPLER MOBILE: [redacted]	RELINQUISHED BY: [redacted]	RECEIVED BY: [redacted]	RELINQUISHED BY: / RECEIVED BY:
COC Emailed to ALS? (YES / NO) EDD FORMAT (or default):	DATE/TIME: 14/10/20 12pm	DATE/TIME: 14/10/2020 12:45	DATE/TIME: / DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): [redacted]			
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EP231X	EP231X-ST							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	SW021	13/10/20-8:30am	W	P	2		✓							
2	SW022	13/10/20-12pm	W	P	2		✓							
3	SW023	13/10/20-11:30am	W	P	2		✓							
4	QC01	13/10/20	W	P	2		✓							
5	QC02	13/10/20	W	P	2		✓							
6	SD021	13/10/20-8:30am	S	P	1	✓								
7	SD022	13/10/20-12pm	S	P	1	✓								
8	QC03	13/10/20	S	P	1	✓								
9	QC04	13/10/20	S	P	1	✓								
10	BIOAFA005	13/10/20	B	B	1	✓								
11	BIOAFA017	13/10/20	B	B	1	✓								
12	BIOAFA018	13/10/20	B	B	1	✓								
W= Water S = Sediment B = Biota				TOTAL	17									

Environmental Division
Brisbane
Work Order Reference
EB2026884

[redacted]

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

Approved Date: 08/06/2020

CHAIN OF CUSTODY

ALS Laboratory: please tick →

[redacted]

CLIENT: AECOM	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: BRISBANE	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes No N/A
PROJECT: 60580555 PROJECT NO.:	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	COC: 1 (2) 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER [redacted] CONTACT PH: [redacted]		OF: 1 (2) 3 4 5 6 7	Other comment:
SAMPLER: [redacted] SAMPLER MOBILE [redacted]	RELINQUISHED BY: [redacted]	RECEIVED BY: [redacted]	RELINQUISHED BY: RECEIVED BY:
COC Emailed to ALS? (YES / NO) EDD FORMAT (or default):	DATE/TIME: 14/10/20 12pm	DATE/TIME: 14/10/2020 12:45	DATE/TIME: DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): [redacted]			
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	BIOAFA 019	13/10/20	B	B	1									
14	BIOAFA 020	13/10/20	B	B	1									
15	BIOAFA 021	13/10/20	B	B	1									
16														
				TOTAL	3									

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

Chain of Custody

Environmental Division Brisbane

[redacted]

59038

Destination Lab: **Sydney**	Due Date: 21/10/2020		Relinquished By
Address: [redacted] Australia 2164	HT Expiry:		Date/Time
Client: AECOM Australia Pty Ltd	Consignment company and Number		Received By
Work Order Number: **EB2026884**			Date/Time
Original Receipt Date/Time 14/10/2020 13:45 Instructions Received			Receipt Temp

ALS Lab ID	Bottle Code	Matrix	Submatrix	Container Type	Test Codes	Task Remarks
EB2026884	010-AA	BIOTA	BIOTA	Frozen Sample	EP231X, EP231-PFOS-SP, Biota-PP, EP231-PR	
EB2026884	011-AA	BIOTA	BIOTA	Frozen Sample	EP231X, EP231-PFOS-SP, Biota-PP, EP231-PR	
EB2026884	012-AA	BIOTA	BIOTA	Frozen Sample	EP231X, EP231-PFOS-SP, Biota-PP, EP231-PR	
EB2026884	013-AA	BIOTA	BIOTA	Frozen Sample	EP231X, EP231-PFOS-SP, Biota-PP, EP231-PR	
EB2026884	014-AA	BIOTA	BIOTA	Frozen Sample	EP231X, EP231-PFOS-SP, Biota-PP, EP231-PR	
EB2026884	015-AA	BIOTA	BIOTA	Frozen Sample	EP231X, EP231-PFOS-SP, Biota-PP, EP231-PR	

C6/11

AECOM

Chain of Custody

COC Page 1 of 5

AECOM Australia Pty Ltd	**Laboratory Details**	Tel:
Level 8, 540 Wickham Street	Lab. Name:	Fax:
Fortitude Valley, QLD, 4006	Lab. Address:	Preliminary Report by:
PO Box 1307 Fortitude Valley QLD 4006	Contact Name:	Final Report by:
Email reports to: [redacted]	Lab. Ref:	Lab Quote No: SY/139/19

Sampled By: [redacted] **Project Name:/ID** QLD_0224_PFASOMP_20 **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Specificati Please report in ESdat format	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat 7. Project Manager: [redacted]

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)		NT-1 (Cations)	NT-2A (Anions + Fluoride)	EA015H (TDS)	EA025H (TSS)	EP002 (DOC)	EK058 (Nitrate)	EK057 (Nitrite)	EK055 (Ammonia)	EK071 (Reactive P)		HOLD	Notes
1	0224_MW110-201028	28-Oct-2020 07:43		✓				✓		6 x 1P	✓													EXTRA SAMPLES FOR LD+MS
2	0224_MW109-201028	08:19		✓				✓		4 x 1P	✓													EXTRA SAMPLES FOR LD
3	0224_MW117-201028	12:41		✓				✓		6 x 1P	✓													EXTRA SAMPLES FOR LD+MS
4	0224_MW116-201028	13:03		✓				✓		2 x 1P	✓													
5	0224_MW118-201028	13:55		✓				✓		↓	✓													
6	0224_MW114-201028	14:15		✓				✓		↓	✓													
7	0224_MW113-201028	↓ 14:38		✓				✓		↓	✓													
8	0224_MW106-201029	29-Oct-2020 07:42		✓				✓		2 x 1P	✓													
9	0224_MW107-201029	10:53		✓				✓		↓	✓													
10	0224_MW108-201029	11:20		✓				✓		↓	✓													
11	0224_MW111-201029	11:57		✓				✓		↓	✓													
12	0224_MW119-201029	12:42		✓				✓		2x1P,1V,1N,1P	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		
13	0224_MW115-201029	13:09		✓				✓		2 x 1P	✓													
14	0224_MW101-201029	↓ 13:41		✓				✓		2x1P,1V,1N,1P	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		

HT

Environmental Division
Brisbane
Work Order Reference
EB2028561

[redacted]

Comments: Please send ESdat files to DERP.labreports@esdat.com.au and ensure that the files use the PROJECT NAME

Temp. received: °C

Report & invoice: [redacted]

Lab Report No | Esky ID

Relinquished by: [redacted]	Signed: [redacted]	Date: 30-Oct-20	Relinquished by:	Signed:	Date:
Received by:	Signed:	Date:	Received by:	Signed:	Date:

[redacted]

30/10/2020 12:00

AECOM

Chain of Custody

COC Page 2 of 5

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name:
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted]

Project Name/ID QLD_0224_PFASOMP_20 **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Specificati	Please report in ESdat format	Yes (tick)
1.	Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2.	Fast TAT Guarantee Required?	
3.	Is any sediment layer present in waters to be excluded from extractions?	
4.	% extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5.	Special storage requirements? (details: _____)	

6. Report Format: ESdat 7. Project Manager: [redacted]

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	NT-1 (Cations)	NT-2A (Anions + Fluoride)	EA015H (TDS)	EA025H (TSS)	EP002 (DOC)	EK058 (Nitrate)	EK057 (Nitrite)	EK055 (Ammonia)	EK071 (Reactive P)	HOLD	Notes
15	0224_MW120_201029	29-Oct-2020 14:14		✓				✓		2 x 1P	✓												
16	0224_MW121_201029	14:39		✓				✓		↓	✓												
17	0224_MW122_201029	15:02		✓				✓		↓	✓												
18	0224_MW112_201029	15:20		✓				✓		2x1P,1N,1V,1P	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		
19	0224_MW103_201030	30-Oct-2020 07:51		✓				✓		2 x 1P	✓												
20	0224_MW104_201030	08:30		✓				✓		2x1P,1V,1N,1P	✓		✓	✓	✓	✓	✓	✓	✓	✓			
21	0224_MW105_201030	08:08		✓				✓		2 x 1P	✓												
22	0224_POT001_201028	28-Oct-2020 10:00		✓				✓		↓	✓												
23	0224_POT005_201028	11:08		✓				✓		↓	✓												
24	0224_OTH001_201028	11:37		✓				✓		↓	✓												
25	0224_QC405_201030	30-Oct-2020		✓				✓		2 x 1P	✓												
26	0224_QC501_201026	26-Oct-2020		✓				✓		2 x 1P	✓												LABELED BY ALS AS TRIP BLANK1
	0224_																						
	0224_																						

Comments: **Please send ESdat files to DERP.labreports@esdat.com.au and ensure that the files use the PROJECT NAME**

Temp. received: °C

Report & invoice: [redacted]

Lab Report No: Esky ID:

Relinquished by: [redacted]	Signed: [redacted]	Date: 30-Oct-20	Relinquished by:	Signed:	Date:
Received by:	Signed:	Date:	Received by:	Signed:	Date:

Rec: [redacted] 30/10/2020 1200

AECOM

Chain of Custody

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name:
Lab. Address:
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted] **Project Name:/ID** QLD_0224_PFASOMP_20 **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Specificati	Please report in ESdat format	Yes (tick)
1.	Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2.	Fast TAT Guarantee Required?	
3.	Is any sediment layer present in waters to be excluded from extractions?	
4.	% extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5.	Special storage requirements? (details: _____)	
6.	Report Format: ESdat	7. Project Manager: [redacted]

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	NT-1 (Cations)	NT-2A (Anions + Fluoride)	EA015H (TDS)	EA025H (TSS)	EP002 (DOC)	EK058 (Nitrate)	EK057 (Nitrite)	EK055 (Ammonia)	EK071 (Reactive P)	HOLD	Notes
27	0224_QC301-201026	26-Oct-2020		✓				✓		2x1P	✓												
28	0224_QC101-201027	27-Oct-2020		✓				✓				✓											
29	0224_QC302-201027	↓		✓				✓			✓												
30	0224_QC102-201028	28-Oct-2020		✓				✓			✓												
31	0224_QC103-201028			✓				✓				✓											
32	0224_QC104-201028			✓				✓			✓												
33	0224_QC303-201028	↓		✓				✓			✓												
34	0224_QC105-201029	29-Oct-2020		✓				✓			✓												
35	0224_QC304-201029	↓		✓				✓			✓												
36	0224_QC305-201030	30-Oct-2020		✓				✓			✓												
37	0224_QC401-201026	26-Oct-2020		✓				✓			✓												
38	0224_QC402-201027	27-Oct-2020		✓				✓			✓												
39	0224_QC403-201028	28-Oct-2020		✓				✓			✓												
40	0224_QC404-201029	29-Oct-2020		✓				✓			✓												

Comments: Please send ESdat files to DERP.labreports@esdat.com.au and ensure that the files use the PROJECT NAME

Temp. received: °C

Report & invoice: [redacted]

Lab Report No: Esky ID:

Relinquished by: [redacted] Signed: [redacted] Date: 30-Oct-20

Received by: Signed: Date:

Relinquished by: Signed: Date:

Received by: Signed: Date:

[redacted] 30/10/20 1200

AECOM

Chain of Custody

COC Page 4 of 5

AECOM Australia Pty Ltd	**Laboratory Details**		Tel:
Level 8, 540 Wickham Street	Lab. Name:		Fax:
Fortitude Valley, QLD, 4006	Lab. Address:		Preliminary Report by:
PO Box 1307 Fortitude Valley QLD 4006	Contact Name:		Final Report by:
Email reports to: [redacted]	Lab. Ref:		Lab Quote No: SY/139/19

Sampled By: [redacted] **Project Name:** /ID QLD_0224_PFASOMP_20 **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Specificati Please report in ESdat format	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	
6. Report Format: ESdat	7. Project Manager: James Peachey

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	NT-1 (Cations)	NT-2A (Anions + Fluoride)	EA015H (TDS)	EA025H (TSS)	EP002 (DOC)	EK058 (Nitrate)	EK057 (Nitrite)	EK055 (Ammonia)	EK071 (Reactive P)	HOLD	Notes
1	0224_SW013_201026	26-Oct-2020 13:11		✓				✓		2 x 1P		✓											
2	0224_SW014_201026	13:34		✓				✓		2x1P, 1V, 1N, 1P		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
23	0224_SW012_201026	15:06		✓				✓		2 x 1P		✓											
46	0224_SW016_201027	27-Oct-2020 07:33		✓				✓		↓		✓											
45	0224_SW007_201027	08:25		✓				✓		2x1P, 1V, 1N, 1P		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
26	0224_SW009_201027	09:36		✓				✓		6 x 1P		✓											Extra samples for LD + MS
27	0224_SW008_201027	10:05		✓				✓		2 x 1P		✓											
47	0224_SW004_201027	10:53		✓				✓		2x1P, 1V, 1N, 1P		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
29	0224_SW005_201027	11:18		✓				✓		2 x 1P		✓											
50	0224_SW006_201027	12:32		✓				✓		↓		✓											
51	0224_SW017_201027	14:49		✓				✓		↓		✓											
52	0224_SW018_201027	15:25		✓				✓		↓		✓											
53	0224_SW019_201028	28-Oct-2020 10:31		✓				✓		4 x 1P		✓											Extra samples for LD
54	0224_SW026_201028	12:16		✓				✓		2 x 1P		✓											

Comments: **Please send ESdat files to DERP.labreports@esdat.com.au and ensure that the files use the PROJECT NAME**

Temp. received: °C

Report & invoice: [redacted]

Lab Report No: Esky ID:

Relinquished by: [redacted]	Signed: [redacted]	Date: 30-Oct-20	Relinquished by:	Signed:	Date:
Received by:	Signed:	Date:	Received by: [redacted]	Signed:	Date:

30/10/2020 12:00

AECOM

Chain of Custody

COC Page 5 of 5

AECOM Australia Pty Ltd Level 8, 540 Wickham Street Fortitude Valley, QLD, 4006 PO Box 1307 Fortitude Valley QLD 4006	**Email reports to:** [redacted]

Laboratory Details

Lab. Name:
Lab. Address:
Contact Name:
Lab. Ref:
Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted] **Project Name:** /ID QLD_0224_PFASOMP_20 **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Specificati Please report in ESdat format	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat 7. Project Manager: [redacted]

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	NT-1 (Cations)	NT-2A (Anions + Fluoride)	EA015H (TDS)	EA025H (TSS)	EP002 (DOC)	EK058 (Nitrate)	EK057 (Nitrite)	EK055 (Ammonia)	EK071 (Reactive P)	HOLD	Notes
55	0224_SW025_201028	28-Oct-2020 13:26		✓				✓		2x1P, 1V, 1N, 1P		✓		✓	✓	✓	✓	✓	✓	✓	✓		
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						

Comments: **Please send ESdat files to DERP.labreports@esdat.com.au and ensure that the files use the PROJECT NAME**

Temp. received: °C

Report & invoice: [redacted]

Lab Report No: Esky ID:

Relinquished by: [redacted]	Signed: [redacted]	Date: 30-SEP-20	
Received by:	Signed:	Date:	
Relinquished by:	Signed:	Date:	
Received by: [redacted]	Signed:	Date: 30/10/2020 12:00	

6/11

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name:
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted] **Project Name:** /ID QLD_0224_PFASOMP_20 **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Specificati Please report in ESdat format

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat 7. Project Manager: [redacted]

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	NT-1 (Cations)	NT-2A (Anions + Fluoride)	EA015H (TDS)	EA025H (TSS)	EP002 (DOC)	EK058 (Nitrate)	EK057 (Nitrite)	EK055 (Ammonia)	EK071 (Reactive P)	HOLD	Notes
1	0224_SW020_201029	29-Oct-2020 09:43						✓		2 x 1P	✓												
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						

Environmental Division
Brisbane
Work Order Reference
EB2028565
[redacted]

Comments: **Please send ESdat files to DERP.labreports@esdat.com.au and ensure that the files use the PROJECT NAME**

Temp. received: °C

Report & invoice: [redacted]

Lab Report No | Esky ID

Relinquished by: [redacted]	Signed: [redacted]	Date: 30-Oct-20	Relinquished by: Signed: Date:
Received by:	Signed:	Date:	Received by: Signed: Date:

[redacted] 30/10/2020 12:00

6/11

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name:
Lab. Address:
Contact Name:
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted] **Project Name:** /ID QLD_0224_PFASOMP_20 **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Specificati	Please report in ESdat format	Yes (tick)
1.	Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2.	Fast TAT Guarantee Required?	
3.	Is any sediment layer present in waters to be excluded from extractions?	
4.	% extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5.	Special storage requirements? (details: _____)	

6. Report Format: ESdat 7. Project Manager: [redacted]

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	NT-1 (Cations)	NT-2A (Anions + Fluoride)	EA015H (TDS)	EA025H (TSS)	EP002 (DOC)	EK058 (Nitrate)	EK057 (Nitrite)	EK055 (Ammonia)	EK071 (Reactive P)	HOLD	Notes
1	0224_SW024_201029	29-Oct-2020 09:17		✓				✓		2 x 1P		✓											
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						

Environmental Division
Brisbane
Work Order Reference
EB2028569
[redacted]

Comments: **Please send ESdat files to DERP.labreports@esdat.com.au and ensure that the files use the PROJECT NAME**

Temp. received: °C

Report & invoice: [redacted]

Lab Report No: Esky ID:

Relinquished by: [redacted] Signed: [redacted] Date: 30-Oct-20

Received by: Signed: Date:

Relinquished by: Signed: Date:

Received by: Signed: Date:

[redacted] 30/10/2020 12:00

PLEASE FORWARD SAMPLES TO NMI

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name:
Lab. Address: AECQ96/201103
Contact Name:
Lab. Ref: Due 10/11/20

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted]

Project Name: /ID QLD_0224_PFASOMP_20

AECOM Project #: 60612563 4.1

Purchase Order No: 60612563 4.1

Specificati Please report in ESdat format

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat

7. Project Manager: [redacted]

Analysis Request

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filt'ed	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	NT-1 (Cations)	NT-2A (Anions + Fluoride)	EA015H (TDS)	EA025H (TSS)	EP002 (DOC)	EK058 (Nitrate)	EK057 (Nitrite)	EK055 (Ammonia)	EK071 (Reactive P)	HOLD	Notes
—	0224_QC201-201027	27-Oct-2020		✓				✓		2x1P		✓											N20/025797
—	0224_QC202-201028	28-Oct-2020		✓				✓		2x1P	✓												N20/025798
—	0224_QC203-201028	↓		✓				✓		2x1P		✓											N20/025799
—	0224_QC204-201028	↓		✓				✓		2x1P	✓												N20/025800
—	0224_QC205-201029	29-Oct-2020		✓				✓		2x1P	✓												N20/025801
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						
	0224_																						

RECEIVED
03 NOV 2020
BY: A.G 15:00

Comments: Please send ESdat files to DERP.labreports@esdat.com.au and ensure that the files use the PROJECT NAME

Temp. received: °C

Report & invoice: [redacted]

Lab Report No: Esky ID:

Relinquished by: [redacted] Signed: [redacted] Date: 30-Oct-20

Received by: Signed: Date:

Relinquished by: [redacted] Signed: Date:

Received by: Signed: Date:

LAB10000065 [redacted] 30/10/2020 1200

Appendix E

Laboratory Analytical Certificates and QA/QC Reports

Appendix E Laboratory Analytical Certificates and QA/QC Reports

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2028561**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Facsimile	: +[redacted]	Facsimile	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Page	: 1 of 4
Order number	: 60612563 4.1	Quote number	: ES2019AECOMAU0030 (SY/139/19 V3)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 60612563 4.1		
Sampler	: [redacted]		

Dates

Date Samples Received	: 30-Oct-2020 12:00	Issue Date	: 30-Oct-2020
Client Requested Due Date	: 06-Nov-2020	Scheduled Reporting Date	: **06-Nov-2020**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 4	Temperature	: 3.7/3.4/0.7/0.5°C - Ice present
Receipt Detail	: MEDIUM HARD ESKY	No. of samples received / analysed	: 55 / 55

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **As per discussion with [redacted] The analysis from sample "MW112" will instead be assigned to sample "MW122" as sample "M122" was received with the correct containers. If this is incorrect, please contact client services at ALSEnviro.Brisbane@alsglobal.com**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- **Sample QC201 to QC205 have been forwarded to NMI , as requested. Please note that this will incur a freight forwarding fee.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK071G Reactive Phosphorus by Discrete analyser	WATER - EP002 Dissolved Organic Carbon (DOC)	WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - NT-01 & 02A Ca, Mg, Na, K, Cl, SO4, Alkalinity & Fluoride
EB2028561-001	28-Oct-2020 07:43	0224_MW110_201028						▯	
EB2028561-002	28-Oct-2020 08:19	0224_MW109_201028						▯	
EB2028561-003	28-Oct-2020 12:41	0224_MW117_201028						▯	
EB2028561-004	28-Oct-2020 13:03	0224_MW116_201028						▯	
EB2028561-005	28-Oct-2020 13:55	0224_MW118_201028						▯	
EB2028561-006	28-Oct-2020 14:15	0224_MW114_201028						▯	
EB2028561-007	28-Oct-2020 14:38	0224_MW113_201028						▯	
EB2028561-008	29-Oct-2020 07:42	0224_MW106_201029						▯	
EB2028561-009	29-Oct-2020 10:53	0224_MW107_201029						▯	
EB2028561-010	29-Oct-2020 11:20	0224_MW108_201029						▯	
EB2028561-011	29-Oct-2020 11:57	0224_MW111_201029						▯	
EB2028561-012	29-Oct-2020 12:42	0224_MW119_201029	▯	▯	▯	▯	▯	▯	▯
EB2028561-013	29-Oct-2020 13:09	0224_MW115_201029						▯	
EB2028561-014	29-Oct-2020 13:41	0224_MW101_201029	▯	▯	▯	▯	▯	▯	▯
EB2028561-015	29-Oct-2020 14:14	0224_MW120_201029						▯	
EB2028561-016	29-Oct-2020 14:39	0224_MW121_201029						▯	
EB2028561-017	29-Oct-2020 15:02	0224_MW122_201029	▯	▯	▯	▯	▯	▯	▯
EB2028561-018	29-Oct-2020 15:20	0224_MW112_201029						▯	
EB2028561-019	30-Oct-2020 07:51	0224_MW103_201030						▯	
EB2028561-020	30-Oct-2020 08:30	0224_MW104_201030	▯	▯	▯	▯	▯	▯	▯
EB2028561-021	30-Oct-2020 08:08	0224_MW105_201030						▯	
EB2028561-022	28-Oct-2020 11:00	0224_POT001_201028						▯	
EB2028561-023	28-Oct-2020 11:08	0224_POT005_201028						▯	
EB2028561-024	28-Oct-2020 11:37	0224_OTH001_201028						▯	
EB2028561-025	30-Oct-2020 00:00	0224_QC405_201030						▯	
EB2028561-026	26-Oct-2020 00:00	0224_QC501_201026						▯	
EB2028561-027	26-Oct-2020 00:00	0224_QC301_201026						▯	
EB2028561-029	27-Oct-2020 00:00	0224_QC302_201027						▯	
EB2028561-030	28-Oct-2020 00:00	0224_QC102_201028						▯	
EB2028561-032	28-Oct-2020 00:00	0224_QC104_201028						▯	
EB2028561-033	28-Oct-2020 00:00	0224_QC303_201028						▯	
EB2028561-034	29-Oct-2020 00:00	0224_QC105_201029						▯	
EB2028561-035	29-Oct-2020 00:00	0224_QC304_201029						▯	
EB2028561-036	30-Oct-2020 00:00	0224_QC305_201030						▯	
EB2028561-037	26-Oct-2020 00:00	0224_QC401_201026						▯	

			WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EK058G Nitrate as N by Discrete Analyser	WATER - EK071G Reactive Phosphorus by Discrete analyser	WATER - EP002 Dissolved Organic Carbon (DOC)	WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - NT-01 & 02A Ca, Mg, Na, K, Cl, SO4, Alkalinity & Fluoride
EB2028561-038	27-Oct-2020 00:00	0224_QC402_201027						☐	
EB2028561-039	28-Oct-2020 00:00	0224_QC403_201028						☐	
EB2028561-040	29-Oct-2020 00:00	0224_QC404_201029						☐	
EB2028561-042	26-Oct-2020 13:34	0224_SW014_201026	☐	☐	☐	☐	☐		☐
EB2028561-045	27-Oct-2020 08:25	0224_SW007_201027	☐	☐	☐	☐	☐		☐
EB2028561-048	27-Oct-2020 10:53	0224_SW004_201027	☐	☐	☐	☐	☐		☐
EB2028561-055	28-Oct-2020 13:26	0224_SW025_201028	☐	☐	☐	☐	☐		☐

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - EK055G Ammonia as N By Discrete Analyser	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2028561-012	29-Oct-2020 12:42	0224_MW119_201029		☐
EB2028561-014	29-Oct-2020 13:41	0224_MW101_201029		☐
EB2028561-017	29-Oct-2020 15:02	0224_MW122_201029		☐
EB2028561-020	30-Oct-2020 08:30	0224_MW104_201030		☐
EB2028561-028	27-Oct-2020 00:00	0224_QC101_201027		☐
EB2028561-031	28-Oct-2020 00:00	0224_QC103_201028		☐
EB2028561-041	26-Oct-2020 13:11	0224_SW013_201026		☐
EB2028561-042	26-Oct-2020 13:34	0224_SW014_201026	☐	☐
EB2028561-043	26-Oct-2020 15:06	0224_SW012_201026		☐
EB2028561-044	27-Oct-2020 07:33	0224_SW016_201027		☐
EB2028561-045	27-Oct-2020 08:25	0224_SW007_201027	☐	☐
EB2028561-046	27-Oct-2020 09:36	0224_SW009_201027		☐
EB2028561-047	27-Oct-2020 10:05	0224_SW008_201027		☐
EB2028561-048	27-Oct-2020 10:53	0224_SW004_201027	☐	☐
EB2028561-049	27-Oct-2020 11:18	0224_SW005_201027		☐
EB2028561-050	27-Oct-2020 12:32	0224_SW006_201027		☐
EB2028561-051	27-Oct-2020 14:49	0224_SW017_201027		☐
EB2028561-052	27-Oct-2020 15:25	0224_SW018_201027		☐
EB2028561-053	28-Oct-2020 10:31	0224_SW019_201028		☐
EB2028561-054	28-Oct-2020 12:16	0224_SW027_201028		☐
EB2028561-055	28-Oct-2020 13:26	0224_SW025_201028	☐	☐

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER** Evaluation: = Holding time breach ; = Within holding time.

Method / Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
				Date	Evaluation	Date	Evaluation
EK057G: Nitrite as N by Discrete Analyser							
0224_SW004_20102	Clear Plastic Bottle - Natural	----	29-Oct-2020	30-Oct-2020		----	----
0224_SW007_20102	Clear Plastic Bottle - Natural	----	29-Oct-2020	30-Oct-2020		----	----
0224_SW014_20102	Clear Plastic Bottle - Natural	----	28-Oct-2020	30-Oct-2020		----	----
EK071G: Reactive Phosphorus as P-By Discrete Analyser							
0224_SW004_20102	Clear Plastic Bottle - Natural	----	29-Oct-2020	30-Oct-2020		----	----
0224_SW007_20102	Clear Plastic Bottle - Natural	----	29-Oct-2020	30-Oct-2020		----	----
0224_SW014_20102	Clear Plastic Bottle - Natural	----	28-Oct-2020	30-Oct-2020		----	----

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) — Email — AP_CustomerService.ANZ@aecom.com

[redacted]

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

[redacted]

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT) — Email

[redacted]

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

[redacted]

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2028561**	Page	: 1 of 40
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020 12:00
Order number	: 60612563 4.1	Date Analysis Commenced	: 30-Oct-2020
C-O-C number	: ----	Issue Date	: 06-Nov-2020 10:52
Sampler	: [redacted]		
Site	: 60612563 4.1		
Quote number	: SY/139/19 V3		
No. of samples received	: 55		
No. of samples analysed	: 54		

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. 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.

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.

[redacted]	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X PFAS: The LOR for PFBS has been raised for sample '0224_OTH001_201028' due to matrix interference.
- EP231X-INJ PFAS: The LOR for PFOS has been raised for sample 0224_MW122_201029 due to matrix interference.
- EP231X-ST PFAS Super Trace: The LOR for PFPeA and PFOS has been raised for particular samples due to matrix interference.
- EP231X-ST PFAS Super Trace: Particular samples were diluted due to matrix interference. LOR adjusted accordingly.
- 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.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EP231X-INJ PFAS by LCMSMS: Particular samples have been tested to the legacy QSM 5.1 aligned, NATA accredited method due to sample matrix being unsuitable for SPE extraction (high sediment content).
- EP231X PFAS by LCMSMS: Sample '0224_QC405_201030' can't be analysed due to a laboratory error. There is insufficient sample volume to repeat extraction . Analysis has been cancelled.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- EP231X-INJ: The direct injection LCMSMS method may be used where the sample matrix is not suitable for Solid Phase Extraction (e.g. significant particulate load) or where only a single sample container is received.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW110_201028	0224_MW109_201028	0224_MW117_201028	0224_MW116_201028	0224_MW118_201028
				28-Oct-2020 07:43	28-Oct-2020 08:19	28-Oct-2020 12:41	28-Oct-2020 13:03	28-Oct-2020 13:55
				EB2028561-001	EB2028561-002	EB2028561-003	EB2028561-004	EB2028561-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<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)				0224_MW110_201028	0224_MW109_201028	0224_MW117_201028	0224_MW116_201028	0224_MW118_201028
				28-Oct-2020 07:43	28-Oct-2020 08:19	28-Oct-2020 12:41	28-Oct-2020 13:03	28-Oct-2020 13:55
				EB2028561-001	EB2028561-002	EB2028561-003	EB2028561-004	EB2028561-005
				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**	**93.6**	**105**	**101**	**93.5**
13C8-PFOA	----	0.02	%	**102**	**101**	**104**	**100**	**104**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW114_201028	0224_MW113_201028	0224_MW106_201029	0224_MW107_201029	0224_MW108_201029
				28-Oct-2020 14:15	28-Oct-2020 14:38	29-Oct-2020 07:42	29-Oct-2020 10:53	29-Oct-2020 11:20
				EB2028561-006	EB2028561-007	EB2028561-008	EB2028561-009	EB2028561-010
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	----	----	<0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	----	----	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	----	----	<0.02	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	----	----	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	----	----	<0.01	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	----	----	<0.02	----	----
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	0.02	µg/L	<0.02	<0.02	----	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	<0.02	<0.02
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	0.10	µg/L	----	----	<0.10	----	----
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	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW114_201028	0224_MW113_201028	0224_MW106_201029	0224_MW107_201029	0224_MW108_201029
				28-Oct-2020 14:15	28-Oct-2020 14:38	29-Oct-2020 07:42	29-Oct-2020 10:53	29-Oct-2020 11:20
				EB2028561-006	EB2028561-007	EB2028561-008	EB2028561-009	EB2028561-010
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	----	----	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	----	----	<0.05	----	----
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	----	----
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	----	----
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	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW114_201028	0224_MW113_201028	0224_MW106_201029	0224_MW107_201029	0224_MW108_201029
				28-Oct-2020 14:15	28-Oct-2020 14:38	29-Oct-2020 07:42	29-Oct-2020 10:53	29-Oct-2020 11:20
				EB2028561-006	EB2028561-007	EB2028561-008	EB2028561-009	EB2028561-010
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	----	----	<0.05	----	----
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	----	----
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	----	----	<0.01	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW114_201028	0224_MW113_201028	0224_MW106_201029	0224_MW107_201029	0224_MW108_201029
				28-Oct-2020 14:15	28-Oct-2020 14:38	29-Oct-2020 07:42	29-Oct-2020 10:53	29-Oct-2020 11:20
				EB2028561-006	EB2028561-007	EB2028561-008	EB2028561-009	EB2028561-010
				Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued								
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	----	----
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**110**	**108**	----	**98.0**	**101**
13C4-PFOS	----	0.02	%	----	----	**118**	----	----
13C8-PFOA	----	0.02	%	**101**	**102**	----	**102**	**104**
13C8-PFOA	----	0.02	%	----	----	**111**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW111_201029	0224_MW119_201029	0224_MW115_201029	0224_MW101_201029	0224_MW120_201029
				29-Oct-2020 11:57	29-Oct-2020 12:42	29-Oct-2020 13:09	29-Oct-2020 13:41	29-Oct-2020 14:14
				EB2028561-011	EB2028561-012	EB2028561-013	EB2028561-014	EB2028561-015
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	----	147	----	80	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	282	----	427	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	----	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	<1	----	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	14	----	3	----
Total Alkalinity as CaCO3	----	1	mg/L	----	14	----	3	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	2	----	3	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	65	----	36	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	5	----	2	----
Magnesium	7439-95-4	1	mg/L	----	4	----	2	----
Sodium	7440-23-5	1	mg/L	----	37	----	22	----
Potassium	7440-09-7	1	mg/L	----	<1	----	<1	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	----	<0.1	----	<0.1	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	<0.01	----	<0.01	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	----	<0.01	----	<0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	----	0.57	----	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	----	0.57	----	<0.01	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	----	<0.01	----	<0.01	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	----	2.15	----	1.14	----
ø Total Cations	----	0.01	meq/L	----	2.19	----	1.22	----
EP002: Dissolved Organic Carbon (DOC)								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW111_201029	0224_MW119_201029	0224_MW115_201029	0224_MW101_201029	0224_MW120_201029
				29-Oct-2020 11:57	29-Oct-2020 12:42	29-Oct-2020 13:09	29-Oct-2020 13:41	29-Oct-2020 14:14
				EB2028561-011	EB2028561-012	EB2028561-013	EB2028561-014	EB2028561-015
				Result	Result	Result	Result	Result
EP002: Dissolved Organic Carbon (DOC) - Continued								
Dissolved Organic Carbon	----	1	mg/L	----	8	----	8	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	----	----	----	<0.02	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	----	----	----	<0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	----	----	----	<0.02	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	----	----	----	<0.02	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	----	----	----	<0.01	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	----	----	----	<0.02	----
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	0.02	µg/L	<0.02	<0.02	<0.02	----	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	----	<0.02
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	0.10	µg/L	----	----	----	<0.10	----
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	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW111_201029	0224_MW119_201029	0224_MW115_201029	0224_MW101_201029	0224_MW120_201029
				29-Oct-2020 11:57	29-Oct-2020 12:42	29-Oct-2020 13:09	29-Oct-2020 13:41	29-Oct-2020 14:14
				EB2028561-011	EB2028561-012	EB2028561-013	EB2028561-014	EB2028561-015
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
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	----
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	----
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	----
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	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW111_201029	0224_MW119_201029	0224_MW115_201029	0224_MW101_201029	0224_MW120_201029
				29-Oct-2020 11:57	29-Oct-2020 12:42	29-Oct-2020 13:09	29-Oct-2020 13:41	29-Oct-2020 14:14
				EB2028561-011	EB2028561-012	EB2028561-013	EB2028561-014	EB2028561-015
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	----	----	----	<0.02	----
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	----	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	----	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	----	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	----	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	----	----	----	<0.05	----
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	----
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	----	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	----	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	----	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	----	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW111_201029	0224_MW119_201029	0224_MW115_201029	0224_MW101_201029	0224_MW120_201029
				29-Oct-2020 11:57	29-Oct-2020 12:42	29-Oct-2020 13:09	29-Oct-2020 13:41	29-Oct-2020 14:14
				EB2028561-011	EB2028561-012	EB2028561-013	EB2028561-014	EB2028561-015
				Result	Result	Result	Result	Result
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	**----**
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	<0.01	**----**	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	**----**	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	**----**	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**108**	**109**	**102**	**----**	**107**
13C4-PFOS	----	0.02	%	**----**	**----**	**----**	**106**	**----**
13C8-PFOA	----	0.02	%	**105**	**104**	**106**	**----**	**105**
13C8-PFOA	----	0.02	%	**----**	**----**	**----**	**107**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW121_201029	0224_MW122_201029	0224_MW112_201029	0224_MW103_201030	0224_MW104_201030
				29-Oct-2020 14:39	29-Oct-2020 15:02	29-Oct-2020 15:20	30-Oct-2020 07:51	30-Oct-2020 08:30
				EB2028561-016	EB2028561-017	EB2028561-018	EB2028561-019	EB2028561-020
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	----	58	----	----	89
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	1150	----	----	149
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	----	----	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	<1	----	----	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	2	----	----	4
Total Alkalinity as CaCO3	----	1	mg/L	----	2	----	----	4
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	3	----	----	2
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	13	----	----	27
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	<1	----	----	<1
Magnesium	7439-95-4	1	mg/L	----	1	----	----	2
Sodium	7440-23-5	1	mg/L	----	12	----	----	19
Potassium	7440-09-7	1	mg/L	----	<1	----	----	<1
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	----	<0.1	----	----	<0.1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	<0.01	----	----	<0.01
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	----	<0.01	----	----	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	----	0.20	----	----	0.10
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	----	0.20	----	----	0.10
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	----	<0.01	----	----	<0.01
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	----	0.47	----	----	0.88
ø Total Cations	----	0.01	meq/L	----	0.60	----	----	0.99
EP002: Dissolved Organic Carbon (DOC)								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW121_201029	0224_MW122_201029	0224_MW112_201029	0224_MW103_201030	0224_MW104_201030
				29-Oct-2020 14:39	29-Oct-2020 15:02	29-Oct-2020 15:20	30-Oct-2020 07:51	30-Oct-2020 08:30
				EB2028561-016	EB2028561-017	EB2028561-018	EB2028561-019	EB2028561-020
				Result	Result	Result	Result	Result
EP002: Dissolved Organic Carbon (DOC) - Continued								
Dissolved Organic Carbon	----	1	mg/L	----	**4**	----	----	**5**
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	----	**0.02**	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	----	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	----	**0.16**	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	----	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	----	<0.02	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	----	<0.02	----	----	----
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	**0.09**	----	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.04**	----	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.10	µg/L	----	<0.10	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW121_201029	0224_MW122_201029	0224_MW112_201029	0224_MW103_201030	0224_MW104_201030
				29-Oct-2020 14:39	29-Oct-2020 15:02	29-Oct-2020 15:20	30-Oct-2020 07:51	30-Oct-2020 08:30
				EB2028561-016	EB2028561-017	EB2028561-018	EB2028561-019	EB2028561-020
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
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	----	----	----
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	----	----	----
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	----	----	----
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	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW121_201029	0224_MW122_201029	0224_MW112_201029	0224_MW103_201030	0224_MW104_201030
				29-Oct-2020 14:39	29-Oct-2020 15:02	29-Oct-2020 15:20	30-Oct-2020 07:51	30-Oct-2020 08:30
				EB2028561-016	EB2028561-017	EB2028561-018	EB2028561-019	EB2028561-020
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	----	<0.02	----	----	----
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	----	<0.05	----	----	----
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	----	----	----
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_MW121_201029	0224_MW122_201029	0224_MW112_201029	0224_MW103_201030	0224_MW104_201030
				29-Oct-2020 14:39	29-Oct-2020 15:02	29-Oct-2020 15:20	30-Oct-2020 07:51	30-Oct-2020 08:30
				EB2028561-016	EB2028561-017	EB2028561-018	EB2028561-019	EB2028561-020
				Result	Result	Result	Result	Result
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**----**	**0.18**	**----**	**----**	**----**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**----**	**0.16**	**----**	**----**	**----**
Sum of PFAS (WA DER List)	----	0.01	µg/L	**----**	**0.18**	**----**	**----**	**----**
Sum of PFAS	----	0.01	µg/L	**0.13**	**----**	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.13**	**----**	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.13**	**----**	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**102**	**----**	**117**	**97.1**	**116**
13C4-PFOS	----	0.02	%	**----**	**91.6**	**----**	**----**	**----**
13C8-PFOA	----	0.02	%	**102**	**----**	**103**	**104**	**102**
13C8-PFOA	----	0.02	%	**----**	**98.9**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

				0224_MW105_201030	0224_POT001_201028	0224_POT005_201028	0224_OTH001_201028	0224_QC501_201026
				30-Oct-2020 08:08	28-Oct-2020 11:00	28-Oct-2020 11:08	28-Oct-2020 11:37	26-Oct-2020 00:00
				EB2028561-021	EB2028561-022	EB2028561-023	EB2028561-024	EB2028561-026
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.04	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<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)				0224_MW105_201030	0224_POT001_201028	0224_POT005_201028	0224_OTH001_201028	0224_QC501_201026
				30-Oct-2020 08:08	28-Oct-2020 11:00	28-Oct-2020 11:08	28-Oct-2020 11:37	26-Oct-2020 00:00
				EB2028561-021	EB2028561-022	EB2028561-023	EB2028561-024	EB2028561-026
				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	**0.02**	<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	**0.02**	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**105**	**96.0**	**107**	**98.0**	**96.0**
13C8-PFOA	----	0.02	%	**102**	**102**	**104**	**103**	**103**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_QC301_201026	0224_QC101_201027	0224_QC302_201027	0224_QC102_201028	0224_QC103_201028
				26-Oct-2020 00:00	27-Oct-2020 00:00	27-Oct-2020 00:00	28-Oct-2020 00:00	28-Oct-2020 00:00
				EB2028561-027	EB2028561-028	EB2028561-029	EB2028561-030	EB2028561-031
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	----	<0.0016	----	----	**0.0025**
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	----	<0.0016	----	----	**0.0370**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	----	<0.0016	----	----	**0.0304**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	<0.01	<0.01	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	<0.02	<0.02	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	----	<0.008	----	----	<0.008
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	<0.1	<0.1	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	----	<0.0020	----	----	<0.0040
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	----	<0.0016	----	----	**0.0020**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	<0.01	<0.01	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	----	<0.0016	----	----	<0.0016

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_QC301_201026	0224_QC101_201027	0224_QC302_201027	0224_QC102_201028	0224_QC103_201028
				26-Oct-2020 00:00	27-Oct-2020 00:00	27-Oct-2020 00:00	28-Oct-2020 00:00	28-Oct-2020 00:00
				EB2028561-027	EB2028561-028	EB2028561-029	EB2028561-030	EB2028561-031
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	<0.02	<0.02	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	----	<0.0040	----	----	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	<0.05	<0.05	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	----	<0.0016	----	----	<0.0016
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	<0.02	<0.02	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	----	<0.004	----	----	<0.004
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	<0.05	<0.05	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	----	<0.004	----	----	<0.004
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	----	<0.004	----	----	<0.004
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	<0.05	<0.05	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_QC301_201026	0224_QC101_201027	0224_QC302_201027	0224_QC102_201028	0224_QC103_201028
				26-Oct-2020 00:00	27-Oct-2020 00:00	27-Oct-2020 00:00	28-Oct-2020 00:00	28-Oct-2020 00:00
				EB2028561-027	EB2028561-028	EB2028561-029	EB2028561-030	EB2028561-031
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	----	<0.004	----	----	<0.004
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	----	<0.0016	----	----	<0.0016
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	<0.02	<0.02	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	----	<0.0016	----	----	<0.0016
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	<0.02	<0.02	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	----	<0.002	----	----	<0.002
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	<0.05	<0.05	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	----	<0.002	----	----	<0.002
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	<0.05	<0.05	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	----	<0.002	----	----	<0.002
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	<0.05	<0.05	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	----	<0.002	----	----	<0.002
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	<0.05	<0.05	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	----	<0.0016	----	----	**0.0719**
Sum of PFAS	----	0.01	µg/L	<0.01	----	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_QC301_201026	0224_QC101_201027	0224_QC302_201027	0224_QC102_201028	0224_QC103_201028
				26-Oct-2020 00:00	27-Oct-2020 00:00	27-Oct-2020 00:00	28-Oct-2020 00:00	28-Oct-2020 00:00
				EB2028561-027	EB2028561-028	EB2028561-029	EB2028561-030	EB2028561-031
				Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	**----**	<0.0016	**----**	**----**	**0.0674**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	**----**	<0.01	<0.01	**----**
Sum of PFAS (WA DER List)	**----**	0.0003	µg/L	**----**	<0.0016	**----**	**----**	**0.0719**
Sum of PFAS (WA DER List)	**----**	0.01	µg/L	<0.01	**----**	<0.01	<0.01	**----**
EP231S: PFAS Surrogate								
13C4-PFOS	**----**	0.0005	%	**----**	**103**	**----**	**----**	**105**
13C4-PFOS	**----**	0.02	%	**92.4**	**----**	**107**	**93.7**	**----**
13C8-PFOA	**----**	0.0005	%	**----**	**100**	**----**	**----**	**108**
13C8-PFOA	**----**	0.02	%	**102**	**----**	**103**	**101**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_QC104_201028	0224_QC303_201028	0224_QC105_201029	0224_QC304_201029	0224_QC305_201030
				28-Oct-2020 00:00	28-Oct-2020 00:00	29-Oct-2020 00:00	29-Oct-2020 00:00	30-Oct-2020 00:00
				EB2028561-032	EB2028561-033	EB2028561-034	EB2028561-035	EB2028561-036
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<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)				0224_QC104_201028	0224_QC303_201028	0224_QC105_201029	0224_QC304_201029	0224_QC305_201030
				28-Oct-2020 00:00	28-Oct-2020 00:00	29-Oct-2020 00:00	29-Oct-2020 00:00	30-Oct-2020 00:00
				EB2028561-032	EB2028561-033	EB2028561-034	EB2028561-035	EB2028561-036
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**95.4**	**94.8**	**95.5**	**104**	**99.7**
13C8-PFOA	----	0.02	%	**102**	**102**	**102**	**103**	**102**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

				0224_QC401_201026	0224_QC402_201027	0224_QC403_201028	0224_QC404_201029	0224_SW013_201026
				26-Oct-2020 00:00	27-Oct-2020 00:00	28-Oct-2020 00:00	29-Oct-2020 00:00	26-Oct-2020 13:11
				EB2028561-037	EB2028561-038	EB2028561-039	EB2028561-040	EB2028561-041
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	----	----	----	----	<0.0016
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	0.0005	µg/L	----	----	----	----	<0.0016
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	0.0005	µg/L	----	----	----	----	<0.0016
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	----	----	----	----	<0.0016
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	0.0003	µg/L	----	----	----	----	<0.0016
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	----	----	----	----	<0.0016
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	0.002	µg/L	----	----	----	----	<0.008
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	----	----	----	----	<0.0016
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	----	----	----	----	<0.0016
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	----	----	----	----	<0.0016
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	----	----	----	----	<0.0016
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	----	----	----	----	<0.0016

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_QC401_201026	0224_QC402_201027	0224_QC403_201028	0224_QC404_201029	0224_SW013_201026
				26-Oct-2020 00:00	27-Oct-2020 00:00	28-Oct-2020 00:00	29-Oct-2020 00:00	26-Oct-2020 13:11
				EB2028561-037	EB2028561-038	EB2028561-039	EB2028561-040	EB2028561-041
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	----	----	----	----	<0.0016
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	----	----	----	----	<0.0016
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	----	----	----	----	<0.0016
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	----	----	----	----	<0.0016
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	----	----	----	----	<0.0040
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	0.0005	µg/L	----	----	----	----	<0.0016
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	0.001	µg/L	----	----	----	----	<0.004
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	0.001	µg/L	----	----	----	----	<0.004
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	----	----	----	----	<0.004
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_QC401_201026	0224_QC402_201027	0224_QC403_201028	0224_QC404_201029	0224_SW013_201026
				26-Oct-2020 00:00	27-Oct-2020 00:00	28-Oct-2020 00:00	29-Oct-2020 00:00	26-Oct-2020 13:11
				EB2028561-037	EB2028561-038	EB2028561-039	EB2028561-040	EB2028561-041
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	----	----	----	----	<0.004
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	0.0005	µg/L	----	----	----	----	<0.0016
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	0.0005	µg/L	----	----	----	----	<0.0016
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	0.001	µg/L	----	----	----	----	<0.002
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	0.001	µg/L	----	----	----	----	<0.002
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	0.001	µg/L	----	----	----	----	<0.002
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	----	----	----	----	<0.002
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	----	0.0003	µg/L	----	----	----	----	<0.0016
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_QC401_201026	0224_QC402_201027	0224_QC403_201028	0224_QC404_201029	0224_SW013_201026
				26-Oct-2020 00:00	27-Oct-2020 00:00	28-Oct-2020 00:00	29-Oct-2020 00:00	26-Oct-2020 13:11
				EB2028561-037	EB2028561-038	EB2028561-039	EB2028561-040	EB2028561-041
				Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	**----**	**----**	**----**	**----**	<0.0016
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)	----	0.0003	µg/L	**----**	**----**	**----**	**----**	<0.0016
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	**----**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**----**	**----**	**----**	**----**	**82.1**
13C4-PFOS	----	0.02	%	**98.2**	**98.0**	**95.5**	**110**	**----**
13C8-PFOA	----	0.0005	%	**----**	**----**	**----**	**----**	**86.4**
13C8-PFOA	----	0.02	%	**103**	**103**	**104**	**108**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW014_201026	0224_SW012_201026	0224_SW016_201027	0224_SW007_201027	0224_SW009_201027
				26-Oct-2020 13:34	26-Oct-2020 15:06	27-Oct-2020 07:33	27-Oct-2020 08:25	27-Oct-2020 09:36
				EB2028561-042	EB2028561-043	EB2028561-044	EB2028561-045	EB2028561-046
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	113	----	----	114	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	24	----	----	8	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	14	----	----	4	----
Total Alkalinity as CaCO3	----	1	mg/L	14	----	----	4	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	----	----	<1	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	43	----	----	45	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	----	----	1	----
Magnesium	7439-95-4	1	mg/L	3	----	----	3	----
Sodium	7440-23-5	1	mg/L	29	----	----	26	----
Potassium	7440-09-7	1	mg/L	<1	----	----	<1	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	<0.1	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	----	<0.01	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	<0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	----	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	<0.01	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	<0.01	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	1.53	----	----	1.35	----
ø Total Cations	----	0.01	meq/L	1.61	----	----	1.43	----
EP002: Dissolved Organic Carbon (DOC)								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW014_201026	0224_SW012_201026	0224_SW016_201027	0224_SW007_201027	0224_SW009_201027
				26-Oct-2020 13:34	26-Oct-2020 15:06	27-Oct-2020 07:33	27-Oct-2020 08:25	27-Oct-2020 09:36
				EB2028561-042	EB2028561-043	EB2028561-044	EB2028561-045	EB2028561-046
				Result	Result	Result	Result	Result
EP002: Dissolved Organic Carbon (DOC) - Continued								
Dissolved Organic Carbon	----	1	mg/L	**11**	----	----	**8**	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	**0.0021**	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.008	<0.008	<0.008	<0.008	<0.008
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0030	<0.0016	<0.0020	<0.0016	<0.0020
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.004	<0.004	<0.004	<0.004	<0.004

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW014_201026	0224_SW012_201026	0224_SW016_201027	0224_SW007_201027	0224_SW009_201027
				26-Oct-2020 13:34	26-Oct-2020 15:06	27-Oct-2020 07:33	27-Oct-2020 08:25	27-Oct-2020 09:36
				EB2028561-042	EB2028561-043	EB2028561-044	EB2028561-045	EB2028561-046
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.004	<0.004	<0.004	<0.004	<0.004
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.004	<0.004	<0.004	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.004	<0.004	<0.004	<0.004	<0.004
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	**0.0021**	<0.0016	<0.0016	<0.0016	<0.0016
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	**0.0021**	<0.0016	<0.0016	<0.0016	<0.0016
Sum of PFAS (WA DER List)	----	0.0003	µg/L	**0.0021**	<0.0016	<0.0016	<0.0016	<0.0016
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**102**	**107**	**119**	**105**	**89.9**
13C8-PFOA	----	0.0005	%	**110**	**108**	**125**	**110**	**86.2**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW008_201027	0224_SW004_201027	0224_SW005_201027	0224_SW006_201027	0224_SW017_201027
				27-Oct-2020 10:05	27-Oct-2020 10:53	27-Oct-2020 11:18	27-Oct-2020 12:32	27-Oct-2020 14:49
				EB2028561-047	EB2028561-048	EB2028561-049	EB2028561-050	EB2028561-051
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	----	141	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	<5	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	8	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	----	8	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	1	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	62	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	2	----	----	----
Magnesium	7439-95-4	1	mg/L	----	4	----	----	----
Sodium	7440-23-5	1	mg/L	----	35	----	----	----
Potassium	7440-09-7	1	mg/L	----	1	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	----	<0.1	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	<0.01	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	----	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	----	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	----	<0.01	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	----	<0.01	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	----	1.93	----	----	----
ø Total Cations	----	0.01	meq/L	----	1.98	----	----	----
EP002: Dissolved Organic Carbon (DOC)								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW008_201027	0224_SW004_201027	0224_SW005_201027	0224_SW006_201027	0224_SW017_201027
				27-Oct-2020 10:05	27-Oct-2020 10:53	27-Oct-2020 11:18	27-Oct-2020 12:32	27-Oct-2020 14:49
				EB2028561-047	EB2028561-048	EB2028561-049	EB2028561-050	EB2028561-051
				Result	Result	Result	Result	Result
EP002: Dissolved Organic Carbon (DOC) - Continued								
Dissolved Organic Carbon	----	1	mg/L	----	**8**	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0016	<0.0016	<0.0016	**0.0017**	<0.0016
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.008	<0.008	<0.008	<0.008	<0.012
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0016	<0.0020	<0.0016	<0.0016	<0.0016
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0040	<0.0040	<0.0040	<0.0039	<0.0039
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.004	<0.004	<0.004	<0.004	<0.004

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW008_201027	0224_SW004_201027	0224_SW005_201027	0224_SW006_201027	0224_SW017_201027
				27-Oct-2020 10:05	27-Oct-2020 10:53	27-Oct-2020 11:18	27-Oct-2020 12:32	27-Oct-2020 14:49
				EB2028561-047	EB2028561-048	EB2028561-049	EB2028561-050	EB2028561-051
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.004	<0.004	<0.004	<0.004	<0.004
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.004	<0.004	<0.004	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.004	<0.004	<0.004	<0.004	<0.004
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	<0.0016	<0.0016	<0.0016	**0.0017**	<0.0016
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	<0.0016	<0.0016	<0.0016	**0.0017**	<0.0016
Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0016	<0.0016	<0.0016	**0.0017**	<0.0016
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**101**	**95.0**	**108**	**103**	**101**
13C8-PFOA	----	0.0005	%	**102**	**104**	**114**	**108**	**107**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW018_201027	0224_SW019_201028	0224_SW027_201028	0224_SW025_201028	----
				27-Oct-2020 15:25	28-Oct-2020 10:31	28-Oct-2020 12:16	28-Oct-2020 13:26	----
				EB2028561-052	EB2028561-053	EB2028561-054	EB2028561-055	--------
				Result	Result	Result	Result	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	----	----	----	**129**	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	----	----	**12**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	**10**	----
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	**10**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	<1	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	----	**41**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	----	----	**2**	----
Magnesium	7439-95-4	1	mg/L	----	----	----	**2**	----
Sodium	7440-23-5	1	mg/L	----	----	----	**27**	----
Potassium	7440-09-7	1	mg/L	----	----	----	<1	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	----	----	----	<0.1	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	----	----	<0.01	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	----	----	----	<0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	----	----	----	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	----	----	----	<0.01	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	----	----	----	<0.01	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	----	----	----	**1.36**	----
ø Total Cations	----	0.01	meq/L	----	----	----	**1.44**	----
EP002: Dissolved Organic Carbon (DOC)								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW018_201027	0224_SW019_201028	0224_SW026_201028	0224_SW025_201028	----
				27-Oct-2020 15:25	28-Oct-2020 10:31	28-Oct-2020 12:16	28-Oct-2020 13:26	----
				EB2028561-052	EB2028561-053	EB2028561-054	EB2028561-055	--------
				Result	Result	Result	Result	----
EP002: Dissolved Organic Carbon (DOC) - Continued								
Dissolved Organic Carbon	----	1	mg/L	----	----	----	**17**	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0016	**0.0025**	<0.0032	<0.0016	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0016	**0.0019**	<0.0032	<0.0016	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	**0.0021**	**0.0433**	**0.0057**	**0.0016**	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0049	**0.0308**	**0.0067**	**0.0030**	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.008	<0.008	<0.016	<0.008	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0016	<0.0040	<0.0065	<0.0030	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0016	**0.0027**	<0.0032	<0.0016	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	**0.0038**	<0.0016	<0.0032	<0.0016	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0040	<0.0040	<0.0080	<0.0040	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.004	<0.004	<0.008	<0.004	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW018_201027	0224_SW019_201028	0224_SW027_201028	0224_SW025_201028	----
				27-Oct-2020 15:25	28-Oct-2020 10:31	28-Oct-2020 12:16	28-Oct-2020 13:26	----
				EB2028561-052	EB2028561-053	EB2028561-054	EB2028561-055	--------
				Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.004	<0.004	<0.008	<0.004	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.004	<0.004	<0.008	<0.004	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.004	<0.004	<0.008	<0.004	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0016	<0.0016	<0.0032	<0.0016	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.002	<0.002	<0.003	<0.002	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.002	<0.002	<0.003	<0.002	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.002	<0.002	<0.003	<0.002	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.002	<0.002	<0.003	<0.002	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	**0.0059**	**0.0812**	**0.0124**	**0.0046**	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	**0.0021**	**0.0741**	**0.0124**	**0.0046**	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	**0.0059**	**0.0793**	**0.0124**	**0.0046**	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**98.7**	**102**	**88.1**	**102**	----
13C8-PFOA	----	0.0005	%	**109**	**115**	**93.2**	**110**	----

Surrogate Control Limits

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2028561**	Page	: 1 of 18
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020
Order number	: 60612563 4.1	Date Analysis Commenced	: 30-Oct-2020
C-O-C number	: ----	Issue Date	: 06-Nov-2020
Sampler	: [redacted]		
Site	: 60612563 4.1		
Quote number	: SY/139/19 V3		
No. of samples received	: 55		
No. of samples analysed	: 54		

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. 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

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.

[redacted]	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3340139)									
EB2028413-008	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	9210	9140	0.708	0% - 20%
EB2028550-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1400000 µg/L	1460	4.54	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3340138)									
EB2028278-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
EB2028550-006	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	202000 µg/L	167	19.0	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3340140)									
EB2028561-048	0224_SW004_201027	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
EB2028585-004	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	9	12	27.2	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 3339013)									
EB2028543-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	85	87	2.28	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	85	87	2.28	0% - 20%
EB2028561-020	0224_MW104_201030	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	4	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	4	4	0.00	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3338254)									
EB2028543-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1060	1060	0.267	0% - 20%
EB2028543-014	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1430	1430	0.121	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 3338255)									
EB2028543-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	8620	8660	0.556	0% - 20%
EB2028543-014	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	11900	11900	0.130	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3339460)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED093F: Dissolved Major Cations (QC Lot: 3339460) - continued									
EB2028543-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	352	353	0.370	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1220	1210	0.783	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	9030	8950	0.931	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	510	508	0.296	0% - 20%
EB2028543-013	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	<1	<1	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3339014)									
EB2028561-020	0224_MW104_201030	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3341441)									
EB2028334-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.01	0.00	No Limit
EB2028561-042	0224_SW014_201026	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3338256)									
EB2028543-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.01	0.00	No Limit
EB2028543-014	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3341440)									
EB2028334-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.10	0.10	0.00	0% - 50%
EB2028561-042	0224_SW014_201026	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3338253)									
EB2028543-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.00	No Limit
EB2028543-014	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	0.02	0.00	No Limit
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 3344337)									
EB2028561-012	0224_MW119_201029	EP002: Dissolved Organic Carbon	----	1	mg/L	8	7	0.00	No Limit
EB2028636-001	Anonymous	EP002: Dissolved Organic Carbon	----	1	mg/L	11	9	15.0	0% - 50%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3338225)									
EB2028561-001	0224_MW110_201028	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3338226)									
EB2028561-003	0224_MW117_201028	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3338226) - continued									
EB2028561-023	0224_POT005_201028	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3340842)									
EB2028561-008	0224_MW106_201029	EP231X-INJ: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X-INJ: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3338225)									
EB2028561-001	0224_MW110_201028	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3338226)									
EB2028561-003	0224_MW117_201028	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3338226) - continued									
EB2028561-003	0224_MW117_201028	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EB2028561-023	0224_POT005_201028	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3340842)									
EB2028561-008	0224_MW106_201029	EP231X-INJ: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X-INJ: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X-INJ: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.10	<0.10	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3338225)									
EB2028561-001	0224_MW110_201028	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3338225) - continued									
EB2028561-001	0224_MW110_201028	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3338226)									
EB2028561-003	0224_MW117_201028	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EB2028561-023	0224_POT005_201028	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3340842)									
EB2028561-008	0224_MW106_201029	EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X-INJ: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3340842) - continued									
EB2028561-008	0224_MW106_201029	EP231X-INJ: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3338225)									
EB2028561-001	0224_MW110_201028	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3338226)									
EB2028561-003	0224_MW117_201028	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EB2028561-023	0224_POT005_201028	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3340842)									
EB2028561-008	0224_MW106_201029	EP231X-INJ: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X-INJ: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X-INJ: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X-INJ: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 3338225)									
EB2028561-001	0224_MW110_201028	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231P: PFAS Sums (QC Lot: 3338225) - continued									
EB2028561-001	0224_MW110_201028	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 3338226)									
EB2028561-003	0224_MW117_201028	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
EB2028561-023	0224_POT005_201028	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 3340842)									
EB2028561-008	0224_MW106_201029	EP231X-INJ: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X-INJ: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X-INJ: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (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 Spike (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 (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3340139)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2460 mg/L	96.5	88.0	112
				<10	293 mg/L	104	88.0	112
				<10	2000 mg/L	102	80.9	118
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3340138)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	104	88.0	112
				<5	1000 mg/L	106	88.0	112
				<5	951 mg/L	106	87.2	116
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3340140)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	102	88.0	112
				<5	1000 mg/L	105	88.0	112
				<5	951 mg/L	110	87.2	116
ED037P: Alkalinity by PC Titrator (QCLot: 3339013)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	102	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3338254)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	85.0	118
				<1	100 mg/L	92.1	85.0	118
ED045G: Chloride by Discrete Analyser (QCLot: 3338255)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	90.0	115
				<1	1000 mg/L	106	90.0	115
ED093F: Dissolved Major Cations (QCLot: 3339460)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	100	70.0	130
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.5	70.0	130
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	101	70.0	130
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.0	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3339014)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	10 mg/L	104	80.0	117
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3341441)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	104	83.5	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3338256)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3341440)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	89.7	85.7	111
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3338253)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3338253) - continued								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	108	81.7	117
EP002: Dissolved Organic Carbon (DOC) (QCLot: 3344337)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	10 mg/L	85.0	80.0	112
				<1	100 mg/L	98.8	80.0	112
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3338225)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	104	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	104	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.2373 µg/L	96.3	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	107	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	109	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	99.0	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3338226)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	84.8	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	83.8	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.2373 µg/L	80.7	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	94.3	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	78.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	73.2	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3338227)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	104	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	123	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	104	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	113	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	111	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	104	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3338228)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	92.8	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	102	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	109	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	91.5	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	84.1	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	88.5	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3340842)								
EP231X-INJ: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.444 µg/L	93.9	72.0	130
EP231X-INJ: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.47 µg/L	96.2	71.0	127
EP231X-INJ: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.475 µg/L	96.4	68.0	131
EP231X-INJ: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.477 µg/L	100	69.0	134
EP231X-INJ: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.4646 µg/L	93.6	65.0	140

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3340842) - continued								
EP231X-INJ: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	84.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3338225)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	98.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	94.4	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	98.0	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	96.8	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	91.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	93.4	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	95.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	95.4	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	98.0	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	86.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	94.1	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3338226)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	83.4	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	85.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	81.0	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	79.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	78.6	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	81.8	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	87.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	83.6	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	86.0	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	77.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	83.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3338227)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	98.0	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	110	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	97.6	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	102	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	104	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	99.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	118	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	106	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	109	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3338228)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3338228) - continued								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	87.6	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.4	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	91.6	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	87.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	101	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	101	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	100	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3340842)								
EP231X-INJ: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.10	2.5 µg/L	91.3	73.0	129
EP231X-INJ: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	91.8	72.0	129
EP231X-INJ: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	89.8	72.0	129
EP231X-INJ: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	91.0	72.0	130
EP231X-INJ: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	93.0	71.0	133
EP231X-INJ: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	91.2	69.0	130
EP231X-INJ: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	104	71.0	129
EP231X-INJ: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	93.0	69.0	133
EP231X-INJ: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	95.8	72.0	134
EP231X-INJ: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	88.6	65.0	144
EP231X-INJ: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	93.9	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3338225)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	99.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	114	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	83.8	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	92.5	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.6	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	96.8	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	86.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3338226)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	86.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	84.1	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.1	60.5	138

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3338226) - continued								
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	79.5	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	89.4	62.6	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	77.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	83.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3338227)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	102	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	114	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	113	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	115	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	98.1	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	119	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	104	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3338228)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	# 53.6	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	104	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	108	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	106	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	81.8	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	99.2	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	112	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3340842)								
EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	94.0	67.0	137
EP231X-INJ: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	105	68.0	141
EP231X-INJ: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	88.6	62.1	136

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3340842) - continued								
EP231X-INJ: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	1.25 µg/L	79.8	65.2	135
EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	97.4	63.2	135
EP231X-INJ: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	77.8	65.0	136
EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	92.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338225)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	85.6	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	93.1	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	103	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	92.3	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338226)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	95.2	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	92.1	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	86.9	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	78.0	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338227)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	98.8	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	106	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	101	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	104	53.1	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338228)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	87.3	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	89.7	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	89.2	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	101	53.1	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3340842)								
EP231X-INJ: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.469 µg/L	95.9	63.0	143
EP231X-INJ: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.476 µg/L	99.6	64.0	140
EP231X-INJ: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.48 µg/L	91.0	67.0	138
EP231X-INJ: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.483 µg/L	94.2	62.2	139
EP231P: PFAS Sums (QCLot: 3338225)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231P: PFAS Sums (QCLot: 3338226)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 3338227)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231P: PFAS Sums (QCLot: 3338228)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231P: PFAS Sums (QCLot: 3340842)								
EP231X-INJ: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X-INJ: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X-INJ: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3338254)							
EB2028543-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3338255)							
EB2028543-002	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	# Not Determined	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3339014)							
EB2028561-014	0224_MW101_201029	EK040P: Fluoride	16984-48-8	5 mg/L	95.6	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3341441)							
EB2028334-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.4 mg/L	86.9	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3338256)							
EB2028543-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.4 mg/L	96.8	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3341440)							
EB2028334-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.4 mg/L	92.3	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3338253)							
EB2028543-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.4 mg/L	109	70.0	130
EP002: Dissolved Organic Carbon (DOC) (QCLot: 3344337)							
EB2028561-014	0224_MW101_201029	EP002: Dissolved Organic Carbon	----	100 mg/L	104	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3338226)							
EB2028561-022	0224_POT001_201028	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	95.4	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	98.3	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	92.1	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	110	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	99.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	97.9	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3340842)							
EB2028561-014	0224_MW101_201029	EP231X-INJ: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.443 µg/L	98.9	70.0	130
		EP231X-INJ: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.47 µg/L	98.7	70.0	130
		EP231X-INJ: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.475 µg/L	97.9	70.0	130
		EP231X-INJ: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.477 µg/L	104	70.0	130
		EP231X-INJ: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	80.8	70.0	130
		EP231X-INJ: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.482 µg/L	91.3	70.0	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3338226)							
EB2028561-022	0224_POT001_201028	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	89.1	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	91.4	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	91.4	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	90.4	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	85.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	87.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	86.2	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	93.2	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	92.8	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	81.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	94.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3340842)							
EB2028561-014	0224_MW101_201029	EP231X-INJ: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	109	70.0	130
		EP231X-INJ: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	98.6	70.0	130
		EP231X-INJ: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	99.2	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3340842) - continued							
EB2028561-014	0224_MW101_201029	EP231X-INJ: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	93.4	70.0	130
		EP231X-INJ: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	97.2	70.0	130
		EP231X-INJ: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	94.6	70.0	130
		EP231X-INJ: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	103	70.0	130
		EP231X-INJ: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	101	70.0	130
		EP231X-INJ: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	103	70.0	130
		EP231X-INJ: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	98.2	70.0	130
		EP231X-INJ: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	100	70.0	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3338226)							
EB2028561-022	0224_POT001_201028	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	93.0	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	99.7	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	82.8	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	93.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	97.1	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	90.8	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	86.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3340842)							
EB2028561-014	0224_MW101_201029	EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	94.6	70.0	130
		EP231X-INJ: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	110	70.0	130
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	90.9	70.0	130
		EP231X-INJ: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	1.25 µg/L	84.7	70.0	130
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	102	70.0	130
		EP231X-INJ: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	84.0	70.0	130
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	103	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338226)							
EB2028561-022	0224_POT001_201028	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	105	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	99.9	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	96.2	67.0	138

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338226) - continued							
EB2028561-022	0224_POT001_201028	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	93.4	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3340842)							
EB2028561-014	0224_MW101_201029	EP231X-INJ: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.468 µg/L	103	70.0	130
		EP231X-INJ: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.475 µg/L	105	70.0	130
		EP231X-INJ: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.48 µg/L	106	70.0	130
		EP231X-INJ: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.483 µg/L	120	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2028561**	Page	: 1 of 16
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020
Site	: 60612563 4.1	Issue Date	: 06-Nov-2020
Sampler	: [redacted]	No. of samples received	: 55
Order number	: 60612563 4.1	No. of samples analysed	: 54

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

- **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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP231C: Perfluoroalkyl Sulfonamides	QC-3338228-002	----	**Perfluorooctane sulfonamide (FOSA)**	754-91-6	53.6 %	67.0-137%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EB2028543--002	Anonymous	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	EB2028543--002	Anonymous	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA015: Total Dissolved Solids dried at 180 ± 5 °C						
Clear Plastic Bottle - Natural						
0224_SW014_201026	----	----	----	03-Nov-2020	02-Nov-2020	**1**
EA025: Total Suspended Solids dried at 104 ± 2°C						
Clear Plastic Bottle - Natural						
0224_SW014_201026	----	----	----	03-Nov-2020	02-Nov-2020	**1**
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural						
0224_SW014_201026	----	----	----	30-Oct-2020	28-Oct-2020	**2**
Clear Plastic Bottle - Natural						
0224_SW007_201027, 0224_SW004_201027	----	----	----	30-Oct-2020	29-Oct-2020	**1**
EK071G: Reactive Phosphorus as P by discrete analyser						
Clear Plastic Bottle - Natural						
0224_SW014_201026	----	----	----	30-Oct-2020	28-Oct-2020	**2**
Clear Plastic Bottle - Natural						
0224_SW007_201027, 0224_SW004_201027	----	----	----	30-Oct-2020	29-Oct-2020	**1**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	3	34	8.82	10.00	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	19	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS) - Continued					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	34	2.94	5.00	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	19	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*
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**03-Nov-2020**	02-Nov-2020	×
Clear Plastic Bottle - Natural (EA015H) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**03-Nov-2020**	03-Nov-2020	✓
Clear Plastic Bottle - Natural (EA015H) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**03-Nov-2020**	04-Nov-2020	✓
Clear Plastic Bottle - Natural (EA015H) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**03-Nov-2020**	05-Nov-2020	✓
Clear Plastic Bottle - Natural (EA015H) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**03-Nov-2020**	06-Nov-2020	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**03-Nov-2020**	02-Nov-2020	×
Clear Plastic Bottle - Natural (EA025H) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**03-Nov-2020**	03-Nov-2020	✓
Clear Plastic Bottle - Natural (EA025H) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**03-Nov-2020**	04-Nov-2020	✓
Clear Plastic Bottle - Natural (EA025H) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**03-Nov-2020**	05-Nov-2020	✓
Clear Plastic Bottle - Natural (EA025H) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**03-Nov-2020**	06-Nov-2020	✓

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
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**02-Nov-2020**	09-Nov-2020	✓
Clear Plastic Bottle - Natural (ED037-P) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**02-Nov-2020**	10-Nov-2020	✓
Clear Plastic Bottle - Natural (ED037-P) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**02-Nov-2020**	11-Nov-2020	✓
Clear Plastic Bottle - Natural (ED037-P) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**02-Nov-2020**	12-Nov-2020	✓
Clear Plastic Bottle - Natural (ED037-P) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**02-Nov-2020**	13-Nov-2020	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**30-Oct-2020**	23-Nov-2020	✓
Clear Plastic Bottle - Natural (ED041G) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**30-Oct-2020**	24-Nov-2020	✓
Clear Plastic Bottle - Natural (ED041G) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**30-Oct-2020**	25-Nov-2020	✓
Clear Plastic Bottle - Natural (ED041G) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**30-Oct-2020**	26-Nov-2020	✓
Clear Plastic Bottle - Natural (ED041G) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**30-Oct-2020**	27-Nov-2020	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**30-Oct-2020**	23-Nov-2020	✓
Clear Plastic Bottle - Natural (ED045G) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**30-Oct-2020**	24-Nov-2020	✓
Clear Plastic Bottle - Natural (ED045G) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**30-Oct-2020**	25-Nov-2020	✓
Clear Plastic Bottle - Natural (ED045G) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**30-Oct-2020**	26-Nov-2020	✓
Clear Plastic Bottle - Natural (ED045G) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**30-Oct-2020**	27-Nov-2020	✓

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
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**05-Nov-2020**	23-Nov-2020	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**05-Nov-2020**	24-Nov-2020	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**05-Nov-2020**	25-Nov-2020	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**05-Nov-2020**	26-Nov-2020	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**05-Nov-2020**	27-Nov-2020	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**02-Nov-2020**	23-Nov-2020	✓
Clear Plastic Bottle - Natural (EK040P) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**02-Nov-2020**	24-Nov-2020	✓
Clear Plastic Bottle - Natural (EK040P) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**02-Nov-2020**	25-Nov-2020	✓
Clear Plastic Bottle - Natural (EK040P) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**02-Nov-2020**	26-Nov-2020	✓
Clear Plastic Bottle - Natural (EK040P) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**02-Nov-2020**	27-Nov-2020	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**02-Nov-2020**	23-Nov-2020	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**02-Nov-2020**	24-Nov-2020	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**02-Nov-2020**	25-Nov-2020	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**02-Nov-2020**	26-Nov-2020	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**02-Nov-2020**	27-Nov-2020	✓

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
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**30-Oct-2020**	28-Oct-2020	×
Clear Plastic Bottle - Natural (EK057G) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**30-Oct-2020**	29-Oct-2020	×
Clear Plastic Bottle - Natural (EK057G) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**30-Oct-2020**	30-Oct-2020	✓
Clear Plastic Bottle - Natural (EK057G) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**30-Oct-2020**	31-Oct-2020	✓
Clear Plastic Bottle - Natural (EK057G) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**30-Oct-2020**	01-Nov-2020	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**02-Nov-2020**	23-Nov-2020	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**02-Nov-2020**	24-Nov-2020	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**02-Nov-2020**	25-Nov-2020	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**02-Nov-2020**	26-Nov-2020	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**02-Nov-2020**	27-Nov-2020	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**30-Oct-2020**	28-Oct-2020	×
Clear Plastic Bottle - Natural (EK071G) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**30-Oct-2020**	29-Oct-2020	×
Clear Plastic Bottle - Natural (EK071G) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**30-Oct-2020**	30-Oct-2020	✓
Clear Plastic Bottle - Natural (EK071G) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**30-Oct-2020**	31-Oct-2020	✓
Clear Plastic Bottle - Natural (EK071G) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**30-Oct-2020**	01-Nov-2020	✓

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
EP002: Dissolved Organic Carbon (DOC)							
Amber DOC Filtered- Sulfuric Preserved (EP002) 0224_SW014_201026	**26-Oct-2020**	**----**	----	----	**04-Nov-2020**	23-Nov-2020	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 0224_SW007_201027, 0224_SW004_201027	**27-Oct-2020**	**----**	----	----	**04-Nov-2020**	24-Nov-2020	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 0224_SW025_201028	**28-Oct-2020**	**----**	----	----	**04-Nov-2020**	25-Nov-2020	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 0224_MW119_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**----**	----	----	**04-Nov-2020**	26-Nov-2020	✓
Amber DOC Filtered- Sulfuric Preserved (EP002) 0224_MW104_201030	**30-Oct-2020**	**----**	----	----	**04-Nov-2020**	27-Nov-2020	✓

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) 0224_QC501_201026, 0224_QC301_201026, 0224_QC401_201026	**26-Oct-2020**	**02-Nov-2020**	24-Apr-2021	✓	**02-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW013_201026, 0224_SW014_201026, 0224_SW012_201026	**26-Oct-2020**	**03-Nov-2020**	24-Apr-2021	✓	**03-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_QC302_201027, 0224_QC402_201027	**27-Oct-2020**	**02-Nov-2020**	25-Apr-2021	✓	**02-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_QC101_201027, 0224_SW016_201027, 0224_SW007_201027, 0224_SW009_201027, 0224_SW008_201027, 0224_SW004_201027, 0224_SW005_201027, 0224_SW006_201027, 0224_SW017_201027, 0224_SW018_201027	**27-Oct-2020**	**03-Nov-2020**	25-Apr-2021	✓	**03-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW110_201028, 0224_MW109_201028, 0224_MW117_201028, 0224_MW116_201028, 0224_MW118_201028, 0224_MW114_201028, 0224_MW113_201028, 0224_POT001_201028, 0224_POT005_201028, 0224_OTH001_201028, 0224_QC102_201028, 0224_QC104_201028, 0224_QC303_201028, 0224_QC403_201028	**28-Oct-2020**	**02-Nov-2020**	26-Apr-2021	✓	**02-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_QC103_201028, 0224_SW019_201028, 0224_SW027_201028, 0224_SW025_201028	**28-Oct-2020**	**03-Nov-2020**	26-Apr-2021	✓	**03-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW107_201029, 0224_MW108_201029, 0224_MW111_201029, 0224_MW119_201029, 0224_MW115_201029, 0224_MW120_201029, 0224_MW121_201029, 0224_MW112_201029, 0224_QC105_201029, 0224_QC304_201029, 0224_QC404_201029	**29-Oct-2020**	**02-Nov-2020**	27-Apr-2021	✓	**02-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X-INJ) 0224_MW106_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW103_201030, 0224_MW104_201030, 0224_MW105_201030, 0224_QC305_201030	**30-Oct-2020**	**02-Nov-2020**	28-Apr-2021	✓	**02-Nov-2020**	28-Apr-2021	✓

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)							
0224_QC501_201026, 0224_QC301_201026, 0224_QC401_201026	**26-Oct-2020**	**02-Nov-2020**	24-Apr-2021	✓	**02-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST)							
0224_SW013_201026, 0224_SW014_201026, 0224_SW012_201026	**26-Oct-2020**	**03-Nov-2020**	24-Apr-2021	✓	**03-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X)							
0224_QC302_201027, 0224_QC402_201027	**27-Oct-2020**	**02-Nov-2020**	25-Apr-2021	✓	**02-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST)							
0224_QC101_201027, 0224_SW016_201027, 0224_SW007_201027, 0224_SW009_201027, 0224_SW008_201027, 0224_SW004_201027, 0224_SW005_201027, 0224_SW006_201027, 0224_SW017_201027, 0224_SW018_201027	**27-Oct-2020**	**03-Nov-2020**	25-Apr-2021	✓	**03-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X)							
0224_MW110_201028, 0224_MW109_201028, 0224_MW117_201028, 0224_MW116_201028, 0224_MW118_201028, 0224_MW114_201028, 0224_MW113_201028, 0224_POT001_201028, 0224_POT005_201028, 0224_OTH001_201028, 0224_QC102_201028, 0224_QC104_201028, 0224_QC303_201028, 0224_QC403_201028	**28-Oct-2020**	**02-Nov-2020**	26-Apr-2021	✓	**02-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST)							
0224_QC103_201028, 0224_SW019_201028, 0224_SW027_201028, 0224_SW025_201028	**28-Oct-2020**	**03-Nov-2020**	26-Apr-2021	✓	**03-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X)							
0224_MW107_201029, 0224_MW108_201029, 0224_MW111_201029, 0224_MW119_201029, 0224_MW115_201029, 0224_MW120_201029, 0224_MW121_201029, 0224_MW112_201029, 0224_QC105_201029, 0224_QC304_201029, 0224_QC404_201029	**29-Oct-2020**	**02-Nov-2020**	27-Apr-2021	✓	**02-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X-INJ)							
0224_MW106_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X)							
0224_MW103_201030, 0224_MW104_201030, 0224_MW105_201030, 0224_QC305_201030	**30-Oct-2020**	**02-Nov-2020**	28-Apr-2021	✓	**02-Nov-2020**	28-Apr-2021	✓

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) 0224_QC501_201026, 0224_QC301_201026, 0224_QC401_201026	**26-Oct-2020**	**02-Nov-2020**	24-Apr-2021	✓	**02-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW013_201026, 0224_SW014_201026, 0224_SW012_201026	**26-Oct-2020**	**03-Nov-2020**	24-Apr-2021	✓	**03-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_QC302_201027, 0224_QC402_201027	**27-Oct-2020**	**02-Nov-2020**	25-Apr-2021	✓	**02-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_QC101_201027, 0224_SW016_201027, 0224_SW007_201027, 0224_SW009_201027, 0224_SW008_201027, 0224_SW004_201027, 0224_SW005_201027, 0224_SW006_201027, 0224_SW017_201027, 0224_SW018_201027	**27-Oct-2020**	**03-Nov-2020**	25-Apr-2021	✓	**03-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW110_201028, 0224_MW109_201028, 0224_MW117_201028, 0224_MW116_201028, 0224_MW118_201028, 0224_MW114_201028, 0224_MW113_201028, 0224_POT001_201028, 0224_POT005_201028, 0224_OTH001_201028, 0224_QC102_201028, 0224_QC104_201028, 0224_QC303_201028, 0224_QC403_201028	**28-Oct-2020**	**02-Nov-2020**	26-Apr-2021	✓	**02-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_QC103_201028, 0224_SW019_201028, 0224_SW027_201028, 0224_SW025_201028	**28-Oct-2020**	**03-Nov-2020**	26-Apr-2021	✓	**03-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW107_201029, 0224_MW108_201029, 0224_MW111_201029, 0224_MW119_201029, 0224_MW115_201029, 0224_MW120_201029, 0224_MW121_201029, 0224_MW112_201029, 0224_QC105_201029, 0224_QC304_201029, 0224_QC404_201029	**29-Oct-2020**	**02-Nov-2020**	27-Apr-2021	✓	**02-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X-INJ) 0224_MW106_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW103_201030, 0224_MW104_201030, 0224_MW105_201030, 0224_QC305_201030	**30-Oct-2020**	**02-Nov-2020**	28-Apr-2021	✓	**02-Nov-2020**	28-Apr-2021	✓

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)							
0224_QC501_201026, 0224_QC301_201026, 0224_QC401_201026	**26-Oct-2020**	**02-Nov-2020**	24-Apr-2021	✓	**02-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST)							
0224_SW013_201026, 0224_SW014_201026, 0224_SW012_201026	**26-Oct-2020**	**03-Nov-2020**	24-Apr-2021	✓	**03-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X)							
0224_QC302_201027, 0224_QC402_201027	**27-Oct-2020**	**02-Nov-2020**	25-Apr-2021	✓	**02-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST)							
0224_QC101_201027, 0224_SW016_201027, 0224_SW007_201027, 0224_SW009_201027, 0224_SW008_201027, 0224_SW004_201027, 0224_SW005_201027, 0224_SW006_201027, 0224_SW017_201027, 0224_SW018_201027	**27-Oct-2020**	**03-Nov-2020**	25-Apr-2021	✓	**03-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X)							
0224_MW110_201028, 0224_MW109_201028, 0224_MW117_201028, 0224_MW116_201028, 0224_MW118_201028, 0224_MW114_201028, 0224_MW113_201028, 0224_POT001_201028, 0224_POT005_201028, 0224_OTH001_201028, 0224_QC102_201028, 0224_QC104_201028, 0224_QC303_201028, 0224_QC403_201028	**28-Oct-2020**	**02-Nov-2020**	26-Apr-2021	✓	**02-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST)							
0224_QC103_201028, 0224_SW019_201028, 0224_SW027_201028, 0224_SW025_201028	**28-Oct-2020**	**03-Nov-2020**	26-Apr-2021	✓	**03-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X)							
0224_MW107_201029, 0224_MW108_201029, 0224_MW111_201029, 0224_MW119_201029, 0224_MW115_201029, 0224_MW120_201029, 0224_MW121_201029, 0224_MW112_201029, 0224_QC105_201029, 0224_QC304_201029, 0224_QC404_201029	**29-Oct-2020**	**02-Nov-2020**	27-Apr-2021	✓	**02-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X-INJ)							
0224_MW106_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X)							
0224_MW103_201030, 0224_MW104_201030, 0224_MW105_201030, 0224_QC305_201030	**30-Oct-2020**	**02-Nov-2020**	28-Apr-2021	✓	**02-Nov-2020**	28-Apr-2021	✓

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) 0224_QC501_201026, 0224_QC301_201026, 0224_QC401_201026	**26-Oct-2020**	**02-Nov-2020**	24-Apr-2021	✓	**02-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW013_201026, 0224_SW014_201026, 0224_SW012_201026	**26-Oct-2020**	**03-Nov-2020**	24-Apr-2021	✓	**03-Nov-2020**	24-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_QC302_201027, 0224_QC402_201027	**27-Oct-2020**	**02-Nov-2020**	25-Apr-2021	✓	**02-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_QC101_201027, 0224_SW016_201027, 0224_SW007_201027, 0224_SW009_201027, 0224_SW008_201027, 0224_SW004_201027, 0224_SW005_201027, 0224_SW006_201027, 0224_SW017_201027, 0224_SW018_201027	**27-Oct-2020**	**03-Nov-2020**	25-Apr-2021	✓	**03-Nov-2020**	25-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW110_201028, 0224_MW109_201028, 0224_MW117_201028, 0224_MW116_201028, 0224_MW118_201028, 0224_MW114_201028, 0224_MW113_201028, 0224_POT001_201028, 0224_POT005_201028, 0224_OTH001_201028, 0224_QC102_201028, 0224_QC104_201028, 0224_QC303_201028, 0224_QC403_201028	**28-Oct-2020**	**02-Nov-2020**	26-Apr-2021	✓	**02-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_QC103_201028, 0224_SW019_201028, 0224_SW027_201028, 0224_SW025_201028	**28-Oct-2020**	**03-Nov-2020**	26-Apr-2021	✓	**03-Nov-2020**	26-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW107_201029, 0224_MW108_201029, 0224_MW111_201029, 0224_MW119_201029, 0224_MW115_201029, 0224_MW120_201029, 0224_MW121_201029, 0224_MW112_201029, 0224_QC105_201029, 0224_QC304_201029, 0224_QC404_201029	**29-Oct-2020**	**02-Nov-2020**	27-Apr-2021	✓	**02-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X-INJ) 0224_MW106_201029, 0224_MW101_201029, 0224_MW122_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW103_201030, 0224_MW104_201030, 0224_MW105_201030, 0224_QC305_201030	**30-Oct-2020**	**02-Nov-2020**	28-Apr-2021	✓	**02-Nov-2020**	28-Apr-2021	✓

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)							
Alkalinity by PC Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	34	**8.82**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	19	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	2	19	**10.53**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	6	39	**15.38**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	12	**25.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	2	19	**10.53**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	34	**2.94**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	19	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2 017-1-L
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Dissolved Organic Carbon	EP002	WATER	In house: Referenced to APHA 5310 B. This method is compliant with NEPM Schedule B(3). Samples are combusted at high termperature in the presence of an oxidative catalyst. The evolved carbon dioxide is quantified using an IR detector.
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.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with mobile phase solvent. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. Where commercially available, isotopically labelled analogues of the target analytes are used as internal standards for quantification. Where a labelled analogue is not commercially available, the internal standard with similar chemistry and the closest retention time to the target is used for quantification. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
Preparation for PFAS in water.	EP231-PR	WATER	Method presumes direct injection without workup. Preparation includes addition of internal standard and surrogate, and filtration prior to analysis.
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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2028565**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Facsimile	: +[redacted]	Facsimile	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2019AECOMAU0030 (SY/139/19 V3)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 60612563 4.1		
Sampler	: [redacted]		

Dates

Date Samples Received	: 30-Oct-2020 12:00	Issue Date	: 30-Oct-2020
Client Requested Due Date	: 06-Nov-2020	Scheduled Reporting Date	: **06-Nov-2020**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 0.5°C - Ice present
Receipt Detail	: MEDIUM HARD ESKY	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2028565-001	29-Oct-2020 09:43	0224_SW020_201029	

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email	AP_CustomerService.ANZ@aecom.com

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT)	Email	derp.labreports@esdat.com.au

[redacted]

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

[redacted]

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2028565**	Page	: 1 of 5
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020 12:00
Order number	: 60612563 4.1	Date Analysis Commenced	: 03-Nov-2020
C-O-C number	: ----	Issue Date	: 06-Nov-2020 10:41
Sampler	: [redacted]		
Site	: 60612563 4.1		
Quote number	: SY/139/19 V3		
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. 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.

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.

[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X-ST PFAS Super Trace: Sample "0224_SW020_201029" required dilution due to sample matrix. LOR values have been adjusted accordingly.
- 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)				0224_SW020_201029	----	----	----	----
				29-Oct-2020 09:43	----	----	----	----
				EB2028565-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0010	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0010	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0010	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0010	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0010	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0010	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	**0.0021**	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	**0.0011**	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0010	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0010	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0010	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0010	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0010	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0010	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0010	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0024	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0010	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.002	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.002	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW020_201029	----	----	----	----
				29-Oct-2020 09:43	----	----	----	----
				EB2028565-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.002	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0010	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0010	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	**0.0032**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	<0.0010	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	**0.0032**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**103**	----	----	----	----
13C8-PFOA	----	0.0005	%	**100**	----	----	----	----

Surrogate Control Limits

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2028565**	Page	: 1 of 4
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020
Order number	: 60612563 4.1	Date Analysis Commenced	: 03-Nov-2020
C-O-C number	: ----	Issue Date	: 06-Nov-2020
Sampler	: [redacted]		
Site	: 60612563 4.1		
Quote number	: SY/139/19 V3		
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. 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

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.

[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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 Spike (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 Spike (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 (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3338228)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	92.8	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	102	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	109	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	91.5	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	84.1	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	88.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3338228)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	87.6	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.4	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	91.6	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	87.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	101	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	101	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	100	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3338228)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	# 53.6	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	104	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	108	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	106	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	81.8	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	99.2	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	112	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338228)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	87.3	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	89.7	64.0	140

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338228) - continued								
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	89.2	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	101	53.1	133
EP231P: PFAS Sums (QCLot: 3338228)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2028565**	Page	: 1 of 4
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020
Site	: 60612563 4.1	Issue Date	: 06-Nov-2020
Sampler	: [redacted]	No. of samples received	: 1
Order number	: 60612563 4.1	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 Matrix Spike outliers occur.**
- **Laboratory Control 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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP231C: Perfluoroalkyl Sulfonamides	QC-3338228-002	----	**Perfluorooctane sulfonamide (FOSA)**	754-91-6	53.6 %	67.0-137%	**Recovery less than lower control limit**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	9	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	9	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-ST) 0224_SW020_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST) 0224_SW020_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST) 0224_SW020_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST) 0224_SW020_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST) 0224_SW020_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓

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-ST	0	9	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	9	**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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2028569**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Facsimile	: +[redacted]	Facsimile	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2019AECOMAU0030 (SY/139/19 V3)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: 60612563 4.1		
Sampler	: [redacted]		

Dates

Date Samples Received	: 30-Oct-2020 12:00	Issue Date	: 30-Oct-2020
Client Requested Due Date	: 06-Nov-2020	Scheduled Reporting Date	: **06-Nov-2020**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 0.5°C
Receipt Detail	: MEDIUM HARD ESKY	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2028569-001	29-Oct-2020 09:17	0224_SW024_201029	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email	AP_CustomerService.ANZ@aecom.com

[redacted]

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

[redacted]

- EDI Format - ESDAT (ESDAT)	Email	derp.labreports@esdat.com.au

[redacted]

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

[redacted]

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2028569**	Page	: 1 of 5
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020 12:00
Order number	: 60612563 4.1	Date Analysis Commenced	: 03-Nov-2020
C-O-C number	: ----	Issue Date	: 05-Nov-2020 17:17
Sampler	: [redacted]		
Site	: 60612563 4.1		
Quote number	: SY/139/19 V3		
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. 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.

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.

[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X-ST PFAS Super Trace: The LOR for PFPeA has been raised on sample '0224_SW024_201029' due to matrix interference.
- EP231X-ST PFAS Super Trace: Sample '0224_SW024_201029' was diluted due to matrix interference. LOR adjusted accordingly.
- 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)				0224_SW024_201029	----	----	----	----
				29-Oct-2020 09:17	----	----	----	----
				EB2028569-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0016	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0016	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0016	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0016	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.008	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0050	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0016	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	**0.0020**	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0016	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0039	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0016	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.004	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.004	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW024_201029	----	----	----	----
				29-Oct-2020 09:17	----	----	----	----
				EB2028569-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.004	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.004	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0016	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0016	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.002	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.002	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.002	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.002	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	**0.0020**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	<0.0016	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	**0.0020**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**96.8**	----	----	----	----
13C8-PFOA	----	0.0005	%	**106**	----	----	----	----

Surrogate Control Limits

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2028569**	Page	: 1 of 4
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020
Order number	: 60612563 4.1	Date Analysis Commenced	: 03-Nov-2020
C-O-C number	: ----	Issue Date	: 05-Nov-2020
Sampler	: [redacted]		
Site	: 60612563 4.1		
Quote number	: SY/139/19 V3		
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. 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

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.

[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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 Spike (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 Spike (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 (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3338228)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	92.8	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	102	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	109	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	91.5	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	84.1	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	88.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3338228)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	87.6	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.4	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	91.6	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	87.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	101	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	101	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	100	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3338228)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	# 53.6	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	104	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	108	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	106	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	81.8	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	99.2	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	112	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338228)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	87.3	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	89.7	64.0	140

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3338228) - continued								
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	89.2	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	101	53.1	133
EP231P: PFAS Sums (QCLot: 3338228)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2028569**	Page	: 1 of 4
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: +[redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 30-Oct-2020
Site	: 60612563 4.1	Issue Date	: 05-Nov-2020
Sampler	: [redacted]	No. of samples received	: 1
Order number	: 60612563 4.1	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 Matrix Spike outliers occur.**
- **Laboratory Control 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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP231C: Perfluoroalkyl Sulfonamides	QC-3338228-002	----	**Perfluorooctane sulfonamide (FOSA)**	754-91-6	53.6 %	67.0-137%	**Recovery less than lower control limit**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	8	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-ST) 0224_SW024_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST) 0224_SW024_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST) 0224_SW024_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST) 0224_SW024_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST) 0224_SW024_201029	**29-Oct-2020**	**03-Nov-2020**	27-Apr-2021	✓	**03-Nov-2020**	27-Apr-2021	✓

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-ST	0	8	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	8	**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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

SAMPLE RECEIPT NOTIFICATION

CUSTOMER DETAILS

Attention: [redacted]

Customer: AECOM AUSTRALIA PTY LTD

Address: [redacted]

Email: [redacted]

Telephone:

Fax:

LABORATORY DETAILS

Lab: National Measurement Institute

Contact: [redacted]

Address: [redacted]

Email: [redacted]

Telephone: [redacted]

Fax:

SAMPLE DETAILS

NMI Job Name: **AECO06/201016**

Total No. of Samples: **2**

LRNs	Estimated Report Date	Customer Sample ID	Lab Sample Description
N20/024381	23-OCT-2020	QC02	WATER
N20/024382	23-OCT-2020	QC04	SOLID

SAMPLE RECEIVED CONDITION

Date samples received:	16-OCT-2020
Sample received in good order:	Yes
NMI Quotation no. provided:	
Client purchase order number:	EB2026884
Temperature of samples:	Chilled
Comments:	Order no used for this job EB2026884. Please advise if you want to use othe
Mode of Delivery:	Courier

Additional Terms and Conditions

Incomplete / unclear information about samples or required testing will delay the start of the analysis work

If you require your Purchase Order (PO) number to be included on our invoice, please provide the number during sample submission and before the completion of work to avoid unnecessary delays and/or additional processing/handling fees.

The lodgement of an order or receipt of samples for NMI services referenced in this Sample Receipt Notification constitutes an acceptence of the current version of NMI Terms and Conditions or other applicable Terms referenced in the NMI Quotation. NMI Terms and Conditions are available on the web at https://www.industry.gov.au/client-services/testing-and-analysis-services/chemical-and-biological-analysis-services-terms-and-conditions

REPORT OF ANALYSIS

Report No. RN1291697

Client	: [redacted]	**Job No.**	: AECO06/201016
	[redacted]	**Quote No.**	: QT-02018
	[redacted]	**Order No.**	: 60580555_2_2
		Date Received	: 16-OCT-2020
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: BE2026884		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N20/024382	0224_QC202_201013	SOLID

Lab Reg No.		N20/024382				
Date Sampled		Not Provided				
	Units					Method
PFAS (per-and poly-fluoroalkyl substances)						
PFBA (375-22-4)	mg/kg	<0.002				NR70
PFPeA (2706-90-3)	mg/kg	<0.002				NR70
PFHxA (307-24-4)	mg/kg	<0.001				NR70
PFHpA (375-85-9)	mg/kg	<0.001				NR70
PFOA (335-67-1)	mg/kg	<0.001				NR70
PFNA (375-95-1)	mg/kg	<0.001				NR70
PFDA (335-76-2)	mg/kg	<0.001				NR70
PFUdA (2058-94-8)	mg/kg	<0.002				NR70
PFDoA (307-55-1)	mg/kg	<0.002				NR70
PFTrDA (72629-94-8)	mg/kg	<0.002				NR70
PFTeDA (376-06-7)	mg/kg	<0.002				NR70
PFHxDA (67905-19-5)	mg/kg	<0.002				NR70
PFODA (16517-11-6)	mg/kg	<0.005				NR70
FOUEA (70887-84-2)	mg/kg	<0.001				NR70
PFBS (375-73-5)	mg/kg	<0.001				NR70
PFPeS (2706-91-4)	mg/kg	<0.001				NR70
PFHxS (355-46-4)	mg/kg	<0.001				NR70
PFHpS (375-92-8)	mg/kg	<0.001				NR70
PFOS (1763-23-1)	mg/kg	<0.002				NR70
PFNS (68259-12-1)	mg/kg	<0.001				NR70
PFDS (335-77-3)	mg/kg	<0.001				NR70
PFOSA (754-91-6)	mg/kg	<0.001				NR70
N-MeFOSA (31506-32-8)	mg/kg	<0.002				NR70
N-EtFOSA (4151-50-2)	mg/kg	<0.002				NR70
N-MeFOSAA (2355-31-9)	mg/kg	<0.002				NR70
N-EtFOSAA(2991-50-6)	mg/kg	<0.002				NR70
N-MeFOSE (24448-09-7)	mg/kg	<0.005				NR70
N-EtFOSE (1691-99-2)	mg/kg	<0.005				NR70
4:2 FTS (757124-72-4)	mg/kg	<0.001				NR70
6:2 FTS (27619-97-2)	mg/kg	<0.001				NR70

REPORT OF ANALYSIS

Lab Reg No.		N20/024382				
Date Sampled		Not Provided				
	Units					Method
PFAS (per-and poly-fluoroalkyl substances)						
8:2 FTS (39108-34-4)	mg/kg	<0.001				NR70
10:2 FTS (120226-60-0)	mg/kg	<0.002				NR70
8:2 diPAP (678-41-1)	mg/kg	<0.002				NR70
PFBA (Surrogate Recovery)	%	111				NR70
PFPeA (Surrogate Recovery)	%	120				NR70
PFHxA (Surrogate Recovery)	%	118				NR70
PFHpA (Surrogate Recovery)	%	136				NR70
PFOA (Surrogate Recovery)	%	134				NR70
PFNA (Surrogate Recovery)	%	137				NR70
PFDA (Surrogate Recovery)	%	138				NR70
PFUdA (Surrogate Recovery)	%	127				NR70
PFDoA (Surrogate Recovery)	%	131				NR70
PFTeDA (Surrogate Recovery)	%	149				NR70
PFHxDA (Surrogate Recovery)	%	149				NR70
FOUEA (Surrogate Recovery)	%	81				NR70
PFBS (Surrogate Recovery)	%	133				NR70
PFHxS (Surrogate Recovery)	%	128				NR70
PFOS (Surrogate Recovery)	%	114				NR70
PFOSA (Surrogate Recovery)	%	126				NR70
N-MeFOSA (Surrogate Recovery)	%	128				NR70
N-EtFOSA (Surrogate Recovery)	%	113				NR70
N-MeFOSAA (Surrogate Recovery)	%	128				NR70
N-EtFOSAA (Surrogate Recovery)	%	149				NR70
N-MeFOSE (Surrogate Recovery)	%	130				NR70
N-EtFOSE (Surrogate Recovery)	%	63				NR70
4:2 FTS (Surrogate Recovery)	%	67				NR70
6:2 FTS (Surrogate Recovery)	%	68				NR70
8:2 FTS (Surrogate Recovery)	%	79				NR70
8:2 diPAP (Surrogate Recovery)	%	72				NR70
Dates						
Date extracted		21-OCT-2020				
Date analysed		23-OCT-2020				

N20/024382
PFOS and PFHxS are quantified using a combined branched and linear standard,
linear and branched isomers are totalled for reporting.
All results corrected for labelled surrogate recoveries.

REPORT OF ANALYSIS

Lab Reg No.		N20/024382				
Date Sampled		Not Provided				
	Units					Method

[redacted]

Organics - NSW
Accreditation No. 198

23-OCT-2020

Lab Reg No.		N20/024382				
Date Sampled		Not Provided				
	Units					Method
Trace Elements						
Total Solids	%	66.6				NT2_49
Dates						
Date extracted		19-OCT-2020				
Date analysed		20-OCT-2020				

[redacted]

Inorganics - NSW
Accreditation No. 198

23-OCT-2020

Solid results are expressed on a dry weight basis.

REPORT OF ANALYSIS

Report No. RN1291697

Client	: AECOM AUSTRALIA PTY LTD	**Job No.**	: AECO06/201016
	[redacted]	**Quote No.**	: QT-02018
	[redacted]	**Order No.**	: 60580555_2_2
		Date Received	: 16-OCT-2020
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: BE2026884		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N20/024381	0224_QC201_201013	WATER

Lab Reg No.			N20/024381				
Date Sampled			Not Provided				
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
PFBA (375-22-4)		ug/L	<0.05				NR70
PFPeA (2706-90-3)		ug/L	<0.02				NR70
PFHxA (307-24-4)		ug/L	<0.01				NR70
PFHpA (375-85-9)		ug/L	<0.01				NR70
PFOA (335-67-1)		ug/L	<0.01				NR70
PFNA (375-95-1)		ug/L	<0.01				NR70
PFDA (335-76-2)		ug/L	<0.01				NR70
PFUdA (2058-94-8)		ug/L	<0.01				NR70
PFDoA (307-55-1)		ug/L	<0.01				NR70
PFTrDA (72629-94-8)		ug/L	<0.02				NR70
PFTeDA (376-06-7)		ug/L	<0.02				NR70
PFHxDA (67905-19-5)		ug/L	<0.02				NR70
PFODA (16517-11-6)		ug/L	<0.05				NR70
FOUEA (70887-84-2)		ug/L	<0.01				NR70
PFDS (335-77-3)		ug/L	<0.01				NR70
PFPeS (2706-91-4)		ug/L	<0.01				NR70
PFHxS (355-46-4)		ug/L	<0.01				NR70
PFHpS (375-92-8)		ug/L	<0.01				NR70
PFOS (1763-23-1)		ug/L	<0.02				NR70
PFNS (68259-12-1)		ug/L	<0.01				NR70
PFBS (375-73-5)		ug/L	<0.01				NR70
PFOSA (754-91-6)		ug/L	<0.01				NR70
N-MeFOSA (31506-32-8)		ug/L	<0.02				NR70
N-EtFOSA (4151-50-2)		ug/L	<0.02				NR70
N-MeFOSAA (2355-31-9)		ug/L	<0.01				NR70
N-EtFOSAA(2991-50-6)		ug/L	<0.01				NR70
N-MeFOSE (24448-09-7)		ug/L	<0.05				NR70
N-EtFOSE (1691-99-2)		ug/L	<0.05				NR70
4:2 FTS (757124-72-4)		ug/L	<0.01				NR70
6:2 FTS (27619-97-2)		ug/L	<0.01				NR70

REPORT OF ANALYSIS

Lab Reg No.			N20/024381				
Date Sampled			Not Provided				
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
8:2 FTS (39108-34-4)		ug/L	<0.01				NR70
10:2 FTS (120226-60-0)		ug/L	<0.01				NR70
8:2 diPAP (678-41-1)		ug/L	<0.02				NR70
PFBA (Surrogate Recovery)		%	94				NR70
PFPeA (Surrogate Recovery)		%	76				NR70
PFHxA (Surrogate Recovery)		%	86				NR70
PFHpA (Surrogate Recovery)		%	88				NR70
PFOA (Surrogate Recovery)		%	98				NR70
PFNA (Surrogate Recovery)		%	100				NR70
PFDA (Surrogate Recovery)		%	87				NR70
PFUdA (Surrogate Recovery)		%	86				NR70
PFDoA (Surrogate Recovery)		%	65				NR70
PFTeDA (Surrogate Recovery)		%	48				NR70
PFHxDA (Surrogate Recovery)		%	65				NR70
FOUEA (Surrogate Recovery)		%	60				NR70
PFBS (Surrogate Recovery)		%	96				NR70
PFHxS (Surrogate Recovery)		%	87				NR70
PFOS (Surrogate Recovery)		%	84				NR70
PFOSA (Surrogate Recovery)		%	64				NR70
N-MeFOSA (Surrogate Recovery)		%	32				NR70
N-EtFOSA (Surrogate Recovery)		%	27				NR70
N-MeFOSAA (Surrogate Recovery)		%	63				NR70
N-EtFOSAA (Surrogate Recovery)		%	50				NR70
N-MeFOSE (Surrogate Recovery)		%	45				NR70
N-EtFOSE (Surrogate Recovery)		%	21				NR70
4:2 FTS (Surrogate Recovery)		%	84				NR70
6:2 FTS (Surrogate Recovery)		%	60				NR70
8:2 FTS (Surrogate Recovery)		%	67				NR70
8:2 diPAP (Surrogate Recovery)		%	28				NR70
Dates							
Date extracted			22-OCT-2020				
Date analysed			23-OCT-2020				

N20/024381
PFOS and PFHxS are quantified using a combined branched and linear standard,
linear and branched isomers are totalled for reporting.
All results corrected for labelled surrogate recoveries.

Selected PFAS surrogate recoveries are biased due to matrix effects.

REPORT OF ANALYSIS

Surrogate recoveries low for selected analytes - PFAS LORs not raised since S/N >10.

[redacted]

Organics - NSW
Accreditation No. 198

23-OCT-2020

NATA
ACCREDITED FOR
TECHNICAL
COMPETENCE

Accredited for compliance with ISO/IEC 17025 - Testing.
This report shall not be reproduced except in full.
Results relate only to the sample(s) as received and tested.

This Report supersedes reports: *RN1291696*

Measurement Uncertainty is available upon request.

Note: Where sampling dates are not provided NMI is unable to determine compliance to any applicable Holding Time requirements

Chemical Accreditation 198: 105 Delhi Road, North Ryde, NSW, 2113

Australian Government

National Measurement Institute

QUALITY ASSURANCE REPORT

Client: AECOM AUSTRALIA PTY LTD

NMI QA Report No: AECO06/201016 **Sample Matrix:** Liquid

Analyte	Method	LOR	Blank	Sample Duplicates			Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		ug/L	ug/L	ug/L	ug/L	%	%	%
PFBA (375-22-4)	NR70	0.05	<0.05	NA	NA	NA	98	NA
PFPeA (2706-90-3)	NR70	0.02	<0.02	NA	NA	NA	99	NA
PFHxA (307-24-4)	NR70	0.01	<0.01	NA	NA	NA	101	NA
PFHpA (375-85-9)	NR70	0.01	<0.01	NA	NA	NA	93	NA
PFOA (335-67-1)	NR70	0.01	<0.01	NA	NA	NA	92	NA
PFNA (375-95-1)	NR70	0.01	<0.01	NA	NA	NA	88	NA
PFDA (335-76-2)	NR70	0.01	<0.01	NA	NA	NA	94	NA
PFUdA (2058-94-8)	NR70	0.01	<0.01	NA	NA	NA	102	NA
PFDoA (307-55-1)	NR70	0.01	<0.01	NA	NA	NA	92	NA
PFTrDA (72629-94-8)	NR70	0.02	<0.02	NA	NA	NA	99	NA
PFTeDA (376-06-7)	NR70	0.02	<0.02	NA	NA	NA	90	NA
PFHxDA (67905-19-5)	NR70	0.02	<0.02	NA	NA	NA	97	NA
PFODA (16517-11-6)	NR70	0.05	<0.05	NA	NA	NA	99	NA
FOUEA (70887-84-2)	NR70	0.01	<0.01	NA	NA	NA	103	NA
PFBS (375-73-5)	NR70	0.01	<0.01	NA	NA	NA	90	NA
PFPeS (2706-91-4)	NR70	0.01	<0.01	NA	NA	NA	90	NA
PFHxS (355-46-4)	NR70	0.01	<0.01	NA	NA	NA	92	NA
PFHpS (375-92-8)	NR70	0.01	<0.01	NA	NA	NA	97	NA
PFOS (1763-23-1)	NR70	0.02	<0.02	NA	NA	NA	97	NA
PFNS (68259-12-1)	NR70	0.01	<0.01	NA	NA	NA	98	NA
PFDS (335-77-3)	NR70	0.01	<0.01	NA	NA	NA	94	NA
PFOSA (754-91-6)	NR70	0.01	<0.01	NA	NA	NA	102	NA
N-MeFOSA (31506-32-8)	NR70	0.02	<0.02	NA	NA	NA	119	NA
N-EtFOSA (4151-50-2)	NR70	0.02	<0.02	NA	NA	NA	148	NA
N-MeFOSAA (2355-31-9)	NR70	0.01	<0.01	NA	NA	NA	86	NA
N-EtFOSAA(2991-50-6)	NR70	0.01	<0.01	NA	NA	NA	84	NA
N-MeFOSE (24448-09-7)	NR70	0.05	<0.05	NA	NA	NA	82	NA
N-EtFOSE (1691-99-2)	NR70	0.05	<0.05	NA	NA	NA	120	NA
4:2 FTS (757124-72-4)	NR70	0.01	<0.01	NA	NA	NA	104	NA
6:2 FTS (27619-97-2)	NR70	0.01	<0.01	NA	NA	NA	107	NA
8:2 FTS (39108-34-4)	NR70	0.01	<0.01	NA	NA	NA	96	NA
10:2 FTS (120226-60-0)	NR70	0.01	<0.01	NA	NA	NA	94	NA
8:2 diPAP (678-41-1)	NR70	0.02	<0.02	NA	NA	NA	95	NA

Results expressed in percentage (%) or ug/L wherever appropriate.
Acceptable Spike recovery is 50-150%.
Maximum acceptable RPDs on spikes and duplicates is 40%.
'NA ' = Not Applicable.
RPD= Relative Percentage Difference.

Signed:

Danny Slee
Organics Manager, NMI-North Ryde

Date: **23/10/2020**

Australian Government

National Measurement Institute

QUALITY ASSURANCE REPORT

Client: AECOM AUSTRALIA PTY LTD

NMI QA Report No: AECO06/201016 **Sample Matrix:** Solid

Analyte	Method	LOR	Blank	Sample Duplicates			Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		mg/kg	mg/kg	mg/kg	mg/kg	%	%	%
PFBA (375-22-4)	NR70	0.002	<0.002	NA	NA	NA	103	NA
PFPeA (2706-90-3)	NR70	0.002	<0.002	NA	NA	NA	82	NA
PFHxA (307-24-4)	NR70	0.001	<0.001	NA	NA	NA	86	NA
PFHpA (375-85-9)	NR70	0.001	<0.001	NA	NA	NA	90	NA
PFOA (335-67-1)	NR70	0.001	<0.001	NA	NA	NA	90	NA
PFNA (375-95-1)	NR70	0.001	<0.001	NA	NA	NA	90	NA
PFDA (335-76-2)	NR70	0.001	<0.001	NA	NA	NA	92	NA
PFUdA (2058-94-8)	NR70	0.002	<0.002	NA	NA	NA	92	NA
PFDoA (307-55-1)	NR70	0.002	<0.002	NA	NA	NA	92	NA
PFTrDA (72629-94-8)	NR70	0.002	<0.002	NA	NA	NA	89	NA
PFTeDA (376-06-7)	NR70	0.002	<0.002	NA	NA	NA	74	NA
PFHxDA (67905-19-5)	NR70	0.002	<0.002	NA	NA	NA	85	NA
PFODA (16517-11-6)	NR70	0.005	<0.005	NA	NA	NA	86	NA
FOUEA (70887-84-2)	NR70	0.001	<0.001	NA	NA	NA	93	NA
PFBS (375-73-5)	NR70	0.001	<0.001	NA	NA	NA	86	NA
PFPeS (2706-91-4)	NR70	0.001	<0.001	NA	NA	NA	88	NA
PFHxS (355-46-4)	NR70	0.001	<0.001	NA	NA	NA	86	NA
PFHpS (375-92-8)	NR70	0.001	<0.001	NA	NA	NA	88	NA
PFOS (1763-23-1)	NR70	0.002	<0.002	NA	NA	NA	101	NA
PFNS (68259-12-1)	NR70	0.001	<0.001	NA	NA	NA	78	NA
PFDS (335-77-3)	NR70	0.001	<0.001	NA	NA	NA	80	NA
PFOSA (754-91-6)	NR70	0.001	<0.001	NA	NA	NA	88	NA
N-MeFOSA (31506-32-8)	NR70	0.002	<0.002	NA	NA	NA	93	NA
N-EtFOSA (4151-50-2)	NR70	0.002	<0.002	NA	NA	NA	68	NA
N-MeFOSAA (2355-31-9)	NR70	0.002	<0.002	NA	NA	NA	77	NA
N-EtFOSAA(2991-50-6)	NR70	0.002	<0.002	NA	NA	NA	88	NA
N-MeFOSE (24448-09-7)	NR70	0.005	<0.005	NA	NA	NA	89	NA
N-EtFOSE (1691-99-2)	NR70	0.005	<0.005	NA	NA	NA	91	NA
4:2 FTS (757124-72-4)	NR70	0.001	<0.001	NA	NA	NA	106	NA
6:2 FTS (27619-97-2)	NR70	0.001	<0.001	NA	NA	NA	100	NA
8:2 FTS (39108-34-4)	NR70	0.001	<0.001	NA	NA	NA	78	NA
10:2 FTS (120226-60-0)	NR70	0.002	<0.002	NA	NA	NA	85	NA
8:2 diPAP (678-41-1)	NR70	0.002	<0.002	NA	NA	NA	90	NA

Results expressed in percentage (%) or mg/kg wherever appropriate.
Acceptable Spike recovery is 50-150%.
Maximum acceptable RPDs on spikes and duplicates is 40%.
'NA ' = Not Applicable.
RPD= Relative Percentage Difference.

Signed: [redacted]

[redacted]
Organics Manager, NMI-North Ryde

Date: **23/10/2020**

Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

SAMPLE RECEIPT NOTIFICATION

CUSTOMER DETAILS

Attention: [redacted]

Customer: AECOM AUSTRALIA PTY LTD

Address: [redacted]

Email: [redacted]

Telephone:

Fax:

LABORATORY DETAILS

Lab: National Measurement Institute

Contact: [redacted]

Address: [redacted]

Email: [redacted]

Telephone: [redacted]

Fax:

SAMPLE DETAILS

NMI Job Name: AECO06/201103

Total No. of Samples: 5

LRNs	Estimated Report Date	Customer Sample ID	Lab Sample Description
N20/025797	10-NOV-2020	0224_QC201_201027	WATER 27-OCT-2020
N20/025798	10-NOV-2020	0224_QC202_201028	WATER 28-OCT-2020
N20/025799	10-NOV-2020	0224_QC203_201028	WATER 28-OCT-2020
N20/025800	10-NOV-2020	0224_QC204_201028	WATER 28-OCT-2020
N20/025801	10-NOV-2020	0224_QC205_201029	WATER 29-OCT-2020

SAMPLE RECEIVED CONDITION

Date samples received:	3-NOV-2020
Sample received in good order:	Yes
NMI Quotation no. provided:	
Client purchase order number:	60612563_4_1
Temperature of samples:	Chilled
Comments:	ALL OK
Mode of Delivery:	Courier

Additional Terms and Conditions

Incomplete / unclear information about samples or required testing will delay the start of the analysis work

If you require your Purchase Order (PO) number to be included on our invoice, please provide the number during sample submission and before the completion of work to avoid unnecessary delays and/or additional processing/handling fees.

The lodgement of an order or receipt of samples for NMI services referenced in this Sample Receipt Notification constitutes an acceptence of the current version of NMI Terms and Conditions or other applicable Terms referenced in the NMI Quotation. NMI Terms and Conditions are available on the web at https://www.industry.gov.au/client-services/testing-and-analysis-services/chemical-and-biological-analysis-services-terms-and-conditions

REPORT OF ANALYSIS

Report No. RN1293194

Client	: AECOM AUSTRALIA PTY LTD	**Job No.**	: AECO06/201103
	[redacted]	**Quote No.**	: QT-02018
	[redacted]	**Order No.**	: 60612563_4_1
		Date Received	: 03-NOV-2020
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: QLD_0224_PFASOMP_20		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N20/025797	0224_QC201_201027	WATER 27-OCT-2020
N20/025799	0224_QC203_201028	WATER 28-OCT-2020

Lab Reg No.		N20/025797	N20/025799			
Date Sampled		27-OCT-2020	28-OCT-2020			
	Units					Method
PFAS (per-and poly-fluoroalkyl substances)						
PFBA (375-22-4)	ug/L	<0.005	<0.005			NR70
PFPeA (2706-90-3)	ug/L	<0.002	0.0022			NR70
PFHxA (307-24-4)	ug/L	<0.001	0.0014			NR70
PFHpA (375-85-9)	ug/L	<0.001	<0.001			NR70
PFOA (335-67-1)	ug/L	<0.001	<0.001			NR70
PFNA (375-95-1)	ug/L	<0.001	<0.001			NR70
PFDA (335-76-2)	ug/L	<0.001	<0.001			NR70
PFUdA (2058-94-8)	ug/L	<0.001	<0.001			NR70
PFDoA (307-55-1)	ug/L	<0.001	<0.001			NR70
PFTrDA (72629-94-8)	ug/L	<0.002	<0.002			NR70
PFTeDA (376-06-7)	ug/L	<0.002	<0.002			NR70
PFHxDA (67905-19-5)	ug/L	<0.002	<0.002			NR70
PFODA (16517-11-6)	ug/L	<0.005	<0.005			NR70
FOUEA (70887-84-2)	ug/L	<0.001	<0.001			NR70
PFBS (375-73-5)	ug/L	<0.001	0.0017			NR70
PFPeS (2706-91-4)	ug/L	<0.001	0.0020			NR70
PFHxS (355-46-4)	ug/L	<0.001	0.027			NR70
PFHpS (375-92-8)	ug/L	<0.001	<0.001			NR70
PFOS (1763-23-1)	ug/L	<0.002	0.024			NR70
PFNS (68259-12-1)	ug/L	<0.001	<0.001			NR70
PFDS (335-77-3)	ug/L	<0.001	<0.001			NR70
PFOSA (754-91-6)	ug/L	<0.001	<0.001			NR70
N-MeFOSA (31506-32-8)	ug/L	<0.002	<0.002			NR70
N-EtFOSA (4151-50-2)	ug/L	<0.002	<0.002			NR70
N-MeFOSAA (2355-31-9)	ug/L	<0.002	<0.002			NR70
N-EtFOSAA(2991-50-6)	ug/L	<0.002	<0.002			NR70
N-MeFOSE (24448-09-7)	ug/L	<0.005	<0.005			NR70
N-EtFOSE (1691-99-2)	ug/L	<0.005	<0.005			NR70
4:2 FTS (757124-72-4)	ug/L	<0.001	<0.001			NR70

REPORT OF ANALYSIS

Lab Reg No.		N20/025797	N20/025799			
Date Sampled		27-OCT-2020	28-OCT-2020			
	Units					Method
PFAS (per-and poly-fluoroalkyl substances)						
6:2 FTS (27619-97-2)	ug/L	<0.001	<0.001			NR70
8:2 FTS (39108-34-4)	ug/L	<0.001	<0.001			NR70
10:2 FTS (120226-60-0)	ug/L	<0.001	<0.001			NR70
8:2 diPAP (678-41-1)	ug/L	<0.002	<0.002			NR70
PFBA (Surrogate Recovery)	%	103	100			NR70
PFPeA (Surrogate Recovery)	%	68	60			NR70
PFHxA (Surrogate Recovery)	%	87	74			NR70
PFHpA (Surrogate Recovery)	%	98	88			NR70
PFOA (Surrogate Recovery)	%	99	94			NR70
PFNA (Surrogate Recovery)	%	83	83			NR70
PFDA (Surrogate Recovery)	%	87	86			NR70
PFUdA (Surrogate Recovery)	%	64	67			NR70
PFDoA (Surrogate Recovery)	%	64	57			NR70
PFTeDA (Surrogate Recovery)	%	72	44			NR70
PFHxDA (Surrogate Recovery)	%	82	48			NR70
FOUEA (Surrogate Recovery)	%	60	63			NR70
PFBS (Surrogate Recovery)	%	97	87			NR70
PFHxS (Surrogate Recovery)	%	97	94			NR70
PFOS (Surrogate Recovery)	%	85	85			NR70
PFOSA (Surrogate Recovery)	%	72	62			NR70
N-MeFOSA (Surrogate Recovery)	%	59	30			NR70
N-EtFOSA (Surrogate Recovery)	%	41	15			NR70
N-MeFOSAA (Surrogate Recovery)	%	54	47			NR70
N-EtFOSAA (Surrogate Recovery)	%	64	42			NR70
N-MeFOSE (Surrogate Recovery)	%	62	39			NR70
N-EtFOSE (Surrogate Recovery)	%	61	34			NR70
4:2 FTS (Surrogate Recovery)	%	108	118			NR70
6:2 FTS (Surrogate Recovery)	%	66	78			NR70
8:2 FTS (Surrogate Recovery)	%	67	58			NR70
8:2 diPAP (Surrogate Recovery)	%	49	38			NR70
Dates						
Date extracted		5-NOV-2020	5-NOV-2020			
Date analysed		5-NOV-2020	5-NOV-2020			

N20/025797
to
N20/025799

PFOS and PFHxS are quantified using a combined branched and linear standard,

linear and branched isomers are totalled for reporting.
All results corrected for labelled surrogate recoveries.

Selected PFAS surrogate recoveries are biased due to matrix effects.
Surrogate recoveries low for selected analytes - PFAS LORs not raised since S/N >10.

[redacted]
[redacted]
Organics - NSW
Accreditation No. 198

06-NOV-2020

REPORT OF ANALYSIS

Report No. RN1293194

Client	: AECOM AUSTRALIA PTY LTD	**Job No.**	: AECO06/201103
	[redacted]	**Quote No.**	: QT-02018
	[redacted]	**Order No.**	: 60612563_4_1
		Date Received	: 03-NOV-2020
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: QLD_0224_PFASOMP_20		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N20/025798	0224_QC202_201028	WATER 28-OCT-2020
N20/025800	0224_QC204_201028	WATER 28-OCT-2020
N20/025801	0224_QC205_201029	WATER 29-OCT-2020

Lab Reg No.			N20/025798	N20/025800	N20/025801		
Date Sampled			28-OCT-2020	28-OCT-2020	29-OCT-2020		
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
PFBA (375-22-4)		ug/L	<0.05	<0.05	<0.05		NR70
PFPeA (2706-90-3)		ug/L	<0.02	<0.02	<0.02		NR70
PFHxA (307-24-4)		ug/L	<0.01	<0.01	<0.01		NR70
PFHpA (375-85-9)		ug/L	<0.01	<0.01	<0.01		NR70
PFOA (335-67-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFNA (375-95-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFDA (335-76-2)		ug/L	<0.01	<0.01	<0.01		NR70
PFUdA (2058-94-8)		ug/L	<0.01	<0.01	<0.01		NR70
PFDoA (307-55-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFTrDA (72629-94-8)		ug/L	<0.02	<0.02	<0.02		NR70
PFTeDA (376-06-7)		ug/L	<0.02	<0.02	<0.02		NR70
PFHxDA (67905-19-5)		ug/L	<0.02	<0.02	<0.02		NR70
PFODA (16517-11-6)		ug/L	<0.05	<0.05	<0.05		NR70
FOUEA (70887-84-2)		ug/L	<0.01	<0.01	<0.01		NR70
PFDS (335-77-3)		ug/L	<0.01	<0.01	<0.01		NR70
PFPeS (2706-91-4)		ug/L	<0.01	<0.01	<0.01		NR70
PFHxS (355-46-4)		ug/L	<0.01	<0.01	<0.01		NR70
PFHpS (375-92-8)		ug/L	<0.01	<0.01	<0.01		NR70
PFOS (1763-23-1)		ug/L	<0.02	<0.02	<0.02		NR70
PFNS (68259-12-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFBS (375-73-5)		ug/L	<0.01	<0.01	<0.01		NR70
PFOSA (754-91-6)		ug/L	<0.01	<0.01	<0.01		NR70
N-MeFOSA (31506-32-8)		ug/L	<0.02	<0.02	<0.02		NR70
N-EtFOSA (4151-50-2)		ug/L	<0.02	<0.02	<0.02		NR70
N-MeFOSAA (2355-31-9)		ug/L	<0.01	<0.01	<0.01		NR70
N-EtFOSAA(2991-50-6)		ug/L	<0.01	<0.01	<0.01		NR70
N-MeFOSE (24448-09-7)		ug/L	<0.05	<0.05	<0.05		NR70
N-EtFOSE (1691-99-2)		ug/L	<0.05	<0.05	<0.05		NR70

REPORT OF ANALYSIS

Lab Reg No.			N20/025798	N20/025800	N20/025801		
Date Sampled			28-OCT-2020	28-OCT-2020	29-OCT-2020		
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
4:2 FTS (757124-72-4)		ug/L	<0.01	<0.01	<0.01		NR70
6:2 FTS (27619-97-2)		ug/L	<0.01	<0.01	<0.01		NR70
8:2 FTS (39108-34-4)		ug/L	<0.01	<0.01	<0.01		NR70
10:2 FTS (120226-60-0)		ug/L	<0.01	<0.01	<0.01		NR70
8:2 diPAP (678-41-1)		ug/L	<0.02	<0.02	<0.02		NR70
PFBA (Surrogate Recovery)		%	99	99	95		NR70
PFPeA (Surrogate Recovery)		%	99	104	106		NR70
PFHxA (Surrogate Recovery)		%	102	108	105		NR70
PFHpA (Surrogate Recovery)		%	98	101	104		NR70
PFOA (Surrogate Recovery)		%	104	103	107		NR70
PFNA (Surrogate Recovery)		%	113	95	107		NR70
PFDA (Surrogate Recovery)		%	105	98	98		NR70
PFUdA (Surrogate Recovery)		%	96	97	104		NR70
PFDoA (Surrogate Recovery)		%	97	88	93		NR70
PFTeDA (Surrogate Recovery)		%	88	86	102		NR70
PFHxDA (Surrogate Recovery)		%	100	102	101		NR70
FOUEA (Surrogate Recovery)		%	81	97	89		NR70
PFBS (Surrogate Recovery)		%	99	100	107		NR70
PFHxS (Surrogate Recovery)		%	99	105	106		NR70
PFOS (Surrogate Recovery)		%	106	102	92		NR70
PFOSA (Surrogate Recovery)		%	107	89	95		NR70
N-MeFOSA (Surrogate Recovery)		%	87	98	90		NR70
N-EtFOSA (Surrogate Recovery)		%	72	81	58		NR70
N-MeFOSAA (Surrogate Recovery)		%	90	87	84		NR70
N-EtFOSAA (Surrogate Recovery)		%	85	91	95		NR70
N-MeFOSE (Surrogate Recovery)		%	96	76	83		NR70
N-EtFOSE (Surrogate Recovery)		%	106	63	71		NR70
4:2 FTS (Surrogate Recovery)		%	70	64	73		NR70
6:2 FTS (Surrogate Recovery)		%	72	72	79		NR70
8:2 FTS (Surrogate Recovery)		%	77	74	83		NR70
8:2 diPAP (Surrogate Recovery)		%	61	74	71		NR70
Dates							
Date extracted			5-NOV-2020	5-NOV-2020	5-NOV-2020		
Date analysed			5-NOV-2020	5-NOV-2020	5-NOV-2020		

N20/025798

****

N20/025801

REPORT OF ANALYSIS

PFOS and PFHxS are quantified using a combined branched and linear standard,
linear and branched isomers are totalled for reporting.
All results corrected for labelled surrogate recoveries.

[redacted]

Organics - NSW
Accreditation No. 198

06-NOV-2020

NATA
ACCREDITED FOR
TECHNICAL
COMPETENCE

Accredited for compliance with ISO/IEC 17025 - Testing.
This report shall not be reproduced except in full.
Results relate only to the sample(s) as received and tested.

This Report supersedes reports: *RN1293182*

Measurement Uncertainty is available upon request.
Chemical Accreditation 198: 105 Delhi Road, North Ryde, NSW, 2113

Australian Government

National Measurement Institute

QUALITY ASSURANCE REPORT

Client: AECOM AUSTRALIA PTY LTD

NMI QA Report No: AECO06/201103 **Sample Matrix:** Liquid

Analyte	Method	LOR	Blank	Sample Duplicates			Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		ug/L	ug/L	ug/L	ug/L	%	%	%
PFBA (375-22-4)	NR70	0.05	<0.05	NA	NA	NA	104	NA
PFPeA (2706-90-3)	NR70	0.02	<0.02	NA	NA	NA	91	NA
PFHxA (307-24-4)	NR70	0.01	<0.01	NA	NA	NA	102	NA
PFHpA (375-85-9)	NR70	0.01	<0.01	NA	NA	NA	87	NA
PFOA (335-67-1)	NR70	0.01	<0.01	NA	NA	NA	99	NA
PFNA (375-95-1)	NR70	0.01	<0.01	NA	NA	NA	90	NA
PFDA (335-76-2)	NR70	0.01	<0.01	NA	NA	NA	90	NA
PFUdA (2058-94-8)	NR70	0.01	<0.01	NA	NA	NA	95	NA
PFDoA (307-55-1)	NR70	0.01	<0.01	NA	NA	NA	86	NA
PFTrDA (72629-94-8)	NR70	0.02	<0.02	NA	NA	NA	77	NA
PFTeDA (376-06-7)	NR70	0.02	<0.02	NA	NA	NA	98	NA
PFHxDA (67905-19-5)	NR70	0.02	<0.02	NA	NA	NA	97	NA
PFODA (16517-11-6)	NR70	0.05	<0.05	NA	NA	NA	100	NA
FOUEA (70887-84-2)	NR70	0.01	<0.01	NA	NA	NA	98	NA
PFBS (375-73-5)	NR70	0.01	<0.01	NA	NA	NA	91	NA
PFPeS (2706-91-4)	NR70	0.01	<0.01	NA	NA	NA	90	NA
PFHxS (355-46-4)	NR70	0.01	<0.01	NA	NA	NA	87	NA
PFHpS (375-92-8)	NR70	0.01	<0.01	NA	NA	NA	86	NA
PFOS (1763-23-1)	NR70	0.02	<0.02	NA	NA	NA	88	NA
PFNS (68259-12-1)	NR70	0.01	<0.01	NA	NA	NA	86	NA
PFDS (335-77-3)	NR70	0.01	<0.01	NA	NA	NA	88	NA
PFOSA (754-91-6)	NR70	0.01	<0.01	NA	NA	NA	93	NA
N-MeFOSA (31506-32-8)	NR70	0.02	<0.02	NA	NA	NA	120	NA
N-EtFOSA (4151-50-2)	NR70	0.02	<0.02	NA	NA	NA	121	NA
N-MeFOSAA (2355-31-9)	NR70	0.01	<0.01	NA	NA	NA	90	NA
N-EtFOSAA(2991-50-6)	NR70	0.01	<0.01	NA	NA	NA	87	NA
N-MeFOSE (24448-09-7)	NR70	0.05	<0.05	NA	NA	NA	82	NA
N-EtFOSE (1691-99-2)	NR70	0.05	<0.05	NA	NA	NA	62	NA
4:2 FTS (757124-72-4)	NR70	0.01	<0.01	NA	NA	NA	90	NA
6:2 FTS (27619-97-2)	NR70	0.01	<0.01	NA	NA	NA	85	NA
8:2 FTS (39108-34-4)	NR70	0.01	<0.01	NA	NA	NA	97	NA
10:2 FTS (120226-60-0)	NR70	0.01	<0.01	NA	NA	NA	84	NA
8:2 diPAP (678-41-1)	NR70	0.02	<0.02	NA	NA	NA	105	NA

Results expressed in percentage (%) or ug/L wherever appropriate.
Acceptable Spike recovery is 50-150%.
Maximum acceptable RPDs on spikes and duplicates is 40%.
'NA ' = Not Applicable.
RPD= Relative Percentage Difference.

Signed: [redacted]

Organics Manager, NMI-North Ryde

Date: **6/11/2020**

Australian Government

National Measurement Institute

QUALITY ASSURANCE REPORT

Client: AECOM AUSTRALIA PTY LTD

NMI QA Report No: AECO06/201103 **Sample Matrix:** Liquid

Analyte	Method	LOR	Blank	Sample Duplicates			Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		ug/L	ug/L	ug/L	ug/L	%	%	%
PFBA (375-22-4)	NR70	0.005	<0.005	NA	NA	NA	104	NA
PFPeA (2706-90-3)	NR70	0.002	<0.002	NA	NA	NA	91	NA
PFHxA (307-24-4)	NR70	0.001	<0.001	NA	NA	NA	102	NA
PFHpA (375-85-9)	NR70	0.001	<0.001	NA	NA	NA	87	NA
PFOA (335-67-1)	NR70	0.001	<0.001	NA	NA	NA	99	NA
PFNA (375-95-1)	NR70	0.001	<0.001	NA	NA	NA	90	NA
PFDA (335-76-2)	NR70	0.001	<0.001	NA	NA	NA	90	NA
PFUdA (2058-94-8)	NR70	0.001	<0.001	NA	NA	NA	95	NA
PFDoA (307-55-1)	NR70	0.001	<0.001	NA	NA	NA	86	NA
PFTrDA (72629-94-8)	NR70	0.002	<0.002	NA	NA	NA	77	NA
PFTeDA (376-06-7)	NR70	0.002	<0.002	NA	NA	NA	98	NA
PFHxDA (67905-19-5)	NR70	0.002	<0.002	NA	NA	NA	97	NA
PFODA (16517-11-6)	NR70	0.005	<0.005	NA	NA	NA	100	NA
FOUEA (70887-84-2)	NR70	0.001	<0.001	NA	NA	NA	98	NA
PFBS (375-73-5)	NR70	0.001	<0.001	NA	NA	NA	91	NA
PFPeS (2706-91-4)	NR70	0.001	<0.001	NA	NA	NA	90	NA
PFHxS (355-46-4)	NR70	0.001	<0.001	NA	NA	NA	87	NA
PFHpS (375-92-8)	NR70	0.001	<0.001	NA	NA	NA	86	NA
PFOS (1763-23-1)	NR70	0.002	<0.002	NA	NA	NA	88	NA
PFNS (68259-12-1)	NR70	0.001	<0.001	NA	NA	NA	86	NA
PFDS (335-77-3)	NR70	0.001	<0.001	NA	NA	NA	88	NA
PFOSA (754-91-6)	NR70	0.001	<0.001	NA	NA	NA	93	NA
N-MeFOSA (31506-32-8)	NR70	0.002	<0.002	NA	NA	NA	120	NA
N-EtFOSA (4151-50-2)	NR70	0.002	<0.002	NA	NA	NA	121	NA
N-MeFOSAA (2355-31-9)	NR70	0.002	<0.002	NA	NA	NA	90	NA
N-EtFOSAA(2991-50-6)	NR70	0.002	<0.002	NA	NA	NA	87	NA
N-MeFOSE (24448-09-7)	NR70	0.005	<0.005	NA	NA	NA	82	NA
N-EtFOSE (1691-99-2)	NR70	0.005	<0.005	NA	NA	NA	62	NA
4:2 FTS (757124-72-4)	NR70	0.001	<0.001	NA	NA	NA	90	NA
6:2 FTS (27619-97-2)	NR70	0.001	<0.001	NA	NA	NA	85	NA
8:2 FTS (39108-34-4)	NR70	0.001	<0.001	NA	NA	NA	97	NA
10:2 FTS (120226-60-0)	NR70	0.001	<0.001	NA	NA	NA	84	NA
8:2 diPAP (678-41-1)	NR70	0.002	<0.002	NA	NA	NA	105	NA

Results expressed in percentage (%) or ug/L wherever appropriate.
Acceptable Spike recovery is 50-150%.
Maximum acceptable RPDs on spikes and duplicates is 40%.
'NA ' = Not Applicable.
RPD= Relative Percentage Difference.

Signed: [redacted]

[redacted]

Organics Manager, NMI-North Ryde

Date: **6/11/2020**

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2026884**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Facsimile	: [redacted]	Facsimile	: +[redacted]
Project	: 60580555 1.0	Page	: 1 of 3
Order number	: 60580555 1.0	Quote number	: ES2020AECOMAU0033 (EN/004/20)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 14-Oct-2020 13:45	Issue Date	: 15-Oct-2020
Client Requested Due Date	: 21-Oct-2020	Scheduled Reporting Date	: **21-Oct-2020**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 6.0°C - Ice present
Receipt Detail	: MEDIUM HARD ESKY	No. of samples received / analysed	: 13 / 13

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **As per phone conversation with [redacted] Samples BIOAFA019 to BIOAFA021 require EP231X PFAS analysis. If this is incorrect please contact client services at ALSEnviro.Brisbane@alsglobal.com**
- **Please be advised, A split TAT has been assigned, All PFAS analysis on soils and waters is due on the 21/10/2020. PFAS analysis on BIOTA has an estimated reporting date of the 06/11/2020.**
- ***15/10/2020*: SRN has been resent to acknowledge the removal of samples QC02 & QC04, which will be forwarded to NMI as per request. Please note, this will incur a freight forwarding fee. For any further information regarding these adjustments please contact client services at ALSEnviro.Brisbane@alsglobal.com.**
- ***15/10/2020*: SRN has been resent to acknowledge the update to sample ID's as per email request by [redacted]. For any further information regarding these adjustments please contact client services at ALSEnviro.Brisbane@alsglobal.com.**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- **Biota PFAS analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

[redacted]

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EB2026884-006	13-Oct-2020 09:30	0224_SD021_201013	✓	✓
EB2026884-007	13-Oct-2020 13:00	0224_SD022_201013	✓	✓
EB2026884-008	13-Oct-2020 00:00	0224_QC102_201013	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2026884-001	13-Oct-2020 09:30	0224_SW021_201013	✓
EB2026884-002	13-Oct-2020 13:00	0224_SW022_201013	✓
EB2026884-003	13-Oct-2020 12:30	0224_SW023_201013	✓
EB2026884-004	13-Oct-2020 00:00	0224_QC101_201013	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) — Email — AP_CustomerService.ANZ@aecom.com

[redacted]

- *AU Certificate of Analysis - NATA (COA) — Email
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) — Email
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) — Email
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) — Email
- A4 - AU Tax Invoice (INV) — Email
- Chain of Custody (CoC) (COC) — Email
- EDI Format - ENMRG (ENMRG) — Email
- EDI Format - EQUIS V5 AECOM (EQUIS_V5_AECOM) — Email
- EDI Format - ESDAT (ESDAT) — Email
- EDI Format - XTab (XTAB) — Email
- Electronic SRN for EQuIS (ESRN_EQUIS) — Email

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2026884-AA**	Page	: 1 of 9
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: BRISBANE	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Project	: 60580555 1.0	Date Samples Received	: 14-Oct-2020 13:45
Order number	: 60580555 1.0	Date Analysis Commenced	: 15-Oct-2020
C-O-C number	: ----	Issue Date	: 21-Oct-2020 18:08
Sampler	: [redacted]		
Site	: ----		
Quote number	: EN/004/20		
No. of samples received	: 10		
No. of samples analysed	: 10		

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. 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.

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.

[redacted]	LCMS Coordinator	Sydney Organics, Smithfield, NSW
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

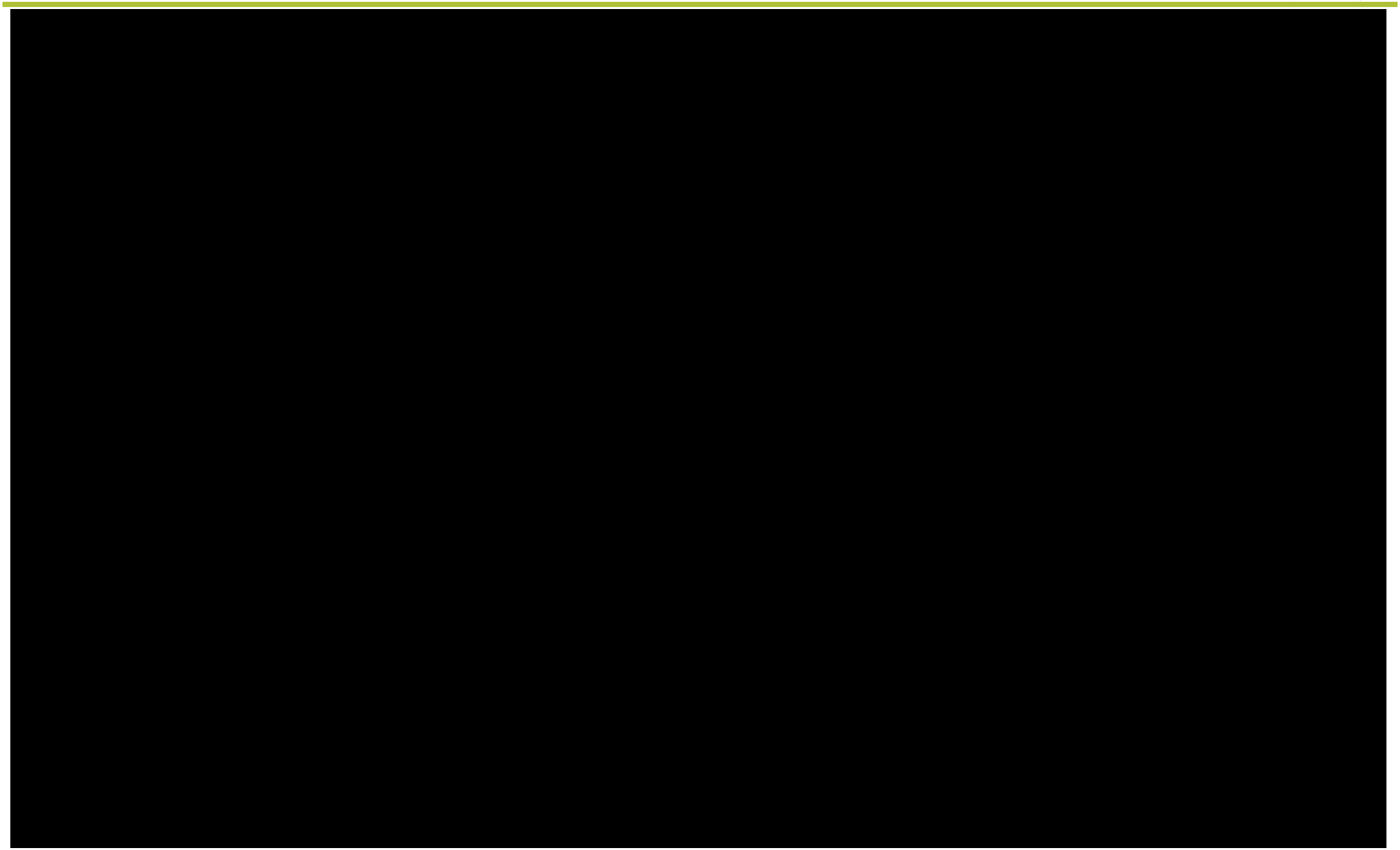
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

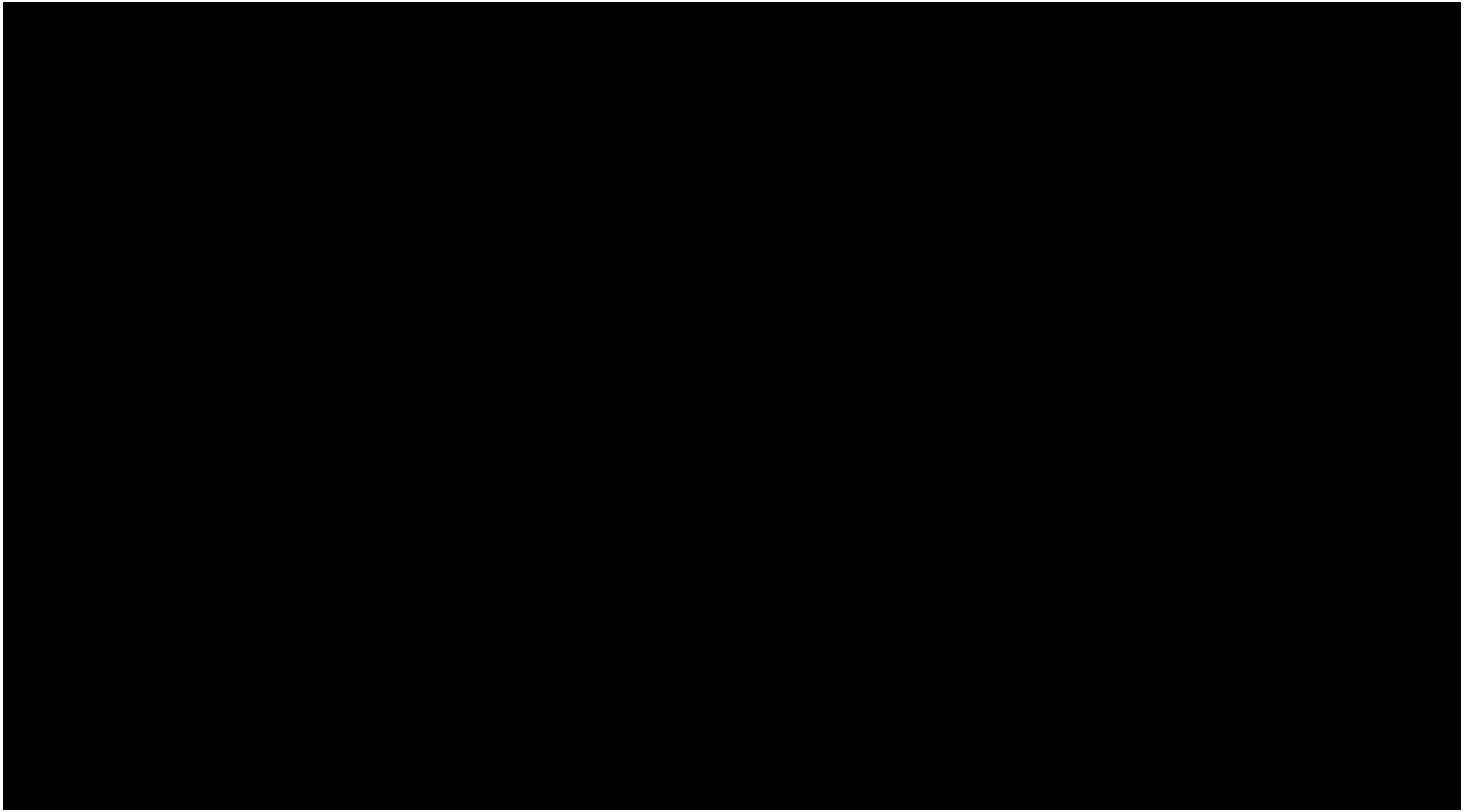
When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

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

- EP231X-ST PFAS Super Trace: Particular samples were diluted due to matrix interference. LOR adjusted accordingly.
- **Biota PFAS analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- EP231X PFAS: Matrix spike recovery not determined due to primary sample dilution for matrix interference.
- EP231X (Biota): ALS NATA accreditation for PFAS in Biota covers all Perfluoroalkyl Sulfonic Acids, Perfluoroalkyl Carboxylic Acids and (n:2) Fluorotelomer Sulfonic Acids in fish (whole and muscle), plants and vegetable matrices, with the exception PFBA (fish only), EtFOSA, MeFOSE, EtFOSE, MeFOSAA, EtFOSAA.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.





Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				0224_SD022_201013	0224_QC102_201013	----	----	----
				13-Oct-2020 13:00	13-Oct-2020 00:00	----	----	----
				EB2026884-007	EB2026884-008	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**26.3**	**29.8**	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	**0.0003**	**0.0003**	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				0224_SD022_201013	0224_QC102_201013	----	----	----
				13-Oct-2020 13:00	13-Oct-2020 00:00	----	----	----
				EB2026884-007	EB2026884-008	--------	--------	--------
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0003**	**0.0003**	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**100**	**96.5**	----	----	----
13C8-PFOA	----	0.0002	%	**102**	**102**	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW022_201013	0224_SW023_201013	0224_QC101_201013	----	----
				13-Oct-2020 13:00	13-Oct-2020 12:30	13-Oct-2020 00:00	----	----
				EB2026884-002	EB2026884-003	EB2026884-004	--------	--------
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	**0.0036**	**0.0028**	<0.0016	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	**0.0057**	**0.0039**	**0.0041**	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.008	<0.008	<0.008	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	**0.0052**	**0.0053**	**0.0052**	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	**0.0022**	**0.0019**	<0.0016	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0040	<0.0039	<0.0040	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.004	<0.004	<0.004	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.004	<0.004	<0.004	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW022_201013	0224_SW023_201013	0224_QC101_201013	----	----
				13-Oct-2020 13:00	13-Oct-2020 12:30	13-Oct-2020 00:00	----	----
				EB2026884-002	EB2026884-003	EB2026884-004	--------	--------
				Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.004	<0.004	<0.004	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.004	<0.004	<0.004	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0016	<0.0016	<0.0016	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.002	<0.002	<0.002	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.002	<0.002	<0.002	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.002	<0.002	<0.002	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.002	<0.002	<0.002	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	**0.0167**	**0.0139**	**0.0093**	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	**0.0093**	**0.0067**	**0.0041**	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	**0.0167**	**0.0139**	**0.0093**	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**128**	**116**	**99.3**	----	----
13C8-PFOA	----	0.0005	%	**127**	**110**	**94.4**	----	----

Surrogate Control Limits

Sub-Matrix: BIOTA		Recovery Limits (%)	
		Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	50	130
13C8-PFOA	----	50	130

Sub-Matrix: SOIL		Recovery Limits (%)	
		Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2026884-AB**	Page	: 1 of 9
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: BRISBANE	Address	: [redacted]
Telephone	: [redacted]	Telephone	: [redacted]
Project	: 60580555 1.0	Date Samples Received	: 14-Oct-2020 13:45
Order number	: 60580555 1.0	Date Analysis Commenced	: 15-Oct-2020
C-O-C number	: ----	Issue Date	: 21-Oct-2020 18:08
Sampler	: [redacted]		
Site	: ----		
Quote number	: EN/004/20		
No. of samples received	: 3		
No. of samples analysed	: 3		

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. 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.

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.

[redacted]	LCMS Coordinator	Sydney Organics, Smithfield, NSW
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X-ST PFAS Super Trace: Particular samples were diluted due to matrix interference. LOR adjusted accordingly.
- **Biota PFAS analysis is conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911 (Micro site no. 14913).**
- EP231X PFAS: Matrix spike recovery not determined due to primary sample dilution for matrix interference.
- EP231X (Biota): ALS NATA accreditation for PFAS in Biota covers all Perfluoroalkyl Sulfonic Acids, Perfluoroalkyl Carboxylic Acids and (n:2) Fluorotelomer Sulfonic Acids in fish (whole and muscle), plants and vegetable matrices, with the exception PFBA (fish only), EtFOSA, MeFOSE, EtFOSE, MeFOSAA, EtFOSAA.
- 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.

[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	--------	--------	--------	--------
[redacted]	----	----	----	----
[redacted]				
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]				
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]				
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----
[redacted]	----	----	----	----

[redacted]

----	----	----	----
----	----	----	----
---------	---------	---------	---------
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----

[redacted]

----	----	----	----
----	----	----	----
--------	--------	--------	--------
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----

[redacted]

----	----	----	----
----	----	----	----
---------	---------	---------	---------
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----
----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW021_201013	----	----	----	----
				13-Oct-2020 09:30	----	----	----	----
				EB2026884-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0016	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0016	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	**0.0043**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0016	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.008	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	**0.0043**	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0016	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0016	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0016	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0040	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0016	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.004	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.004	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				0224_SW021_201013	----	----	----	----
				13-Oct-2020 09:30	----	----	----	----
				EB2026884-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.004	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.004	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0016	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0016	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.002	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.002	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.002	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.002	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	**0.0086**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	**0.0043**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	**0.0086**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	**103**	----	----	----	----
13C8-PFOA	----	0.0005	%	**97.4**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: BIOTA		Recovery Limits (%)	
		Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	50	130
13C8-PFOA	----	50	130

Sub-Matrix: SOIL		Recovery Limits (%)	
		Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2026884-AA**	Page	: 1 of 11
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: BRISBANE	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: +[redacted]
Project	: 60580555 1.0	Date Samples Received	: 14-Oct-2020
Order number	: 60580555 1.0	Date Analysis Commenced	: 15-Oct-2020
C-O-C number	: ----	Issue Date	: 21-Oct-2020
Sampler	: [redacted]		
Site	: ----		
Quote number	: EN/004/20		
No. of samples received	: 10		
No. of samples analysed	: 10		

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. 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

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.

[redacted]	LCMS Coordinator	Sydney Organics, Smithfield, NSW
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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: **BIOTA**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3313296)									
EB2026884-010	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	1	µg/kg	<2	<2	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3313296)									
EB2026884-010	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	1	µg/kg	<2	<2	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	1	µg/kg	<2	<2	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	1	µg/kg	<2	<2	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	5	µg/kg	<5	<5	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3313296)									
EB2026884-010	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	1	µg/kg	<5	<5	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	1	µg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **BIOTA**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3313296) - continued									
EB2026884-010	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	2	µg/kg	<5	<5	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	2	µg/kg	<2	<2	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3313296)									
EB2026884-010	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	2	µg/kg	<2	<2	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 3313296)									
EB2026884-010	Anonymous	EP231X: Sum of PFAS	----	1	µg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3309621)									
EB2026819-001	Anonymous	EA055: Moisture Content	----	0.1	%	51.6	51.2	0.661	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3309620)									
EB2026819-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0059	0.0057	4.40	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0168	0.0147	13.4	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3309620)									
EB2026819-001	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0033	0.0033	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0050	0.0050	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0012	0.0012	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0023	0.0022	8.18	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0014	0.0010	32.4	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3309620) - continued									
EB2026819-001	Anonymous	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.005	<0.005	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3309620)									
EB2026819-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3309620)									
EB2026819-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0010	<0.0010	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (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 Spike (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: **BIOTA**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3313296)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	1	µg/kg	<1	5 µg/kg	96.8	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	1	µg/kg	<1	5 µg/kg	117	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	1	µg/kg	<1	5 µg/kg	110	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	1	µg/kg	<1	5 µg/kg	114	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	1	µg/kg	<1	5 µg/kg	117	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	1	µg/kg	<1	5 µg/kg	114	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3313296)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	5	µg/kg	<5	25 µg/kg	117	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	1	µg/kg	<1	5 µg/kg	79.2	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	1	µg/kg	<1	5 µg/kg	128	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	1	µg/kg	<1	5 µg/kg	109	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	1	µg/kg	<1	5 µg/kg	129	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	1	µg/kg	<1	5 µg/kg	92.0	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	1	µg/kg	<1	5 µg/kg	108	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	1	µg/kg	<1	5 µg/kg	123	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	1	µg/kg	<1	5 µg/kg	132	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	1	µg/kg	<1	5 µg/kg	122	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	2	µg/kg	<2	12.5 µg/kg	107	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3313296)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	1	µg/kg	<1	5 µg/kg	133	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	2	µg/kg	<2	12.5 µg/kg	100	88.1	105
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	2	µg/kg	<2	12.5 µg/kg	106	81.6	144
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	2	µg/kg	<2	12.5 µg/kg	126	84.7	135
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	2	µg/kg	<2	12.5 µg/kg	105	20.5	150
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	1	µg/kg	<1	5 µg/kg	111	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	1	µg/kg	<1	5 µg/kg	138	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3313296)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	2	µg/kg	<2	5 µg/kg	109	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	2	µg/kg	<2	5 µg/kg	106	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	2	µg/kg	<2	5 µg/kg	106	65.0	137

Sub-Matrix: **BIOTA**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3313296) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	2	µg/kg	<2	5 µg/kg	113	93.4	130
EP231P: PFAS Sums (QCLot: 3313296)								
EP231X: Sum of PFAS	----	1	µg/kg	<1	----	----	----	----

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3309620)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	86.8	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00117 mg/kg	97.4	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	91.5	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	107	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	85.3	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	87.5	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3309620)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	113	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.4	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.6	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.0	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.2	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.6	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	77.2	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.4	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.8	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.2	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.2	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3309620)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	85.6	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	80.6	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	86.0	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	72.1	61.9	137
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.2	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3309620)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3309620) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	92.7	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	88.1	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	98.3	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	85.8	54.8	124

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3308417)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	96.4	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	74.9	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	88.6	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	105	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	94.9	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	84.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3308417)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	117	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	105	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	93.6	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	100	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	89.2	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	106	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	95.6	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	82.4	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	104	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3308417)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	98.4	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	97.0	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	80.6	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	96.3	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	93.8	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	65.0	136

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3308417) - continued								
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	114	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3308417)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	99.7	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	107	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	90.0	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	84.6	53.1	133
EP231P: PFAS Sums (QCLot: 3308417)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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: **BIOTA**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3313296)							
EB2026884-011	[redacted]	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	5 µg/kg	126	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	5 µg/kg	118	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	5 µg/kg	92.8	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	5 µg/kg	118	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	5 µg/kg	122	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	5 µg/kg	118	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3313296)							
EB2026884-011	[redacted]	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	25 µg/kg	81.0	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	5 µg/kg	90.4	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	5 µg/kg	128	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	5 µg/kg	109	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	5 µg/kg	128	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	5 µg/kg	91.6	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	5 µg/kg	104	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	5 µg/kg	135	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	5 µg/kg	127	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	5 µg/kg	135	66.0	139

Sub-Matrix: **BIOTA**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3313296) - continued							
EB2026884-011	0224_BIOAFA017_201013	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	12.5 µg/kg	96.2	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3313296)							
EB2026884-011	0224_BIOAFA017_201013	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	5 µg/kg	129	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	12.5 µg/kg	105	88.1	105
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	12.5 µg/kg	106	81.6	144
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	12.5 µg/kg	103	84.7	135
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	12.5 µg/kg	127	20.5	150
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	5 µg/kg	102	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	5 µg/kg	126	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3313296)							
EB2026884-011	0224_BIOAFA017_201013	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	5 µg/kg	133	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	5 µg/kg	110	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	5 µg/kg	112	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	5 µg/kg	114	93.4	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3309620)							
EB2026825-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	# Not Determined	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	# Not Determined	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	# Not Determined	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	# Not Determined	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	# Not Determined	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	# Not Determined	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3309620)							
EB2026825-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	# Not Determined	71.0	135

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3309620) - continued							
EB2026825-001	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	# Not Determined	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	# Not Determined	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	# Not Determined	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	# Not Determined	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	# Not Determined	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	# Not Determined	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	# Not Determined	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	# Not Determined	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	# Not Determined	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	# Not Determined	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3309620)							
EB2026825-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	# Not Determined	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	# Not Determined	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	# Not Determined	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	# Not Determined	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	# Not Determined	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	# Not Determined	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	# Not Determined	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3309620)							
EB2026825-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	# Not Determined	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	# Not Determined	64.0	140

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3309620) - continued							
EB2026825-001	Anonymous	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	# Not Determined	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	# Not Determined	70.0	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2026884-AB**	Page	: 1 of 11
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: +[redacted]	Telephone	: [redacted]
Project	: 60580555 1.0	Date Samples Received	: 14-Oct-2020
Order number	: 60580555 1.0	Date Analysis Commenced	: 15-Oct-2020
C-O-C number	: ----	Issue Date	: 21-Oct-2020
Sampler	: [redacted]		
Site	: ----		
Quote number	: EN/004/20		
No. of samples received	: 3		
No. of samples analysed	: 3		

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. 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

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.

[redacted]	LCMS Coordinator	Sydney Organics, Smithfield, NSW
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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: **BIOTA**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3313296)									
EB2026884-010	0224_BIOAFA005_201013	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	1	µg/kg	<2	<2	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3313296)									
EB2026884-010	0224_BIOAFA005_201013	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	1	µg/kg	<2	<2	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	1	µg/kg	<2	<2	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	1	µg/kg	<2	<2	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	5	µg/kg	<5	<5	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3313296)									
EB2026884-010	0224_BIOAFA005_201013	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	1	µg/kg	<5	<5	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	1	µg/kg	<1	<1	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	1	µg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **BIOTA**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3313296) - continued									
EB2026884-010	0224_BIOAFA005_201013	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	2	µg/kg	<5	<5	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	2	µg/kg	<2	<2	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3313296)									
EB2026884-010	0224_BIOAFA005_201013	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	2	µg/kg	<2	<2	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	2	µg/kg	<2	<2	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 3313296)									
EB2026884-010	0224_BIOAFA005_201013	EP231X: Sum of PFAS	----	1	µg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3309621)									
EB2026819-001	Anonymous	EA055: Moisture Content	----	0.1	%	51.6	51.2	0.661	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3309620)									
EB2026819-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0059	0.0057	4.40	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0168	0.0147	13.4	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3309620)									
EB2026819-001	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0033	0.0033	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0050	0.0050	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0012	0.0012	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0023	0.0022	8.18	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0014	0.0010	32.4	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3309620) - continued									
EB2026819-001	Anonymous	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.005	<0.005	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3309620)									
EB2026819-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0025	<0.0025	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3309620)									
EB2026819-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0010	<0.0010	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0010	<0.0010	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (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 Spike (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: **BIOTA**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3313296)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	1	µg/kg	<1	5 µg/kg	96.8	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	1	µg/kg	<1	5 µg/kg	117	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	1	µg/kg	<1	5 µg/kg	110	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	1	µg/kg	<1	5 µg/kg	114	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	1	µg/kg	<1	5 µg/kg	117	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	1	µg/kg	<1	5 µg/kg	114	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3313296)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	5	µg/kg	<5	25 µg/kg	117	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	1	µg/kg	<1	5 µg/kg	79.2	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	1	µg/kg	<1	5 µg/kg	128	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	1	µg/kg	<1	5 µg/kg	109	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	1	µg/kg	<1	5 µg/kg	129	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	1	µg/kg	<1	5 µg/kg	92.0	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	1	µg/kg	<1	5 µg/kg	108	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	1	µg/kg	<1	5 µg/kg	123	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	1	µg/kg	<1	5 µg/kg	132	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	1	µg/kg	<1	5 µg/kg	122	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	2	µg/kg	<2	12.5 µg/kg	107	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3313296)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	1	µg/kg	<1	5 µg/kg	133	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	2	µg/kg	<2	12.5 µg/kg	100	88.1	105
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	2	µg/kg	<2	12.5 µg/kg	106	81.6	144
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	2	µg/kg	<2	12.5 µg/kg	126	84.7	135
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	2	µg/kg	<2	12.5 µg/kg	105	20.5	150
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	1	µg/kg	<1	5 µg/kg	111	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	1	µg/kg	<1	5 µg/kg	138	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3313296)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	2	µg/kg	<2	5 µg/kg	109	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	2	µg/kg	<2	5 µg/kg	106	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	2	µg/kg	<2	5 µg/kg	106	65.0	137

Sub-Matrix: **BIOTA**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3313296) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	2	µg/kg	<2	5 µg/kg	113	93.4	130
EP231P: PFAS Sums (QCLot: 3313296)								
EP231X: Sum of PFAS	----	1	µg/kg	<1	----	----	----	----

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3309620)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	86.8	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00117 mg/kg	97.4	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	91.5	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	107	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	85.3	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	87.5	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3309620)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	113	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.4	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.6	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.0	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.2	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.6	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	77.2	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.4	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.8	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.2	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.2	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3309620)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	85.6	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	80.6	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	86.0	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	72.1	61.9	137
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.2	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3309620)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3309620) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	92.7	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	88.1	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	98.3	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	85.8	54.8	124

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3308417)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	96.4	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	74.9	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	88.6	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	105	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	94.9	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	84.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3308417)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	117	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	105	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	93.6	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	100	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	89.2	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	106	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	95.6	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	82.4	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	104	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3308417)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	98.4	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	97.0	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	80.6	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	96.3	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	93.8	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	65.0	136

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3308417) - continued								
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	114	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3308417)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	99.7	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	107	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	90.0	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	84.6	53.1	133
EP231P: PFAS Sums (QCLot: 3308417)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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: **BIOTA**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3313296)							
EB2026884-011	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	5 µg/kg	126	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	5 µg/kg	118	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	5 µg/kg	92.8	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	5 µg/kg	118	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	5 µg/kg	122	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	5 µg/kg	118	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3313296)							
EB2026884-011	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	25 µg/kg	81.0	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	5 µg/kg	90.4	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	5 µg/kg	128	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	5 µg/kg	109	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	5 µg/kg	128	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	5 µg/kg	91.6	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	5 µg/kg	104	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	5 µg/kg	135	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	5 µg/kg	127	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	5 µg/kg	135	66.0	139

Sub-Matrix: **BIOTA**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3313296) - continued							
EB2026884-011	Anonymous	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	12.5 µg/kg	96.2	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3313296)							
EB2026884-011	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	5 µg/kg	129	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	12.5 µg/kg	105	88.1	105
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	12.5 µg/kg	106	81.6	144
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	12.5 µg/kg	103	84.7	135
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	12.5 µg/kg	127	20.5	150
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	5 µg/kg	102	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	5 µg/kg	126	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3313296)							
EB2026884-011	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	5 µg/kg	133	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	5 µg/kg	110	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	5 µg/kg	112	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	5 µg/kg	114	93.4	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3309620)							
EB2026825-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	# Not Determined	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	# Not Determined	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	# Not Determined	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	# Not Determined	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	# Not Determined	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	# Not Determined	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3309620)							
EB2026825-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	# Not Determined	71.0	135

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3309620) - continued							
EB2026825-001	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	# Not Determined	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	# Not Determined	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	# Not Determined	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	# Not Determined	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	# Not Determined	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	# Not Determined	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	# Not Determined	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	# Not Determined	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	# Not Determined	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	# Not Determined	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3309620)							
EB2026825-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	# Not Determined	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	# Not Determined	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	# Not Determined	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	# Not Determined	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	# Not Determined	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	# Not Determined	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	# Not Determined	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3309620)							
EB2026825-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	# Not Determined	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	# Not Determined	64.0	140

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3309620) - continued							
EB2026825-001	Anonymous	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	# Not Determined	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	# Not Determined	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2026884**	Page	: 1 of 7
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	[redacted]	Telephone	: +[redacted]
Project	: 60580555 1.0	Date Samples Received	: 14-Oct-2020
Site	: ----	Issue Date	: 21-Oct-2020
Sampler	: [redacted]	No. of samples received	: 13
Order number	: 60580555 1.0	No. of samples analysed	: 13

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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	EB2026825--001	Anonymous	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	4	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: **BIOTA**

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*
Biota Sample Pre-Preparation							
Frozen Sample (Biota-PP) [redacted]	**13-Oct-2020**	**16-Oct-2020**	----	----	**----**	----	----
EP231A: Perfluoroalkyl Sulfonic Acids							
Frozen Sample (EP231-PFOS-SP) [redacted]	**13-Oct-2020**	**20-Oct-2020**	11-Apr-2021	✓	**20-Oct-2020**	29-Nov-2020	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
Frozen Sam le (EP231X) [redacted]	**13-Oct-2020**	**20-Oct-2020**	11-Apr-2021	✓	**20-Oct-2020**	29-Nov-2020	✓

Matrix: **BIOTA**

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							
Frozen Sample (EP231X) [redacted]	**13-Oct-2020**	**20-Oct-2020**	11-Apr-2021	✓	**20-Oct-2020**	29-Nov-2020	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
Frozen Sample (EP231X) [redacted]	**13-Oct-2020**	**20-Oct-2020**	11-Apr-2021	✓	**20-Oct-2020**	29-Nov-2020	✓
EP231P: PFAS Sums							
Frozen Sample (EP231X) [redacted]	**13-Oct-2020**	**20-Oct-2020**	11-Apr-2021	✓	**20-Oct-2020**	29-Nov-2020	✓

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) 0224_SD021_201013, 0224_SD022_201013, 0224_QC102_201013	**13-Oct-2020**	**----**	----	----	**15-Oct-2020**	27-Oct-2020	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X) 0224_SD021_201013, 0224_SD022_201013, 0224_QC102_201013	**13-Oct-2020**	**19-Oct-2020**	11-Apr-2021	✓	**19-Oct-2020**	28-Nov-2020	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X) 0224_SD021_201013, 0224_SD022_201013, 0224_QC102_201013	**13-Oct-2020**	**19-Oct-2020**	11-Apr-2021	✓	**19-Oct-2020**	28-Nov-2020	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X) 0224_SD021_201013, 0224_SD022_201013, 0224_QC102_201013	**13-Oct-2020**	**19-Oct-2020**	11-Apr-2021	✓	**19-Oct-2020**	28-Nov-2020	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X) 0224_SD021_201013, 0224_SD022_201013, 0224_QC102_201013	**13-Oct-2020**	**19-Oct-2020**	11-Apr-2021	✓	**19-Oct-2020**	28-Nov-2020	✓

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
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
0224_SD021_201013, 0224_SD022_201013, 0224_QC102_201013	**13-Oct-2020**	**19-Oct-2020**	11-Apr-2021	✓	**19-Oct-2020**	28-Nov-2020	✓

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-ST)							
0224_SW021_201013, 0224_SW022_201013, 0224_SW023_201013, 0224_QC101_201013	**13-Oct-2020**	**16-Oct-2020**	11-Apr-2021	✓	**16-Oct-2020**	11-Apr-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW021_201013, 0224_SW022_201013, 0224_SW023_201013, 0224_QC101_201013	**13-Oct-2020**	**16-Oct-2020**	11-Apr-2021	✓	**16-Oct-2020**	11-Apr-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST)							
0224_SW021_201013, 0224_SW022_201013, 0224_SW023_201013, 0224_QC101_201013	**13-Oct-2020**	**16-Oct-2020**	11-Apr-2021	✓	**16-Oct-2020**	11-Apr-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW021_201013, 0224_SW022_201013, 0224_SW023_201013, 0224_QC101_201013	**13-Oct-2020**	**16-Oct-2020**	11-Apr-2021	✓	**16-Oct-2020**	11-Apr-2021	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST)							
0224_SW021_201013, 0224_SW022_201013, 0224_SW023_201013, 0224_QC101_201013	**13-Oct-2020**	**16-Oct-2020**	11-Apr-2021	✓	**16-Oct-2020**	11-Apr-2021	✓

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: **BIOTA**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	5	**20.00**	**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-ST	0	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	4	**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
PFOS - Linear/Branched Speciation	EP231-PFOS-SP	BIOTA	In-house: Linear PFOS is determined by quantiation of the separate linear peak using linear PFOS. Branched PFOS is determined as the difference between total PFOS (determined using a mixed linear/branched standard) and linear PFOS.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	BIOTA	In-house: A sample extract is analysed 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 biota which is then solvent extracted. 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.
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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
Prep-Preparation for Biota Analysis	* Biota-PP	BIOTA	A sample is prepared from whole or particular tissues/organs, identified, homogenised and the total weight of prepared sample recorded.
Sample Preparation for PFAS in Biota	EP231-PR	BIOTA	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of homogenised biota 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 conform to US DoD QSM 5.3, table B-15 requirements.
Sample Extraction for PFAS in solid matrices	ORG73	SOIL	In-house: 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 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.

Prepared for
Department of Defence
ABN: 68706814312

Sampling Event Factual Report, May 2021

PFAS OMP - Wide Bay Training Area

05-Aug-2021
Doc No. 60612563_RP_033_0_210805

aecom.com

Delivering a better world

Sampling Event Factual Report, May 2021

PFAS OMP - Wide Bay Training Area

Client: Department of Defence

ABN: 68706814312

Prepared by

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3056 4800 www.aecom.com
ABN 20 093 846 925

05-Aug-2021

Job No.: 60612563

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

Quality Information

Document	Sampling Event Factual Report, May 2021
Ref	60612563
Date	05-Aug-2021
Prepared by	Camden McCosker
Reviewed by	James Peachey

Revision History

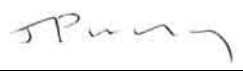
Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	30-Jun-2021	Draft for client review	James Peachey Associate Director	
B	16-Jul-2021	Draft for client review	James Peachey Associate Director	
C	23-Jul-2021	Draft for client review	James Peachey Associate Director	
0	05-Aug-2021	Final	James Peachey Associate Director	

Table of Contents

List of Tables (in Text)

List of Figures (in Appendix A)

List of Tables (in Appendix B)

Abbreviations

Abbreviation	
ALS	Australian Laboratory Services
ASC NEPM	Assessment of Site Contamination National Environment Protection Measure 1999 (as amended 2013)
COC	Chain of Custody
DCMM	Defence Contamination Management Manual
Defence	Department of Defence
DO	Dissolved oxygen
EC	Electrical conductivity
HEPA	Heads of Environmental Protection Agencies
IP	Interface probe
LOR	Limit of reporting
mAHD	metres Australian height datum
mbtoc	Metres below top of casing
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan
NHMRC	National Health and Medical Research Council
NMI	National Measurement Institute
OMP	Ongoing management plan
ORP	Oxidation reduction potential
PFAS	Per- and poly-fluorinated alkyl substances
PFHxS	Perfluorohexane sulfonate
PFOA	Perflurooctanoic acid
PFOS	Perflurooctanesulfonic acid
PMAP	PFAS management area plan
POL	Paints, oil and lubricants
QA/QC	Quality assurance / quality control
QLD	Queensland
RPD	Relative percent difference
SAQP	Sampling analysis and quality plan
SWL	Standing water level
WBTA	Wide Bay Training Area
WWTP	Wastewater treatment plant

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

Units of Measurement			
L	Litres	m	Metres
mg	Milligram	ha	Hectares
kg	Kilogram	µg	Microgram
mV	Millivolts		

1.0 Introduction

1.1 General

AECOM Australia Pty Ltd (AECOM) has been engaged by the Department of Defence (Defence) to implement the per- and poly-fluoroalkyl substances (PFAS) Ongoing Monitoring Program (OMP) (Defence, 2020) at the Wide Bay Training Area (WBTA) (the 'Site') and the WBTA Management Area in the South Queensland Region. The locations of the Site and the Management Area are shown in **Figure 1** in **Appendix A**. The OMP for WBTA (Defence, 2020) includes the following sampling events:

- Biannual sampling events in October 2020, April 2021, October 2021, April 2022, October 2022 and April 2023 including:
  - groundwater sampling of 17 on-Site groundwater monitoring wells and five off-Site groundwater monitoring wells
  - surface water sampling of creeks and dams at 13 on-Site and seven off-Site sampling locations
  - tap sampling of the two on-Site groundwater extraction bores
  - tap sampling of the treated wastewater from the outlet tap of the Camp Kerr wastewater treatment plant (WWTP).
- Sediment samples (co-located with the surface water samples) at creeks and dams to be collected once per year in April 2021, April 2022 and April 2023.
- Up to two event-based sampling of the WWTP during times of high site usage.

Following each sampling event, a sampling event factual report will be prepared. Annual interpretative reports will be prepared following the completion of each 12-month sampling period.

This sampling event factual report has been prepared to report the results of the biannual sampling event completed in May 2021, specifically highlighting any first-time detections and/or first-time exceedances of human health or ecological (freshwater species) screening criteria for PFHxS+PFOS and / or PFOA.

The sampling event planned for April 2021 was delayed until May 2021 due to training activities within the WBTA Management Area preventing safe access to the base.

This report has been prepared in accordance with the *Defence (2020) PFAS OMP factual reports – guidance for preparation,* v0.2, May 2021 (Defence, 2021).

1.2 Objectives

The objectives of the OMP program are to:

- Implement the OMP prepared as part of the PFAS Management Area Plan (PMAP); and
- Collect data that will enable Defence to maintain an up-to-date understanding of the distribution, concentration and transport of PFAS at the Site and WBTA Management Area.

The data will assist in the timely identification of risks and inform Defence's approach to the management of PFAS, including updates and revisions to the PMAP.

The objective of this phase of works is to implement the scope of works for the biannual May 2021 sampling event (identified in **Section 2.0**) in accordance with the sampling and analysis quality plan (SAQP) (AECOM, 2021).

2.0 Scope of Work

The biannual sampling event at WBTA was completed in accordance with the SAQP (AECOM, 2021). In summary, the scope of works for this sampling event included:

- Obtaining access to private properties where some surface water and sediment sampling locations are situated.
- Review of the SAQP prior to the monitoring event to ensure compliance with the following:
  - PFAS National Environmental Management Plan (NEMP) (2020)
  - National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B1, as amended in 2013 (ASC NEPM, 2013)
  - Defence Routine Environment Water Quality Monitoring Manual
  - AS/NZ 5667:1998 Water quality – Sampling
  - Australian and New Zealand Guidelines for Fresh and Marine Water Quality; and
  - Relevant State regulatory guidelines.
- Gauging of groundwater level at 22 locations including 17 on-Site and five off-Site monitoring wells (located on Council / State land) prior to collection of samples (refer to **Table 1** below, and **Figure 2** and **Figure 3** in **Appendix A** for specific locations).
- Tap sampling of the two on-Site groundwater extraction bores (refer to **Table 1** below and **Figure 3** in **Appendix A** for specific locations).
- Tap sampling of the treated wastewater from the outlet tap of the Camp Kerr WWTP (refer to **Table 2** below and **Figure 3** in **Appendix A** for specific location).
- Collection of surface water and sediment samples at 20 locations including 13 on-Site and seven off-Site locations (refer to **Table 3** below, and **Figure 2** and **Figure 3** in **Appendix A**).
- Collecting field quality control samples including field duplicate and triplicate samples at a rate of 1 in 10 primary samples and collecting one rinsate sample per fieldwork day as per the SAQP.
- Analysis of all groundwater and sediment samples for the PFAS suite at the standard limit of reporting (LOR).
- Analysis of all surface water samples for the PFAS suite at trace levels of detection.
- Analysis of WWTP outlet sample for the PFAS suite at the standard LOR.
- Data management of all OMP field and laboratory data in the Defence ESdat database.
- Preparation of results letters for off-site stakeholders.
- Preparation of this Sampling Event Factual Report.

Table 1 Groundwater Sampling Locations

Location	Monitoring Well
Paints, oils and lubricants (POL) Refuelling point	MW101, MW102, MW115
Airfield	MW103, MW104, MW105
Southern site boundary	MW106
Electronic Classification Range	MW107
Landfill 1	MW108
Eastern site boundary	MW109
Multiuser Firing Point Range	MW110
Possible demonstration area	MW111
WWTP discharge areas	MW112, MW113*, MW114*, MW120, MW121, MW122
Central portion of Camp Kerr	MW119
Down-gradient / cross-gradient of Camp Kerr	MW116*, MW117*, MW118*
Water treatment plant	POT001, POT005
Note: * denotes off-site sampling location	

Table 2 Wastewater Sampling Locations

Description	Tapwater Sampling Locations
Wastewater treatment plant outlet	OTH001

Table 3 Surface Water and Sediment Sampling Locations

Area	Description	Surface Water Sampling Locations
Creek	Kauri Creek	SW/SD004, SW/SD008, SW/SD012
	Mosquito Creek	SW/SD005
	Kangaroo Creek	SW/SD006, SW/SD07, SW/SD009
	Snapper Creek	SW/SD013, SW/SD014, SW/SD016
Drainage Channel	Site entrance (receives runoff from WWTP discharge areas)	SW/SD017
	Vehicle wash point drainage channel	SW/SD018
	Ponded water from surface water flows flowing overland from Camp Kerr	SW/SD019
	Drainage pipe at Clyde Road discharging runoff from Camp Kerr to residential dam	SW/SD027*
	Ephemeral waterway draining residential dams in Wallu	SW/SD025*
Dams	Residential dams in Wallu	SW/SD020*, SW/SD021*, SW/SD022*, SW/SD023*, SW/SD024*
Note: * denotes off-site sampling location		

3.0 Methodology

The methodology used for the May 2021 sampling event was in accordance with the SAQP (AECOM, 2021) and is summarised below.

3.1 Groundwater Sampling Methodology

Table 4 Groundwater Sampling Methodology

Item	Details
Groundwater gauging	The depth to groundwater was measured in each monitoring well immediately prior to collection of groundwater samples using an interface probe. Due to ongoing training activities in different areas of the Base at the time of the fieldworks, areas of the Base were only accessible at specific times/days. Consequently, groundwater gauging data were collected over several days, between 18 and 21 May 2021.
Groundwater quality parameter field measurements	Temperature, electrical conductivity (EC), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH and observations of water quality were recorded for all groundwater samples. Equipment calibration certificates are provided in **Appendix F**.
Sampling methodology	Groundwater samples were collected from all monitoring wells using no-purge methodology HydraSleeves™, which were installed within the screened interval of each well, approximately 1 m above the base of the well (the target depth is shown in **Table T1** in **Appendix B**), for a minimum of 24 hours prior to the sampling round. Once sampling was completed, new HydraSleeves™ were deployed at the screened interval depth in preparation for the next sampling round. Tap samples from extraction bores were collected by opening the tap / valve and allowing the water to run for approximately 3 minutes prior to sample collection. Water samples were collected by placing the laboratory provided sample bottle beneath the tap outlet.
Sample analysis	All primary samples were submitted for PFAS suite using the standard levels of detection. ALS Environmental (ALS) Brisbane, Queensland was used as the primary laboratory. The National Measurement Institute (NMI) of Sydney, NSW was used as the secondary laboratory. ALS and NMI methods for groundwater analyses were certified by the National Association of Testing Authorities (NATA). Chain of custody (COC) forms and laboratory certificates are presented in **Appendix D** and **Appendix E** respectively.
QA/QC Samples	Field quality assurance (QA) / quality control (QC) samples collected included intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and rinsate samples. Refer to **Appendix C** for assessment of QA/QC sample data.

3.2 Surface Water Sampling Methodology

Table 5 Surface Water Sampling Methodology

Item	Details
Surface water quality parameter field measurements	Temperature, electrical conductivity, dissolved oxygen, oxidation-reduction potential, pH and observations of water quality were recorded for all surface water samples. Equipment calibration certificates are provided in **Appendix F**.
Sampling methodology	Samples were collected from immediately below the water surface to minimise collection of sediment or floating materials in the samples. At each location, a new, laboratory-supplied container was lowered into the water with the cap immediately applied once the container was full.
Sample analysis	All primary samples were submitted for PFAS suite using the trace levels of detection. ALS Brisbane, Queensland was used as the primary laboratory. NMI of Sydney, NSW was used as the secondary laboratory. ALS and NMI methods for groundwater analyses were certified by the NATA. COC forms and laboratory certificates are presented in **Appendix D** and **Appendix E** respectively.
QA/QC Samples	Field QA/QC samples collected included intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and rinsate samples. Refer to **Appendix C** for assessment of QA/QC sample data.

3.3 Sediment Sampling Methodology

Table 6 Sediment Sampling Methodology

Item	Details
Sampling methodology	Samples representative of sediments were collected co-located with surface water samples. Sediment samples were by gloved hand or using a trowel. At each location, a new laboratory supplied container was used for each sample.
Logging	Sediment characteristics were recorded for each sample.
QA/QC Samples	Field QA/QC samples collected included intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and rinsate samples. Refer to **Appendix C** for assessment of QA/QC sample data.
Sample analysis	All primary samples were submitted for PFAS suite using the standard levels of detection. ALS Brisbane, Queensland was used as the primary laboratory. NMI of Sydney, NSW was used as the secondary laboratory. ALS and NMI methods for groundwater analyses were certified by the NATA. COC forms and laboratory certificates are presented in **Appendix D** and **Appendix E** respectively.

3.4 Wastewater Sampling Methodology

Table 7 Wastewater Sampling Methodology

Item	Details
Locations sampled	OTH001 was collected from an outlet at the WWTP.
Sampling methodology	The tap/valve was opened and water allowed to run for approximately one minute prior to a sample being collected. A laboratory provided sample bottle was placed beneath the tap outlet. The sample bottle was filled to the top to ensure no headspace and the cap was immediately applied. The sample bottle was immediately placed in a cooler with cooling media.
Wastewater quality parameter field measurements	Temperature, electrical conductivity, dissolved oxygen, oxidation-reduction potential, pH and observations of water quality were recorded for the wastewater sample. Equipment calibration certificates are provided in **Appendix F**.
Sample analysis	The sample was submitted for PFAS suite using the standard levels of detection.

3.5 Adopted Screening Criteria

Adopted screening criteria references national guidance in the form of the PFAS National Environmental Management Plan (NEMP), Defence estate and environmental strategies, and Defence PFAS-specific strategies and guidance. Guidance documents used to assess the dataset includes the following:

- PFAS NEMP v2.0 (HEPA 2020)
- Department of Health, 2019. Health Based Guidance Values for PFAS for use in site investigations in Australia. April 2017 [updated September 2019]
- National Health and Medical Research Council (NHMRC), 2019. Guidance on PFAS in Recreational Water. August 2019 (NHMRC 2019)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B1, as amended in 2013.

The adopted PFAS screening criteria to assess the data generated as part of the OMP are presented in **Table 8** below.

Table 8 Summary of Adopted Screening Criteria

Pathway	Compound	Criteria	Comment / Reference
Human Health Receptors			
Drinking water - groundwater	PFOS + PFHxS	0.07 µg/L	The values are from the PFAS NEMP (HEPA, 2020). *All groundwater results will be compared to these criteria.*
	PFOA	0.56 µg/L	
Recreational use – surface water	PFOS + PFHxS	2 µg/L	The values are from NHMRC (2019). *All surface water results will be compared to these criteria.*
	PFOA	10 µg/L	
Ecological Receptors			
Freshwater (99% species protection values)	PFOS	0.00023 µg/L	The values are from the PFAS NEMP (HEPA, 2020). The 99% level of protection has been applied for slightly to moderately disturbed ecosystems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. For the purposes of preliminary screening of analytical water results, the laboratory LOR will be adopted rather than sole use of the criteria value. *All surface water (except SW025) and groundwater results will be compared to these criteria.*
	PFOA	19 µg/L	
Freshwater (95% species protection values)	PFOS	0.13 µg/L	Surface water in the ephemeral waterway south of Clyde Road (SW025) should be screened against freshwater ecological guidelines for slight to moderately disturbed ecosystems (95% species protection).
	PFOA	220 µg/L	

There are no human health or ecological guideline values available for sediment.

3.6 Data Quality Objectives and Data Validation

The data quality objectives and data quality indicators adopted for these works are presented in the SAQP (AECOM, 2021).

Data validation assessment is provided in **Appendix C**.

The data validation procedure employed in the assessment of the field and laboratory QA/QC data indicated that the reported analytical results are representative of the sample locations and that the overall quality of the analytical data produced is acceptably reliable for the purpose of this report.

All data collected during this event has been reviewed and uploaded to the Defence ESdat database in accordance with Defence Contamination Management Manual (Defence, 2018) requirements.

3.7 Deviations from the SAQP

Table 9 lists the deviations from the SAQP (AECOM, 2021) during this sampling event.

Table 9 Deviations from the SAQP during the May 2021 Sampling Event

SAQP	Sampling Event
The biannual event was scheduled for April 2021	The sampling event was delayed until May 2021 due to ongoing training activities at WBTA.
Groundwater sampling of monitoring well MW102	Groundwater well MW102 was unable to be located as it was buried under compacted road base in a new car parking area.
Surface water and sediment sampling at SW/SD020	SW/SD020 is located on private property and the stakeholder was unable to be contacted to arrange sampling as the property ownership has recently changed.
Sediment samples were to be collected using a trenching shovel or Dormer Piston Sediment Sampler.	Sediment samples were collected by gloved hand (using a new pair of gloves) or with a trowel.

4.0 Field Observations and Results

The May 2021 biannual sampling event was completed between 18 and 21 May 2021. The results are summarised in following sections.

4.1 Groundwater

4.1.1 Groundwater Observations and Quality Parameter Field Measurements

Table 10 Groundwater Observations and Quality Parameter Field Measurements

Compound	Criteria
Access	All monitoring wells and bores were accessible except for monitoring well MW102, which was unable to be located as it was buried under road base.
Monitoring Well Network	Covers to the groundwater monitoring wells were noted to be in good condition at the time of sampling.
Field Observations	No visible or olfactory indications of contamination were observed during the sampling of the 21 accessible groundwater monitoring wells. Field observations are presented **Table T1** in **Appendix B**.
Depth to Groundwater	Depth to groundwater in the monitoring wells was between 1.075 (MW109) metres below top of casing (mbtoc) and 14.112 mbtoc (MW101). Groundwater elevations in these bores were between 8.132 metres above Australian Height Datum (mAHD) (MW109) and 72.921 mAHD (MW119). Groundwater gauging data are presented in **Table T1** in **Appendix B**.
Groundwater Flow Direction	Inferred groundwater contours and groundwater flow directions in the greater WBTA area in May 2021 are shown on **Figure 4** in **Appendix A**. The inferred local groundwater flow direction is generally from the southwest to the northeast, towards Tin Can Bay Inlet. Inferred groundwater contours and groundwater flow directions within and immediately adjacent to Camp Kerr between 18 to 21 May 2021 are shown on **Figure 5** in **Appendix A**. A groundwater divide appears to be present in the central portion of Camp Kerr with groundwater to the east of the groundwater divide flowing towards the east. Groundwater to the west of the groundwater divide appears to be flowing to the west and southwest towards Wallu, and towards the south. The observed groundwater divide is consistent with that observed in previous investigations (AECOM, 2020).
Groundwater Quality Parameter Field Measurements	Groundwater quality parameters were measured prior to collecting groundwater samples. The readings are presented in **Table T1** in **Appendix B** and are summarised below: • Electrical conductivity ranged from 67.3 µS/cm (MW114) to 541 µS/cm (MW105) indicating fresh conditions. • pH ranged from 4.26 (MW106) to 7.1 (MW109). pH results generally indicated slightly acidic to near neutral conditions. • Corrected redox ranged from 56 mV (MW108) to 489 mV (MW106) indicating mildly to strongly reducing conditions. • Temperature ranged from 19.6°C (MW117) to 24.8°C (MW104). • The dissolved oxygen results ranged between 0.38 mg/L (MW108) and 4.52 mg/L (MW103) indicating poorly to moderately oxygenated conditions.
Weather Conditions	Weather conditions during groundwater sampling were overcast with rainfall on three days (19-21 May 2021). There was a total of 20 mm of rainfall between 19 and 21 May 2021.

Compound	Criteria
Estate Management Works or Training Activities	During the sampling event no notable estate works or training activities were observed in the vicinity of sampling locations.

4.1.2 PFAS Groundwater Analytical Results

The PFAS groundwater analytical results from this sampling event are presented in **Table T2** in **Appendix B**. There were no first-time detections or first-time exceedances of the human health guideline values in the May 2021 sampling event for PFOA and sum of PFHxS+PFOS. Two groundwater samples exceeded the HEPA (2020) drinking water guideline value for sum of PFHxS and PFOS (MW121 and MW122). Three groundwater samples reported PFOS above the limit of reporting at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of freshwater species (MW118, MW121 and MW122). There were no exceedances of the human health or ecological guidelines values for PFOA.

PFAS were not detected at concentrations that exceeded the limit of reporting in groundwater samples from either of the two extraction bores, Bore 1 (POT001) and Bore 2 (POT005). There were no exceedances of the human health or ecological guideline values for sum of PFHxS and PFOS, PFOS and PFOA in these potable water samples.

4.2 Surface Water

4.2.1 Surface Water Observations and Quality Parameter Field Measurements

Table 11 Surface Water Observations and Quality Parameter Field Measurements

Compound	Criteria
Access	Nineteen of the 20 surface water sampling locations were accessible during the May 2021 sampling event. Prior to conducting sampling on private properties, access permissions were obtained from stakeholders. SW020 was not sampled as the stakeholder could not be contacted.
Field Observations	No visual or olfactory indications of contamination were observed during the sampling of the surface water sampling locations. Two samples were observed to have an organic odour, SW021 and SW025. Field observations are presented in **Table T3** in **Appendix B**.
Surface Water Quality Parameter Field Measurements	Surface water quality parameters were measured prior to collecting surface water samples. The readings are presented in **Table T3** in **Appendix B** and are summarised below: • Dissolved oxygen ranged from 0.96 mg/L (SW021) to 9.56 mg/L (SW019). The measurements generally indicated moderately to well oxygenated conditions. • With the exception of SW008, SW012 and SW013, electrical conductivity ranged from 69 µS/cm (SW023) to 932 µS/cm (SW017) indicating fresh conditions in inland creeks and dams. The three surface water samples from estuarine environments had between 2,959 µS/cm (SW008) and 9,667µS/cm (SW012) indicating brackish conditions. • pH ranged from 4.27 (SW007) to 7.12 (SW022). pH results generally indicated very slightly acidic to near neutral conditions. • Corrected redox ranged from 222 mV (SW021) to 482.0 mV (SW007) indicating mildly reducing conditions. • Temperature ranged from 16.5°C (SW007) and 22.0°C (SW018).

Compound	Criteria
Weather conditions	Weather conditions during surface water sampling were overcast with rainfall on three days (19-21 May 2021). There was a total of 20 mm of rainfall between 19 and 21 May 2021.
Estate Management Works or Training Activities	During the sampling event no notable estate works or training activities were observed in the vicinity of sampling locations.

4.2.2 PFAS Surface Water Analytical Results

The PFAS surface water analytical results from this sampling event are presented in **Table T4** in **Appendix B**. There were no first-time detections or first-time exceedances of the human health guideline values in the May 2021 sampling event for PFOA and sum of PFHxS+PFOS. Six surface water samples reported PFOS above the limit of reporting at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of fresh / marine water species. No surface water samples reported PFOA at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of fresh / marine water species.

Concentrations of PFOS and PFOA at SW025 were below the HEPA (2020) ecological guideline value for 95% species protection of freshwater species.

4.3 Sediment

4.3.1 Sediment Observations

Table 12 Sediment Observations

Compound	Criteria
Access	Nineteen of the 20 sediment sampling locations were accessible during the May 2021 sampling event. Prior to conducting sampling on private properties, access permissions were obtained from stakeholders. SD020 was not sampled as the stakeholder could not be contacted.
Field Observations	No visible or olfactory indications of contamination were observed during the sampling of the sediment locations. Two sediment samples had an organic odour, SD021 and SD025. Field observations are presented in **Table T5** in **Appendix B**.
Weather Conditions	Weather conditions during surface water sampling were overcast with rainfall on three days (19-21 May 2021). There was a total of 20 mm of rainfall between 19 and 21 May 2021.
Estate Management Works or Training Activities	During the sampling event no notable estate works or training activities were observed in the vicinity of sampling locations.

4.3.2 Sediment Analytical Results

The PFAS sediment analytical results from this sampling event are presented in **Table T6** in **Appendix B.** Two sediment sampling locations, SD021 and SD027 were sampled for the first-time and sum of PFHxS and PFOS were detected in both samples (0.0012 mg/kg in SD021 and 0.0005 mg/kg in SD025). The location of SD027 is shown in **Figure 6** in **Appendix A**, the location of SD021 is not shown on this figure for privacy reasons.

4.4 Wastewater Observations, Quality Parameter Field Measurements and Analytical Results

Wastewater observations and quality parameter field measurements are presented in **Table T7**, **Appendix B**. The water was clear with no sheen or odour. The field parameters indicated the water was slightly alkaline, fresh, well oxygenated and mildly reducing.

The PFAS analytical results for the wastewater sample is presented in **Table T8** in **Appendix B**. None of the concentrations exceeded the LOR. There were no first-time detections of PFAS or exceedances of the human health guideline values in the May 2021 sampling event.

5.0 Summary and Next Sampling Event

5.1 Summary of Monitoring Event

A biannual groundwater, surface water and wastewater monitoring event was completed at the WBTA Management Area between 18 and 21 May 2021. The event included sampling of groundwater from 21 monitoring wells, two extraction bores, one wastewater sample from the WWTP, 19 surface water sampling locations and 19 sediment sampling locations. **Table 13** summarises the findings of the biannual May 2021 sampling event and the recommended actions.

Table 13 Summary of Sampling Event

Item	Comment	Recommended Actions
Access to sampling locations	Twenty-three out of 24 monitoring well/bore locations were accessible and able to be sampled. MW102 was not accessible as it was buried beneath road base. The area containing MW102 has been recently redeveloped as a car park, with the ground resurfaced. The loss of the well is not considered of high significance as down-gradient wells are present in this area. Nineteen out of twenty co-located surface water and sediment sampling location were accessible and able to be sampled. One sample location (SW/SD020) could not be sampled as the stakeholder was unable to be contacted as the property ownership has recently changed.	The need to replace monitoring well MW102 will be considered in the interpretative report. The new property owners for sample SW/SD020 will be contacted prior to the next sampling event.
Monitoring well network condition	No issues were identified in the 21 monitoring wells sampled.	None.
Analytical Results	PFAS concentrations in all groundwater, surface and wastewater samples were consistent with historical results. PFAS concentrations in 17 sediment samples were consistent with historical results. Sum of PFHxS and PFOS concentrations exceeded the HEPA (2020) drinking water guidelines value in two groundwater samples. PFOS concentrations in three groundwater and six surface water samples exceeded the HEPA (2020) ecological guideline value (99% species protection).	Ongoing monitoring in accordance with the OMP.
First-time detections of Sum of PFHxS+PFOS or PFOA	There were no first-time detections of sum of PFHxS+PFOS or PFOA in the 23 groundwater samples, the 19 surface water samples or the wastewater sample. Two sediment locations (SD021 and SD027) were sampled for the first-time in May 2021 and detectable concentrations of sum of PFHxS and PFOS were reported in both samples.	Ongoing monitoring in accordance with the OMP.
First time exceedance of NEMP (HEPA, 2020) drinking water or recreational use guidelines	There were no first-time exceedances of the NEMP (HEPA, 2020) drinking water guidelines or NHMRC (2019) recreational use guidelines.	Ongoing monitoring in accordance with the OMP.

5.2 Upcoming Sampling Events

The next biannual sampling event is scheduled for October 2021.

5.3 Upcoming Annual Interpretive Report

The next annual interpretative report is scheduled for January 2022.

6.0 References

AECOM, 2020, *PFAS Detailed Site Investigation*, WBTA, Rev 0, September 2020.

AECOM, 2021, *PFAS OMP - WBTA Sampling and Analysis Quality Plan*, Revision 4, 23 April 2021.

ASC NEPM, 2013. *Schedule B2. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B2 Guideline on Site Characterisation*.

ASC NEPM, 2013. *Schedule B4. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B4 Guideline on Site-Specific Health Risk Assessment Methodology*.

ASC NEPM, 2013. *Schedule B7. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B7 Guideline on Derivation of Health-Based Investigation Levels*.

Australian and New Zealand Governments and Australian state and territory governments [ANZG]. , 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

Department of Defence, July 2018, Amended August 2019, *Defence Contamination Management Manual.*

Department of Defence, 2020. *Wide Bay Training Area – PFAS Management Area Plan*, Version 7, September 2020.

Department of Defence, 2021. *PFAS OMP Factual Reports – Interim Guidance for Preparation*, Version 0.2.

Department of Health, 2019. *Health Based Guidance Values for PFAS for use in site investigations in Australia*. 2017, as updated in 2019.

Heads of EPAs Australia and New Zealand, 2018. *PFAS National Environmental Management Plan*. January 2020.

National Health and Medical Research Council, 2019. *Guidance on PFAS in Recreational Water. August 2019*. August 2019.

Appendix A

Figures

Appendix A Figures

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\60580555 F2 Investigation Area 08 01 2020 TO Rev B

AECOM Imagine it. Delivered.

LOCATION OF WBTA AND MANAGEMENT AREA

May 2021 Sampling Event

Wide Bay Training Area, Queensland

FIGURE 1

Pioneer Point Boat Ramp
Tin Can Bay
Inskip
Pannikin
UOTF/EHTA
Demolition Range
SW/SD012
Old Boat Ramp/Sentry Post
Little Sturgy Creek
Airstrip UAV
24m Tower
Wide Bay Training Area
SW/SD005
SW/SD008
Hospital Creek
Tuckers Creek
Griffin Creek
Forward Operating Base
SW/SD009
Carlo Island
AGR/SGR/DFSW
SW/SD004
Moon Creek
Snapper Point
Tin Can Inlet
Smooger Point
Easy Feature/MUFP/MCR/BIF
Tin Can Bay
Quarry
Kanangra Creek
Tin Can Bay Waste Transfer Station and Sewage Treatment Works
MW110
MW109
SW/SD013
SW/SD014
Ammunition Storage
Toolara
Maryborough - Cooloola Road
SW/SD007
Range/ECR
MW104
MW107
MW105
Teewah Point
MW108
SW/SD006
MW103
North Cooloola Point
Landfill 1
SW/SD016
Tin Can Bay Road
MW111
MW106
Area shown in Figure 3
Wallu
Wallu Heights
Rainbow Beach Road
Snapper Creek
Cooloola Cove
South Cooloola Point
Poverty Point

KEY
- Wide Bay Training Area
- Management Area
- Great Sandy Strait Ramsar
- Parks and recreation reserves
- Major road
- Road
- Watercourse
- Surface water sample location
- Groundwater monitoring well location

0 2km

G:\ENV\GIS\Projects\605\605805555 Wide Bay Training Area\FIGURES\605805555 F5 Sample Locations (Greater WBTA) 08 01 2020 TO Rev B

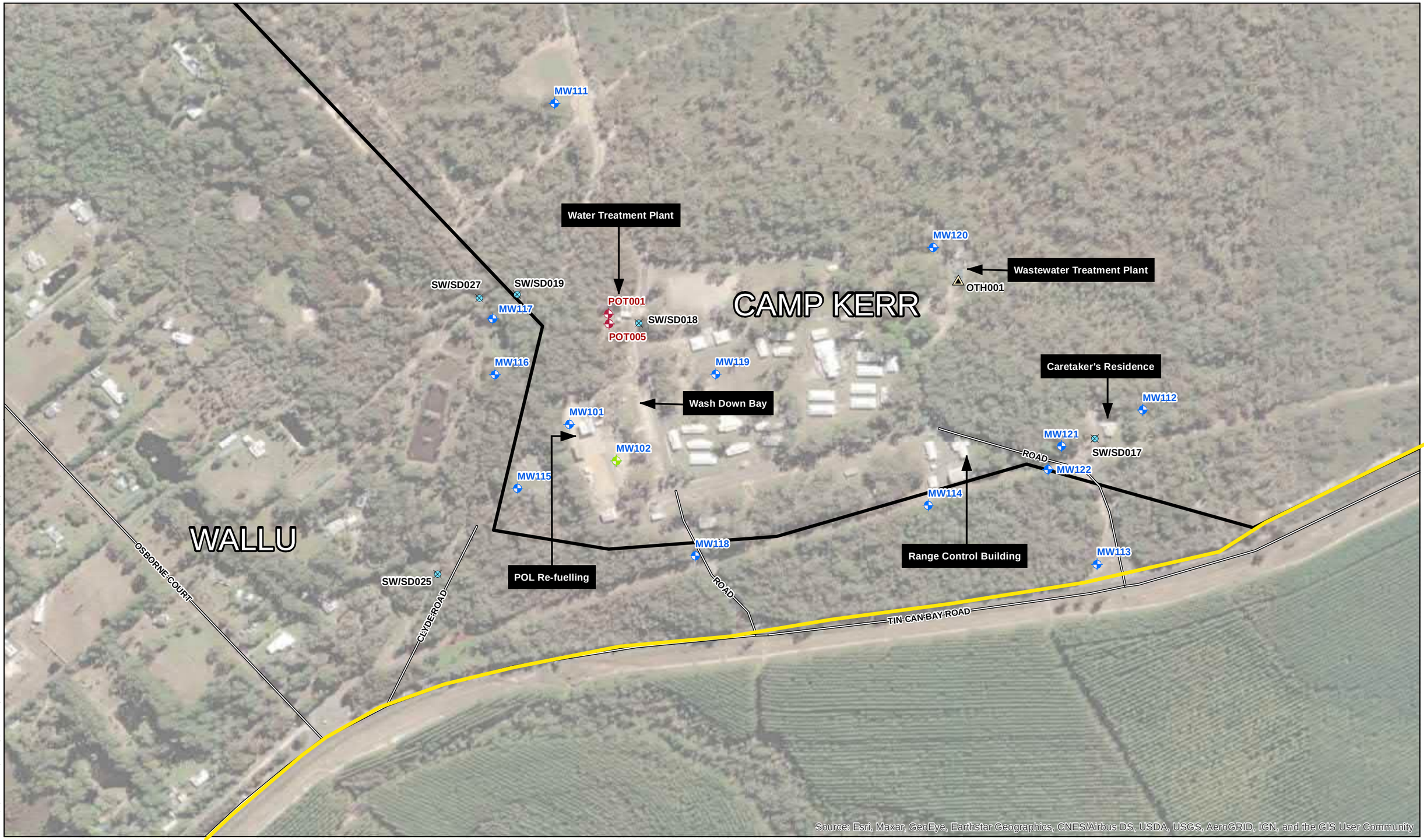
AECOM Imagine it. Delivered.

UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SAMPLING LOCATIONS (GREATER WIDE BAY TRAINING AREA)

May 2021 Sampling Event
Wide Bay Training Area, Queensland

FIGURE 2



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE

0 50 100 200

metres

1:4,500 (when printed at A3)

LEGEND

- Waste Water Treatment Plant Sampling Location
- Groundwater sampling location not accessible
- Abstraction Bore
- Groundwater sampling location
- Sediment / surface water sampling location
- Road
- WBTA Property Boundary
- WBTA Management Area

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Wide Bay Training Area, Queensland

SAMPLING LOCATIONS (CAMP KERR)

May 2021 Sampling Event

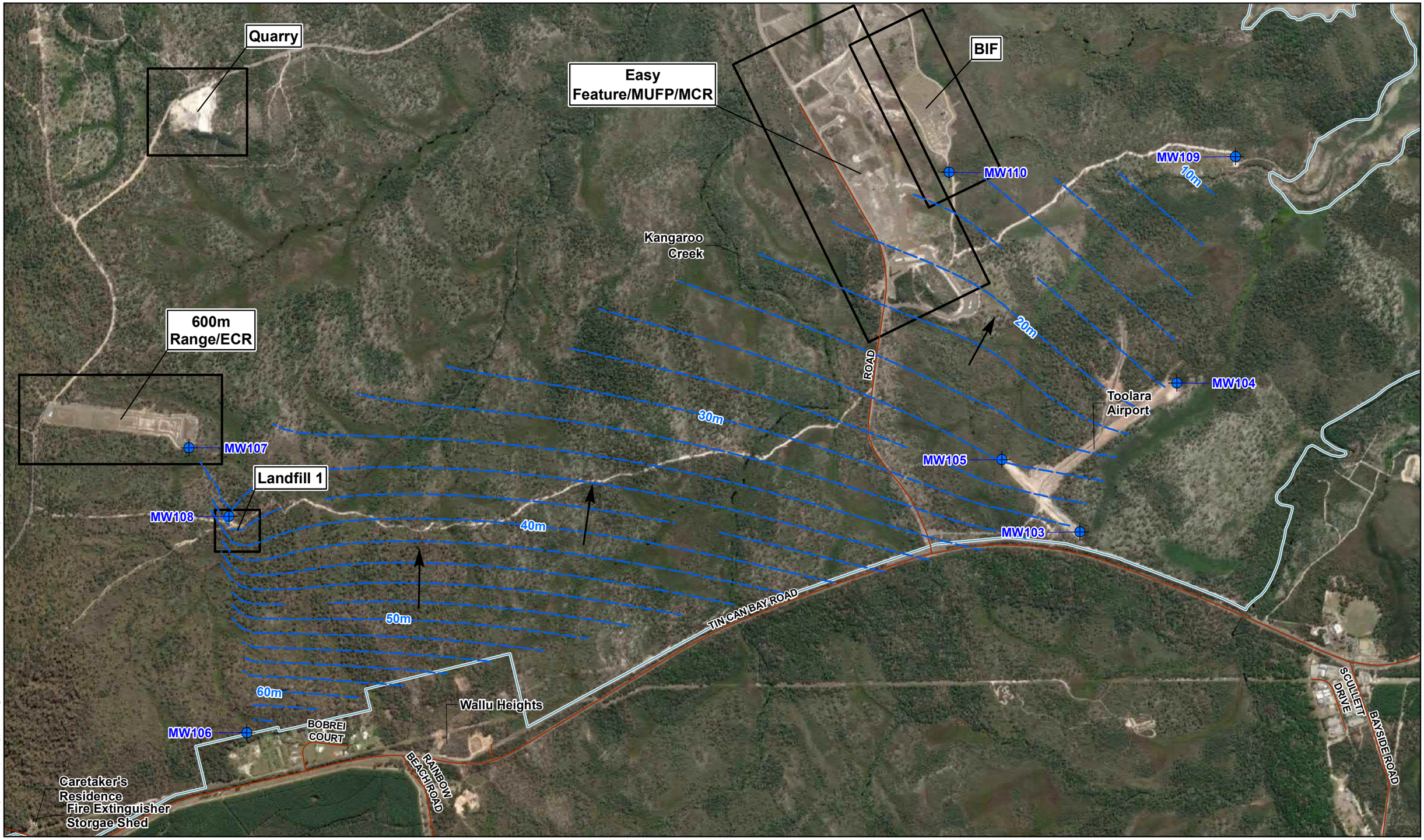
PROJECT ID	60612563
CREATED BY	PeacheyJ
LAST MODIFIED	SCS- 25/06/21
VERSION:	1

Figure

3

Filename:\\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\20200817_JP_OMP_AnnualInterpretativeReport2020_PFAS_AACO\WBTA_P60612563_F3_OMP_Sampling_Locations_CampKerr_20210624 v3.mxd

A3 size



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE

0 200 400 800

metres

1:16,918 (when printed at A3)

LEGEND

- Groundwater Well Location
- Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction
- Features
- WBTA Property Boundary

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Wide Bay Training Area, Queensland

INFERRED GROUNDWATER CONTOURS, GREATER WBTA

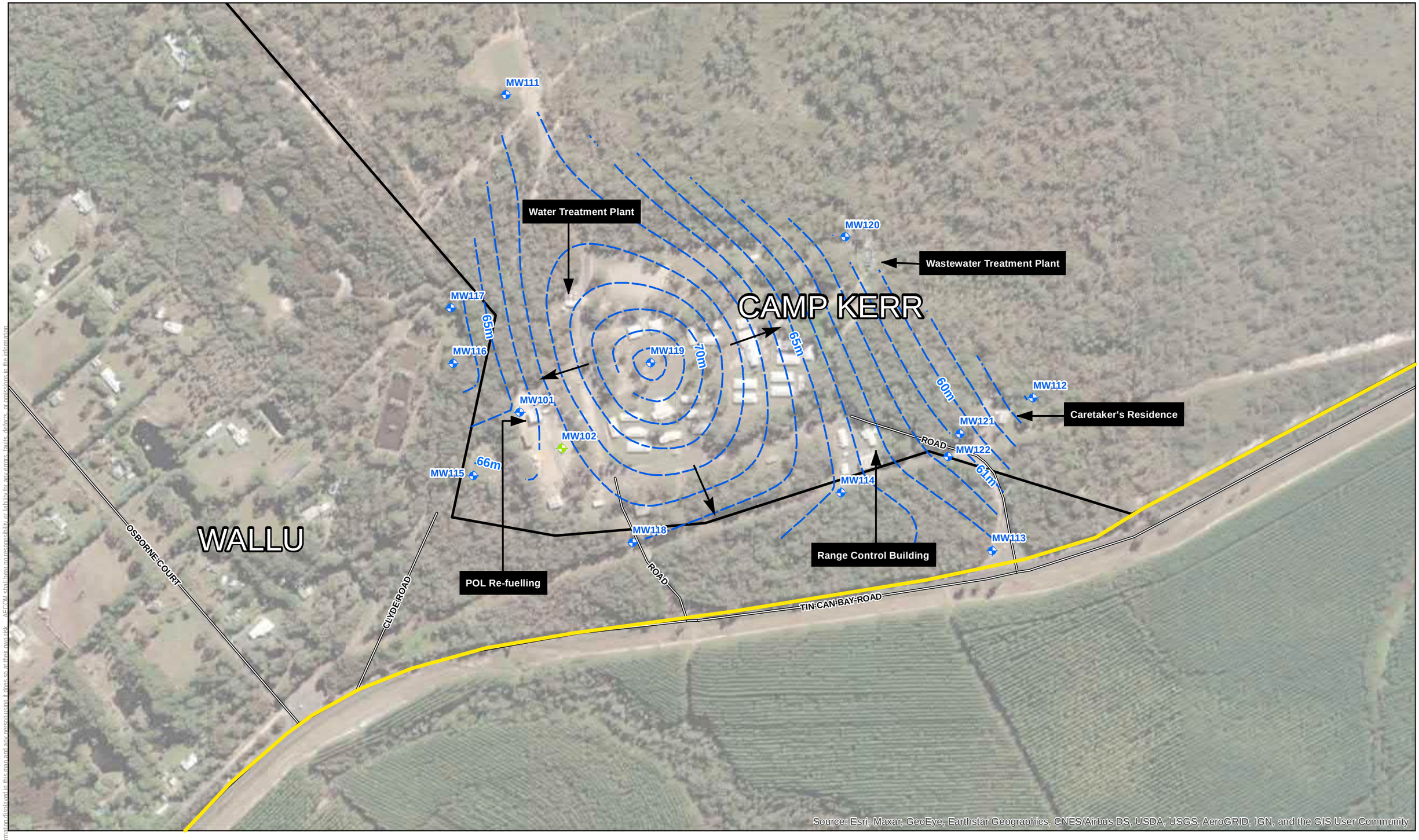
May 2021

PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	SCS- 28/06/21
VERSION:	1

Figure 4

Filename:L:\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_Report May 2021\WBTA_P60612563_F4_InferredGroundwaterContours_May2021_20210624.mxd

A3 size



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE

0 50 100 200

metres

1:4,500 (when printed at A3)

LEGEND

- Groundwater sampling location not accessible
- Groundwater sampling location
- Road
- WBTA Property Boundary
- WBTA Management Area
- Inferred Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Wide Bay Training Area, Queensland

INFERRED GROUNDWATER CONTOURS (CAMP KERR)

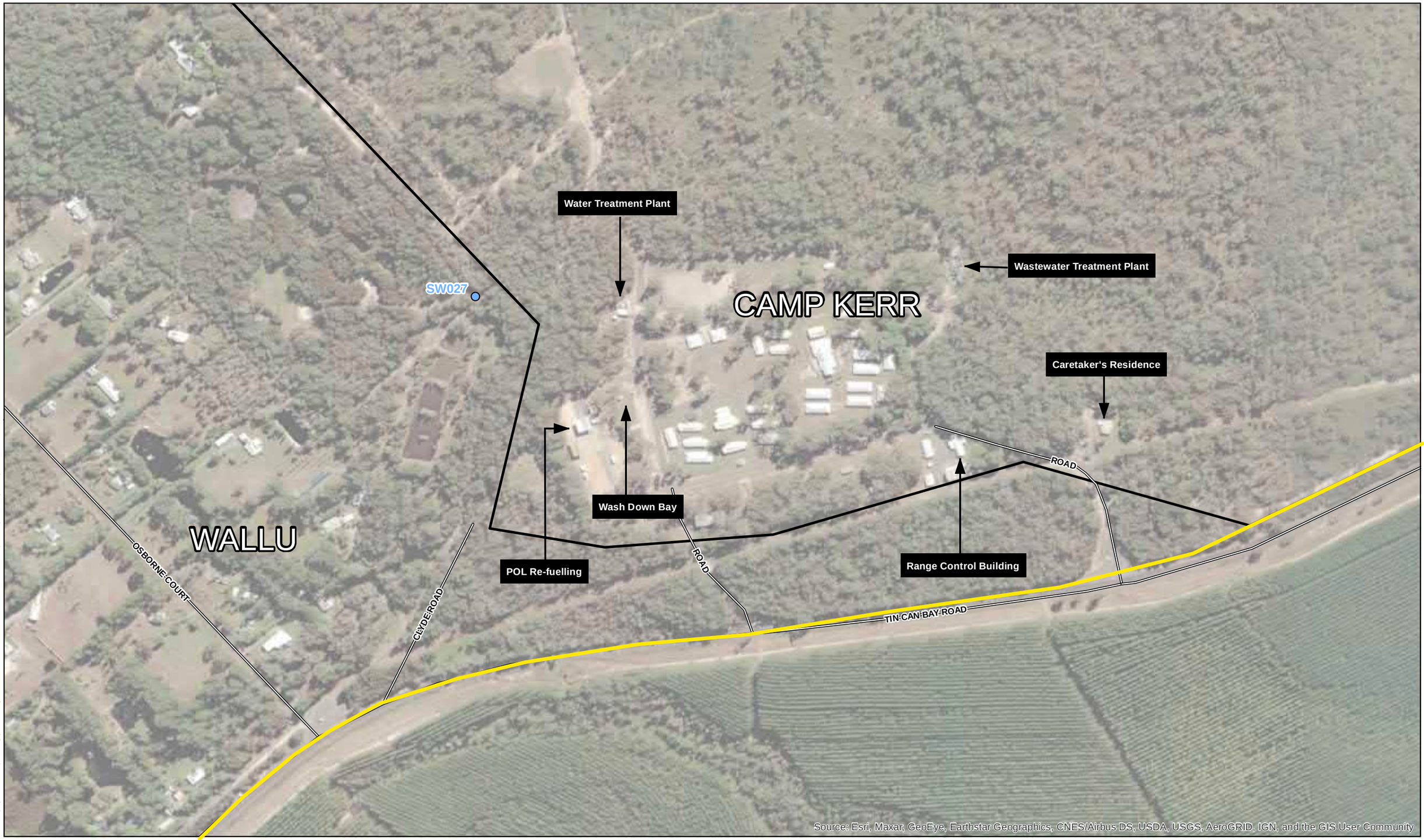
May 2021

PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	SCS- 26/06/21
VERSION:	1

Figure 5

A3 size

Filename:\\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\20200817_JP_OMP_AnnualInterpretativeReport2020_PFAS_AACO\WBTA_P60612563_F5_OMP_InferredGWcontours_CampKerr_20210625v3.mxd



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE

0 50 100 200

metres

1:4,500 (when printed at A3)

LEGEND

- Detection of PFHxS+PFOS or PFOA
- Road
- WBTA Property Boundary
- WBTA Management Area

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Wide Bay Training Area, Queensland

SEDIMENT ANALYTICAL RESULTS FIRST TIME DETECTIONS

PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	SCS- 25/06/21
VERSION:	1

Figure 6

A3 size

Filename:\\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\20200817_JP_OMP_AnnualInterpretativeReport2020_PFAS_AACO\WBTA_P60612563_F6_OMP_SedimentResults_CampKerr_20210624v3.mxd

Appendix B

Tables

D R A F T

Appendix B Tables

Table T1 Groundwater Gauging and Quality Parameter Field Measurement Results

Property ID	Well ID	Sample Date	Screened Interval depth (mbgs)	Well Depth (mbtoc)	Depth to Water (mbtoc)	TOC Elevation (mAHD)	Groundwater Elevation (mAHD)	Condition of Stand up cover / Gatic	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Water Colour	Odour	Sheen	Sample Method / Comments	Hydrasleeve target depth (mbtoc)	Hydrasleeve install date	Hydrasleeve install time	Hydrasleeve removal date	Hydrasleeve removal time
0224	MW101	20/05/2021	11 - 15	16.2	14.112	79.264	65.152	Good	1.92	133	4.3	239	444	21.6	Clear	Clear	No odour	No sheen	Hydrasleeve	15.0	20/05/2021	1:02:08 PM	21/05/2021	1:02:50 PM
0224	MW102	21/05/2021	14-20	-	-	78.564	-	Not found	-	-	-	-	-	-	-	-	-	-	Well not accessible as it is likely to be buried under compacted road base in a roadway	-	-	-	-	-
0224	MW103	19/05/2021	7.5 - 10.5	10.85	2.958	33.239	30.281	Good	4.52	94.8	5.77	200.6	405.6	23.4	Clear	Clear	No odour	No sheen	Hydrasleeve	10.5	30/10/2020	7:49:15 AM	19/05/2021	3:00:00 PM
0224	MW104	19/05/2021	8 - 11	10.84	3.468	20.815	17.347	Good	2.39	112.9	5.68	213	418	24.8	Clear	Clear	No odour	No sheen	Hydrasleeve	11.0	30/10/2020	8:20:20 AM	19/05/2021	3:30:00 PM
0224	MW105	20/05/2021	4.2 - 7.2	8.38	1.845	27.603	25.758	Good	1.76	541	6.18	169	374	22.5	Clear	Clear	No odour	No sheen	Hydrasleeve	7.0	19/05/2021	3:05:29 PM	21/05/2021	3:05:18 PM
0224	MW106	20/05/2021	4 - 10	10.08	3.707	69.468	65.761	Good	4	81.1	4.26	284	489	21.9	Clear	Clear	No odour	No sheen	Hydrasleeve	10.0	29/10/2020	7:39:40 AM	20/05/2021	2:16:41 PM
0224	MW107	20/05/2021	2.8 - 5.8	5.66	1.813	37.789	35.976	Good	1.2	195	5.54	161	366	23.2	Clear	Clear	No odour	No sheen	Hydrasleeve	5.8	29/10/2020	10:43:00 AM	20/05/2021	11:37:26 AM
0224	MW108	20/05/2021	14.5 - 17.5	17.85	4.005	39.99	35.985	Good	0.38	448	6.94	-149	56	22.1	Clear	Clear	No odour	No sheen	Hydrasleeve	17.5	29/10/2020	11:14:53 AM	20/05/2021	10:54:24 AM
0224	MW109	19/05/2021	7 - 10	9.97	1.075	9.207	8.132	Good	0.55	292.3	7.1	116.5	321.5	21.8	Clear	Light Brown	No odour	No sheen	Hydrasleeve	10.0	28/10/2020	8:09:57 AM	19/05/2021	12:21:17 PM
0224	MW110	19/05/2021	0.5 - 4	3.45	1.17	17.967	16.797	Good	1.83	208.3	5.69	238	443	21.7	Clear	Clear	No odour	No sheen	Hydrasleeve	3.5	28/10/2020	7:34:39 AM	19/05/2021	12:42:04 PM
0224	MW111	20/05/2021	16.5 - 20.5	20.8	11.383	78.952	67.569	Good	0.77	229.5	6.23	-102	103	21.4	Clear	Clear	No odour	No sheen	Hydrasleeve	20.5	29/10/2020	11:46:33 AM	20/05/2021	10:15:49 AM
0224	MW112	20/05/2021	6 - 9	8.865	8.504	65.183	56.679	Good	2.02	157	5.51	212	417	21.2	Clear	Clear	No odour	No sheen	Hydrasleeve	9.0	29/10/2020	3:15:07 PM	20/05/2021	3:40:55 PM
0224	MW113	21/05/2021	6 - 9	7.81	4.298	67.717	63.419	Good	1.5	167	5.59	195	400	23.6	Clear	Clear	No odour	No sheen	Hydrasleeve	8.0	28/10/2020	2:36:02 PM	21/05/2021	11:32:38 AM
0224	MW114	21/05/2021	8.5 - 11.5	11.41	8.156	73.016	64.860	Good	2.34	67.3	4.9	230	435	24.3	Clear	Clear	No odour	No sheen	Hydrasleeve	11.5	28/10/2020	2:13:20 PM	21/05/2021	12:03:25 PM
0224	MW115	20/05/2021	13 - 16	16.05	10.356	76.659	66.303	Good	0.69	133	4.97	227.2	432.2	22	Clear	Clear	No odour	No sheen	Hydrasleeve	16.0	28/10/2020	7:10:00 PM	20/05/2021	1:11:36 PM
0224	MW116	19/05/2021	8 - 11	10.74	6.695	69.815	63.120	Good	0.6	394	6.07	138	343	21.9	Clear	Clear	No odour	No sheen	Hydrasleeve	11.0	28/10/2020	12:59:13 PM	19/05/2021	-
0224	MW117	18/05/2021	7 - 10	11.02	5.57	68.914	63.344	Good	1.85	379	6.34	20.5	225.5	19.6	Medium	Light Brown	No odour	No sheen	Hydrasleeve	10.0	28/10/2020	12:30:56 PM	18/05/2021	3:25:00 PM
0224	MW118	21/05/2021	10 - 13	12.35	10.139	76.154	66.015	Good	3.14	94	4.67	252	457	22.1	Clear	Clear	No odour	No sheen	Hydrasleeve	12.7	28/10/2020	1:46:37 PM	21/05/2021	12:34:43 PM
0224	MW119	20/05/2021	13 - 16	14.8	6.625	79.546	72.921	Good	1.78	207	4.63	260	465	23.6	Clear	Clear	No odour	No sheen	Hydrasleeve	14.7	29/10/2020	12:32:49 PM	20/05/2021	1:36:19 PM
0224	MW120	20/05/2021	Unknown	13.85	10.727	71.332	60.605	Good	0.93	237	4.81	228	433	21	Clear	Clear	No odour	No sheen	Hydrasleeve	12.7	20/05/2021	9:54:55 AM	21/05/2021	10:55:39 AM
0224	MW121	20/05/2021	Unknown	15.2	9.72	70.405	60.685	Good	1.05	193	6.1	166	371	20.6	Clear	Clear	No odour	No sheen	Hydrasleeve	14.0	20/05/2021	8:49:57 AM	21/05/2021	9:51:16 AM
0224	MW122	20/05/2021	Unknown	20.04	8.91	70.575	61.665	Good	0.85	69.4	4.84	230	435	21.5	Clear	Clear	No odour	No sheen	Hydrasleeve	19.0	20/05/2021	9:26:23 AM	21/05/2021	10:28:17 AM
0224	POT001	20/05/2021	18 - 78.4	-	-	-	-	-	1.16	498	6.55	77	282	22.9	Clear	Clear	No odour	No sheen	Tap	-	-		-	-
0224	POT005	20/05/2021	30 - 51.5	-	-	-	-	-	3.05	440	6.72	87	292	22.1	Clear	Clear	No odour	No sheen	Tap	-	-		-	-

mbgs is metres below ground surface
mbtoc is metres below top of casing
mAHD is metres above Australian height datum
DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential
Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)
Temp is Temperature
µS/cm is microsiemens per centrimetre
ºC is degrees Celcius
mV is millivolts
` - No data

Table T2 Groundwater PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFDoDA	PFTeDA	PFTrDA	PFUnDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.05	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.05	0.01
NEMP (2020) Human Health Drinking Water		**0.07**											**0.56**																		
NHMRC (2019) PFAS Recreational Water		2											10																		
NEMP (2020) Ecological Freshwater 99% Species Protection							*0.00023*						*19*																		

Location ID	Sample ID	Lab Report Number	Sample Date																													
MW101	0224_MW101_210521	EB2114447	21/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW103	0224_MW103_210519	EB2114447	19/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW104	0224_MW104_210519	EB2114447	19/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW105	0224_MW105_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW106	0224_MW106_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW107	0224_MW107_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW108	0224_MW108_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW109	0224_MW109_210519	EB2114447	19/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW110	0224_MW110_210519	EB2114447	19/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW111	0224_MW111_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW112	0224_MW112_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW113	0224_MW113_210521	EB2114447	21/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW114	0224_MW114_210521	EB2114447	21/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW115	0224_MW115_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW116	0224_MW116_210519	EB2114447	19/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW117	0224_MW117_210518	EB2114447	18/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW118	0224_MW118_210521	EB2114447	21/05/2021	0.03	<0.02	<0.02	0.02	<0.02	*0.01*	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	0.03
MW119	0224_MW119_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW120	0224_MW120_210521	EB2114447	21/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
MW121	0224_MW121_210521	EB2114447	21/05/2021	**0.09**	<0.02	<0.02	0.07	<0.02	*0.02*	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	0.09
MW122	0224_MW122_210521	EB2114447	21/05/2021	**0.2**	<0.02	<0.02	0.17	<0.02	*0.03*	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	0.2
POT001	0224_POT001_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01
POT005	0224_POT005_210520	EB2114447	20/05/2021	<0.01	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.01

LOR is limit of reporting
µg/L is micrograms per litre
-' denotes no analysis undertaken
<' denotes concentration is less than
NEMP is National Environmental Mangement Plan
NHMRC is National Health Medical Research Council
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values

Table T3 Surface Water Quality Parameter Field Measurement Results

Property ID	Location ID	Sample Date	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Odour	Sheen
0224	SW004	19/05/2021	7.01	155.5	5.35	201	406	17.9	Clear	No odour	No sheen
0224	SW005	19/05/2021	5.68	132.7	5.85	108.5	313.5	18.8	Clear	No odour	No sheen
0224	SW006	20/05/2021	3.07	86.7	5.89	140	345	17.1	Clear	No odour	No sheen
0224	SW007	20/05/2021	9.28	99.5	4.27	277	482	16.5	Clear	No odour	No sheen
0224	SW008	19/05/2021	5.61	2959	6.31	149.7	354.7	19.5	Clear	No odour	No sheen
0224	SW009	19/05/2021	4.11	232	6.93	166.7	371.7	17.5	Clear	No odour	No sheen
0224	SW012	19/05/2021	5.16	9667	6.91	122	327	19.3	Medium	No odour	No sheen
0224	SW013	19/05/2021	5.77	9461	6.17	130.8	335.8	21.1	Clear	No odour	No sheen
0224	SW014	19/05/2021	5.7	121.4	6.8	151.2	356.2	17.8	Clear	No odour	No sheen
0224	SW016	19/05/2021	8.1	87	5.16	240	445	17.3	Clear	No odour	No sheen
0224	SW017	21/05/2021	3.42	932	6.85	146	351	19.2	Clear	No odour	No sheen
0224	SW018	20/05/2021	6.34	434	6.9	149	354	22.0	Turbid	No odour	No sheen
0224	SW019	20/05/2021	9.56	189	6.09	139	344	20.0	Clear	No odour	No sheen
0224	SW020	21/05/2021	Not sampled- stakeholder could not be contacted to obtain access permission.								
0224	SW021	18/05/2021	0.96	115	5.9	16.9	221.9	16.9	Clear	Slight organic odour	No sheen
0224	SW022	18/05/2021	2.81	92	7.12	112	317	17.9	Turbid	No odour	No sheen
0224	SW023	18/05/2021	5.05	69	6.81	70	275	19.2	Turbid	No odour	No sheen
0224	SW024	19/05/2021	1.1	126	5.5	184	389	19.2	Clear	No odour	No sheen
0224	SW025	19/05/2021	1.74	118	5.62	195	400	17.9	Clear	Organic odour	No sheen
0224	SW027	18/05/2021	3.46	173	5.97	100	305	16.8	Turbid	No odour	No sheen

DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential

Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)
Temp is Temperature
µS/cm is microsiemens per centrimetre
ºC is degrees Celcius
mV is millivolts
` - No data

Table T4 Surface Water PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFDA	PFDoDA	PFNA	PFTeDA	PFTrDA	PFUnDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.0016	0.0005	0.0005	0.0005	0.0005	0.0003	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0016
NHMRC (2019) PFAS Recreational Water		2											10																		
NEMP (2020) Ecological Freshwater 99% Species Protection							**0.00023**						**19**																		
NEMP Ecological Freshwater 95% Species Protection (SW025 only)							*0.13*						*220*																		
Location ID	**Sample ID**	**Lab Report No.**	**Sample Date**																													
SW004	0224_SW004_210519	EB2114449	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0045	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.005	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW005	0224_SW005_210519	EB2114449	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.002	0.0051	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0051
SW006	0224_SW006_210520	EB2114449	20/05/2021	0.0016	<0.0016	<0.0016	0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0035	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0016
SW007	0224_SW007_210520	EB2114449	20/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW008	0224_SW008_210519	EB2114449	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.002	<0.003	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW009	0224_SW009_210519	EB2114449	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.006	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.108	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW012	0224_SW012_210519	EB2114449	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.01	<0.0035	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW013	0224_SW013_210519	EB2114449	19/05/2021	0.003	<0.0016	<0.0016	0.003	<0.0016	<0.0016	<0.0016	<0.002	0.0027	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0057
SW014	0224_SW014_210519	EB2114449	19/05/2021	0.0016	<0.0016	<0.0016	0.0016	<0.0016	<0.0016	<0.0016	<0.002	0.0068	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0055	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0084
SW016	0224_SW016_210519	EB2114449	19/05/2021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.002	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0705	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	<0.0016
SW017	0224_SW017_210521	EB2114449	21/05/2021	0.0151	0.0169	0.0022	0.0151	<0.0016	<0.003	<0.0016	<0.008	0.017	0.0059	<0.0016	0.0072	0.0029	<0.0016	<0.0016	<0.006	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0672
SW018	0224_SW018_210520	EB2114449	20/05/2021	0.0159	<0.0079	<0.0079	0.0159	<0.0079	<0.0079	<0.0079	<0.04	<0.0079	0.0143	<0.0079	<0.0079	<0.0079	<0.0079	<0.0079	<0.0198	<0.0079	<0.0079	<0.0079	<0.02	<0.02	<0.02	<0.02	<0.0079	<0.0079	<0.008	0.013	<0.008	<0.008	0.0432
SW019	0224_SW019_210520	EB2114449	20/05/2021	0.0063	<0.0016	<0.0016	0.0036	<0.0016	**0.0027**	<0.0016	<0.008	<0.0025	<0.002	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0063
SW021	0224_SW021_210518	EB2114077	18/05/2021	0.0056	<0.0016	<0.0016	0.0016	<0.0016	**0.004**	<0.0016	<0.008	<0.004	0.0021	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.112	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0077
SW022	0224_SW022_210518	EB2114445	18/05/2021	0.0076	<0.0016	<0.0016	0.003	<0.0016	**0.0046**	<0.0016	<0.016	0.0133	0.0024	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0085	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0233
SW023	0224_SW023_210518	EB2114445	18/05/2021	0.0057	<0.0016	<0.0016	0.0027	<0.0016	**0.003**	<0.0016	<0.012	0.0177	0.0032	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0266
SW024	0224_SW024_210519	EB2114446	19/05/2021	0.0025	<0.0016	<0.0016	<0.0016	<0.0016	**0.0025**	<0.0016	<0.012	<0.005	<0.003	<0.0016	0.0025	<0.0016	<0.0016	0.0016	<0.035	<0.0025	<0.0016	<0.0016	<0.004	<0.005	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0066
SW025	0224_SW025_210519	EB2114449	19/05/2021	0.0051	<0.0016	<0.0016	0.0017	<0.0016	0.0034	<0.0016	<0.008	<0.0045	0.0017	<0.0016	0.0016	<0.0016	<0.0016	<0.0016	<0.0039	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0084
SW027	0224_SW027_210518	EB2114449	18/05/2021	0.0202	0.0021	<0.0016	0.0125	<0.0016	**0.0077**	<0.0016	<0.02	0.0072	0.0066	<0.0016	0.0021	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.004	<0.004	<0.0016	<0.0016	<0.002	<0.002	<0.002	<0.002	0.0382

LOR is limit of reporting
µg/L is micrograms per litre
-' denotes no analysis undertaken
<' denotes concentration is less than
NEMP is National Environmental Mangement Plan
NHMRC is National Health Medical Research Council
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values
In accordance with the SAQP, SW025 has been assessed with NEMP (2020) ecological guideline for the protection of freshwater species at 95%.

Table T5 Sediment Sample Field Observations

Property ID	Location ID	Sample Date	Sample Description	Odour
0224	SD004	18/05/2021	SAND, pale brown.	No odour
0224	SD005	19/05/2021	SAND, pale brown.	No odour
0224	SD006	20/05/2021	SAND, pale brown.	No odour
0224	SD007	20/05/2021	SAND, pale brown, with organic matter.	No odour
0224	SD008	19/05/2021	sandy CLAY, brown.	No odour
0224	SD009	19/05/2021	clayey SAND, dark brown, with gravels.	No odour
0224	SD012	19/05/2021	silty SAND, yellow-brown, with gravels.	No odour
0224	SD013	19/05/2021	sandy CLAY, dark brown.	No odour
0224	SD014	19/05/2021	SAND, pale yellow.	No odour
0224	SD016	19/05/2021	silty CLAY, dark brown, with organic matter.	No odour
0224	SD017	20/05/2021	clayey SAND, brown, with organic matter.	No odour
0224	SD018	20/05/2021	sandy CLAY, dark brown, with organic matter.	No odour
0224	SD019	20/05/2021	sandy CLAY, dark brown, with organic matter.	No odour
0224	SD020	-	Not sampled - stakeholder could not be contacted to obtain access permission.	-
0224	SD021	18/05/2021	sandy CLAY, brown/black, with organic matter and gravels.	Organic odour
0224	SD022	18/05/2021	clayey SAND, dark brown, with gravels.	No odour
0224	SD023	18/05/2021	clayey SAND, dark brown, with gravels.	No odour
0224	SD024	19/05/2021	clayey SAND, dark brown, with organic matter and gravels.	No odour
0224	SD025	19/05/2021	clayey SAND, with organic matter.	Organic odour
0224	SD027	18/05/2021	silty SAND, dark brown, with gravels.	No odour

Table T6 Sediment PFAS Analytical Results

	PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFDoDA	PFTeDA	PFTrDA	PFUnDA	FOSA	EtFOSE	MeFOSE	EtFOSA	MeFOSA	EtFOSAA	MFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002

Location ID	Sample ID	Sample Date	Lab Report No.																												
SD004	0224_SD004_210519	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD005	0224_SD005_210519	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD006	0224_SD006_210520	18/05/2021	EB2114450	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.001	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0007
SD007	0224_SD007_210520	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD008	0224_SD008_210519	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD009	0224_SD009_210519	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.0005	<0.0004	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0012	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
SD012	0224_SD012_210519	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD013	0224_SD013_210519	18/05/2021	EB2114450	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0002
SD014	0224_SD014_210519	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD016	0224_SD016_210519	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD017	0224_SD017_210521	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0003
SD018	0224_SD018_210520	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0003
SD019	0224_SD019_210520	18/05/2021	EB2114450	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008
SD021	0224_SD021_210518	18/05/2021	EB2114077	0.0012	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0013	<0.0005	<0.0005	<0.0005	<0.0013	<0.0013	<0.0013	<0.0013	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012
SD022	0224_SD022_210518	18/05/2021	EB2114445	0.0009	<0.0002	<0.0002	<0.0002	<0.0002	0.0009	<0.0002	<0.001	<0.0002	0.0007	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0016
SD023	0224_SD023_210518	18/05/2021	EB2114445	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD024	0224_SD024_210519	19/05/2021	EB2114446	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0002
SD025	0224_SD025_210519	18/05/2021	EB2114450	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
SD027	0224_SD027_210518	18/05/2021	EB2114450	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005

LOR is limit of reporting
mg/kg is milligrams per kilogram
µg/kg is micrograms per kilogram
'-' denotes no analysis undertaken
'<' denotes concentration is less than
Denotes first time detection above LOR

Table T7 Wastewater Quality Parameter Field Measurement Results

Property ID	Well ID	Sample Date	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Water Colour	Odour	Sheen	Sample Method / Comments
0224	OTH001	20/05/2021	5.85	976	8.05	97.1	302.1	21.9	Clear	Clear	No odour	No sheen	Tap

DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential
Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)
Temp is Temperature
µS/cm is microsiemens per centrimetre
ºC is degrees Celcius
mV is millivolts

Table T8 Wastewater PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHpA	PFHxA	PFOA	PFNA	PFDA	PFTeDA	PFTrDA	PFUnDA	PFDoDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.05	0.02	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.05	0.01
PFAS NEMP Ecological Freshwater 99% Species Protection							*0.00023*						*19*																		
Location ID	**Sample ID**	**Lab Report Number**	**Sample Date**																												
OTH001	0224_OTH001_210520	EB2114447	20/05/2021	<0.01	<0.04	<0.02	<0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.03	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01

LOR is limit of reporting
µg/L is micrograms per litre
-' denotes no analysis undertaken
<' denotes concentration is less than
NEMP is National Environmental Mangement Plan
NHMRC is National Health Medical Research Council
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values

DRAFT

Appendix C

Analytical Data Validation

D R A F T

Appendix C Analytical Data Validation

DATA VALIDATION REPORT

Project No.:	60612563	**Validation by:** CM		**Date:**	23/06/2021
Client:	Department of Defence				
Site:	Wide Bay Training Area				
Matrix type:	Groundwater, surface water, waste water	**Data verified by:** JP		**Date:**	24/06/2021
No. of primary samples:	43 water, 19 sediment				
Laboratory:	ALS (Brisbane), NMI (Sydney)	**Project Manager:** JP			
Lab reference:	EB2114447; EB2114449; EB2114450; EB2114077; EB2114445; EB2114446; AECO06_210527				

Key Issues:	Analytical results for two of the four rinsate samples reported some compounds at detectable concentrations. The rinsate samples were analysed for a trace level analytical suite and all concentrations were within an order of magnitude of the LOR. However, the detection of residual PFAS on the equipment is not considered to impact data quality. With the minor exception of some matrix spike and frequency of laboratory QC samples non-conformities, no other QA/QC issues were identified in the field or laboratory datasets that could have a material implication on data interpretation and therefore decision-making on the project. The data are therefore considered appropriate for use to meet the project objectives.

Field QA/QC

Sampling personnel	Sampling was conducted by Navjot Kaur between 18 – 21 May 2021.
Sampling Methodology	Samples were collected using appropriate methods as identified within the main body of the report.
Hydrasleeve sampling	All Hydrasleeves were left in the monitoring wells for a minimum of 24 hours prior to being sampled. Installation and retrieval times and dates are shown in **Table T1** in **Appendix B**.
Daily Equipment Calibration	Daily equipment calibration was completed during the sampling event and are attached within **Appendix F**.
Chain of Custody (COC)	COC documents were completed as per AECOM procedures and are attached within **Appendix D**.
Rinsate Blank (refer to **Table C4**)	Rinsate blank samples were collected at a frequency of approximately one per day of sampling (four in total). All rinsates were collected from the decontaminated interface probe. Concentrations reported below the LOR for all analytes tested with the exception of: • 0224_QC307_210519 for PFOS (0.0004 µg/L) and PFHxS (0.0017 µg/L). • 0227_QC309_210521 for PFBS (0.0005 µg/L), PFHxA (0.0013 µg/L), PFPeS (0.0006 µg/L), PFOS (0.0015 µg/L) and PFHxS (0.0046 µg/L). The rinsate samples were inadvertently analysed for a trace level analytical suite rather than the standard suite. The trace concentrations detected are noted to be within an order of magnitude of the LOR. This indicates the potential for residual PFAS (at very low concentrations) to be present following decontamination. As the majority of rinsate sample data was reported below LOR and no groundwater field duplicate or triplicate samples reported RPDs above the acceptable limits the identified detections of PFAS in the two rinsate samples at trace concentrations is not expected to impact data quality.

Frequency of field QC	Field duplicate (inter-laboratory duplicates) and triplicates (inter-laboratory duplicates) were collected for samples analysed for PFAS in at a frequency of one in ten primary samples (three pairs each for groundwater, surface water and sediment). The frequency of field QC achieves the expected frequency for each media type. The target frequency of one in ten primary samples was achieved for all matrices.
Handling and preservation	Primary, duplicate and triplicate samples were received preserved and chilled at the laboratory. All samples were received at the laboratory in appropriate sample containers with no sample container / preservation non-compliances noted.
Laboratory QA/QC	
Tests requested/reported	Samples were analysed and reported as requested on the COC.
Holding time compliance	Samples were extracted and analysed within recommended holding times.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Brisbane) a National Association of Testing Authorities (NATA) accredited laboratory. The triplicate samples were analysed at the National Measurement Institute (Sydney), also a NATA accredited laboratory.
Frequency of laboratory QC	The laboratory reported a sufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision, except: • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in EB2114449 (26 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in EB2114449 (26 samples in batch) • Laboratory duplicates for PFAS (6.25%) below the expected rate of 10.00% in EB2114447 (32 samples in batch) • Matrix spikes for PFAS (3.13%) below the expected rate of 5.00% in EB2114447 (32 samples in batch) • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in EB2114077 (13 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in EB2114077 (13 samples in batch) • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in EB2114445 (13 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in EB2114445 (13 samples in batch) • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in EB2114446 (13 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in EB2114446 (13 samples in batch) The reason for insufficient matrix spikes and laboratory duplicates for these batches is unknown however as all other QC results including primary and duplicate field QC samples met control limits this is not expected to impact data quality.
Method Blank	No method blank non-conformances were reported in the batches.
Laboratory duplicate RPDs	Laboratory duplicate relative percentage differences (RPD) were within control limits for all samples.
Laboratory control spike recovery	No non-compliances were reported for Laboratory Control Spikes (LCS).
Matrix spike recovery	All matrix spike recoveries were within control limits, except: • EB2114450: PFTrDA in an anonymous sample where MS recovery (160%) was greater than the upper data quality objective (139%).

	• EB2114445: PFTrDA in 0224_SD023_210518 where MS recovery (160%) was greater than the upper data quality objective (139%). These non-conformances are not expected to impact data quality.
Surrogate spike recovery	Surrogate spike recoveries were within control limits.
QA/QC Data Evaluation	
Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Data transcription	A random 10% check of the laboratory results identified no anomalies within the electronic data, the laboratory reports, and tables generated by AECOM.
Limits of reporting	LORs were sufficiently low to enable assessment against adopted screening levels except for PFOS for NEMP (HEPA, 2020) ecological guideline values for the 99% protection of freshwater species. The potential exists for concentrations of PFOS to be above the adopted guideline, but below the laboratory LOR. This should be taken into consideration when interpreting and using this data quantitatively where results are reported below LOR.
Field duplicate RPDs (refer to **Tables C1 C2**, and **C3**)	Field duplicate RPDs were reported within control limits for all primary and duplicate samples.
Field triplicate RPDs (refer to **Tables C1 C2**, and **C3**)	Field triplicate RPDs were reported within control limits for all primary and triplicate samples.
Other	
Other observations	Due to access constraints, the groundwater gauging event was undertaken over four days (18 to 21 May 2021). During this period several rainfall events occurred with a total of approximately 20 mm rainfall recorded at the nearest Bureau of Metrology (BoM) station (040856 Rainbow Beach) between 19 to 21 May 2021. Due to the depth to groundwater across the majority of the Base, it not considered likely that groundwater elevations would respond to short-term events as infiltrating groundwater would not reach the groundwater table in such a short period. This is supported by the consistency of the groundwater contour maps for May 2021 with previous results.

Table C1 Groundwater Duplicate and Triplicate Analytical Results

AECOM Imagine it Delivered

Lab Report No.			EB2114447	EB2114447		RN1316916		EB2114447	EB2114447		RN1316916		EB2114447	EB2114447		RN1316916	
Sample ID			MW121	QC112	**RPD**	QC212	**RPD**	MW122	QC113	**RPD**	QC213	**RPD**	MW101	QC114	**RPD**	QC214	**RPD**
Sample Date			21/05/2021	21/05/2021		21/05/2021		21/05/2021	21/05/2021		21/05/2021		21/05/2021	21/05/2021		21/05/2021	
Sample Type			Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate	
Chemical	**Units**	**LOR**															
10:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC
4:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC
6:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC
8:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC
EtFOSA	µg/L	0.05 : 0.02 (Interlab)	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC
EtFOSAA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
EtFOSE	µg/L	0.05 : 0.005 (Interlab)	<0.05	<0.05	NC	<0.05	NC	<0.05	<0.05	NC	<0.05	NC	<0.05	<0.05	NC	<0.05	NC
MeFOSA	µg/L	0.05 : 0.02 (Interlab)	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC
MFOSAA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
MeFOSE	µg/L	0.05 : 0.005 (Interlab)	<0.05	<0.05	NC	<0.05	NC	<0.05	<0.05	NC	<0.05	NC	<0.05	<0.05	NC	<0.05	NC
PFBS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	0.018	NC	<0.02	<0.02	NC	<0.01	NC
PFBA	µg/L	0.1 : 0.05 (Interlab)	<0.1	<0.1	NC	<0.05	NC	<0.1	<0.1	NC	<0.05	NC	<0.1	<0.1	NC	<0.05	NC
PFDS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFDoDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFHpS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFHpA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFHxA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFNA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
FOSA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFPeS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	0.02	NC	<0.02	<0.02	NC	<0.01	NC
PFPeA	µg/L	0.02 : 0.002 (Interlab)	<0.02	<0.02	NC	<0.02	NC	<0.02	<0.02	NC	<0.02	NC	<0.02	<0.02	NC	<0.02	NC
PFTeDA	µg/L	0.05 : 0.02 (Interlab)	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC
PFTrDA	µg/L	0.02 : 0.002 (Interlab)	<0.02	<0.02	NC	<0.02	NC	<0.02	<0.02	NC	<0.02	NC	<0.02	<0.02	NC	<0.02	NC
PFUnDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFOS	µg/L	0.01 : 0.02 (Interlab)	0.02	0.02	0	0.028	33	0.03	0.03	0	0.025	18	<0.01	<0.01	NC	<0.02	NC
PFOA	µg/L	0.01 : 0.001 (Interlab)	<0.01	<0.01	NC	<0.01	NC	<0.01	<0.01	NC	<0.01	NC	<0.01	<0.01	NC	<0.01	NC
PFHxS	µg/L	0.02 : 0.01 (Interlab)	0.07	0.07	0	0.064	9	0.17	0.16	6	0.17	0	<0.02	<0.02	NC	<0.01	NC

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

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: no limit (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 C2 Surface Water Duplicate and Triplicate Analytical Results

AECOM Imagine it. Delivered.

Lab Report Number	EB2114449	EB2114449	RPD	RN1316916	RPD	EB2114449	EB2114449	RPD	RN1316916	RPD	EB2114449	EB2114449	RPD	RN1316916	RPD
Sample ID	0224_SW027_210518	0224_QC106_210518		0224_QC206_210518		0224_SW014_210519	0224_QC109_210519		0224_QC209_210519		0224_SW006_210520	0224_QC110_210520		0224_QC210_210520	
Sample Date	18/05/2021	18/05/2021		18/05/2021		19/05/2021	19/05/2021		19/05/2021		20/05/2021	20/05/2021		20/05/2021	
Sample Type	Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate	
Chemical	**Units**	**LOR**													
10:2 FTS	µg/L	0.001	<0.002	<0.002	NC	<0.001	NC	<0.002	<0.001	NC	<0.001	NC	<0.002	<0.002	NC	<0.001	NC
4:2 FTS	µg/L	0.001	<0.002	<0.002	NC	<0.001	NC	<0.002	<0.001	NC	<0.001	NC	<0.002	<0.002	NC	<0.001	NC
6:2 FTS	µg/L	0.001	<0.002	<0.002	NC	<0.001	NC	<0.002	<0.001	NC	<0.001	NC	<0.002	<0.002	NC	<0.001	NC
8:2 FTS	µg/L	0.001	<0.002	<0.002	NC	<0.001	NC	<0.002	<0.001	NC	<0.001	NC	<0.002	<0.002	NC	<0.001	NC
EtFOSA	µg/L	0.001 : 0.002 (Interlab)	<0.004	<0.004	NC	<0.002	NC	<0.004	<0.002	NC	<0.002	NC	<0.004	<0.004	NC	<0.002	NC
EtFOSAA	µg/L	0.0005 : 0.002 (Interlab)	<0.0016	<0.0016	NC	<0.002	NC	<0.0016	<0.0008	NC	<0.002	NC	<0.0016	<0.0016	NC	<0.002	NC
EtFOSE	µg/L	0.001 : 0.005 (Interlab)	<0.004	<0.004	NC	<0.005	NC	<0.004	<0.002	NC	<0.005	NC	<0.004	<0.004	NC	<0.005	NC
MeFOSA	µg/L	0.001 : 0.002 (Interlab)	<0.004	<0.004	NC	<0.002	NC	<0.004	<0.002	NC	<0.002	NC	<0.004	<0.004	NC	<0.002	NC
MFOSAA	µg/L	0.0005 : 0.002 (Interlab)	<0.0016	<0.0016	NC	<0.002	NC	<0.0016	<0.0008	NC	<0.002	NC	<0.0016	<0.0016	NC	<0.002	NC
MeFOSE	µg/L	0.001 : 0.005 (Interlab)	<0.004	<0.004	NC	<0.005	NC	<0.004	<0.002	NC	<0.005	NC	<0.004	<0.004	NC	<0.005	NC
PFBS	µg/L	0.0005 : 0.001 (Interlab)	0.0021	0.0019	10	0.0016	27	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFBA	µg/L	0.002 : 0.005 (Interlab)	<0.02	0.01	67	0.011	58	<0.002	<0.004	NC	<0.005	NC	<0.008	<0.008	NC	<0.005	NC
PFDS	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFDA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFDoDA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFHpS	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFHpA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	0.0025	44	0.0022	32	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFHxA	µg/L	0.0005 : 0.001 (Interlab)	0.0066	0.0066	0	0.0051	26	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFNA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
FOSA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFPeS	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	0.0016	NC	0.0015	0	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFPeA	µg/L	0.0005 : 0.002 (Interlab)	0.0072	0.0098	31	0.0073	1	0.0068	0.0028	83	<0.002	109	<0.0035	0.0033	6	<0.002	NC
PFTeDA	µg/L	0.0005 : 0.002 (Interlab)	<0.004	<0.0039	NC	<0.002	NC	<0.0055	<0.002	NC	<0.002	NC	<0.004	<0.0051	NC	<0.002	NC
PFTrDA	µg/L	0.0005 : 0.002 (Interlab)	<0.0016	<0.0016	NC	<0.002	NC	<0.0016	<0.0008	NC	<0.002	NC	<0.0016	<0.0016	NC	<0.002	NC
PFUnDA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFOS	µg/L	0.0003 : 0.002 (Interlab)	0.0077	0.0104	30	0.0078	1	<0.0016	0.001	0	0.0023	36	<0.0016	<0.0016	NC	<0.002	NC
PFOA	µg/L	0.0005 : 0.001 (Interlab)	0.0021	0.0022	5	0.0016	27	<0.0016	<0.0008	NC	<0.001	NC	<0.0016	<0.0016	NC	<0.001	NC
PFHxS	µg/L	0.0005 : 0.001 (Interlab)	0.0125	0.0147	16	0.011	13	0.0016	0.0032	67	0.0015	6	0.0016	<0.0016	NC	<0.001	NC

is not calculable

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

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: no limit (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 C3 Sediment Duplicate and Triplicate Analytical Results

AECOM Imagine it. Delivered.

Lab Report Number		EB2114450	EB2114450		RN1316916		EB2114450	EB2114450		RN1316916		EB2114450	EB2114450		RN1316916		
Sample ID		0224_SD027_210518	0224_QC107_210518	**RPD**	0224_QC207_210518	**RPD**	0224_SD014_210519	0224_QC108_210519	**RPD**	0224_QC208_210519	**RPD**	0224_SD006_210520	0224_QC111_210520	**RPD**	0224_QC211_210520	**RPD**
Sample Date		18/05/2021	18/05/2021		18/05/2021		18/05/2021	18/05/2021		18/05/2021		18/05/2021	18/05/2021		18/05/2021	
Sample Type		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate	
Chemical	**Units**	**LOR**														
10:2 FTS	µg/L	0.0005 : 0.002 (Interlab)	<0.0005	<0.0005	NC	<0.002	NC	<0.0005	<0.0005	NC	<0.002	NC	<0.0005	<0.0005	NC	<0.002	NC
4:2 FTS	µg/L	0.0005 : 0.001 (Interlab)	<0.0005	<0.0005	NC	<0.001	NC	<0.0005	<0.0005	NC	<0.001	NC	<0.0005	<0.0005	NC	<0.001	NC
6:2 FTS	µg/L	0.0005 : 0.001 (Interlab)	<0.0005	<0.0005	NC	<0.001	NC	<0.0005	<0.0005	NC	<0.001	NC	<0.0005	<0.0005	NC	<0.001	NC
8:2 FTS	µg/L	0.0005 : 0.001 (Interlab)	<0.0005	<0.0005	NC	<0.001	NC	<0.0005	<0.0005	NC	<0.001	NC	<0.0005	<0.0005	NC	<0.001	NC
EtFOSA	µg/L	0.0005 : 0.002 (Interlab)	<0.0005	<0.0005	NC	<0.002	NC	<0.0005	<0.0005	NC	<0.002	NC	<0.0005	<0.0005	NC	<0.002	NC
EtFOSAA	µg/L	0.0002 : 0.002 (Interlab)	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC
EtFOSE	µg/L	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	NC	<0.005	NC	<0.0005	<0.0005	NC	<0.005	NC	<0.0005	<0.0005	NC	<0.005	NC
MeFOSA	µg/L	0.0005 : 0.002 (Interlab)	<0.0005	<0.0005	NC	<0.002	NC	<0.0005	<0.0005	NC	<0.002	NC	<0.0005	<0.0005	NC	<0.002	NC
MFOSAA	µg/L	0.0002 : 0.002 (Interlab)	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC
MeFOSE	µg/L	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	NC	<0.005	NC	<0.0005	<0.0005	NC	<0.005	NC	<0.0005	<0.0005	NC	<0.005	NC
PFBS	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
PFBA	µg/L	0.001	<0.001	<0.001	NC	<0.002	NC	<0.001	<0.001	NC	<0.002	NC	<0.001	<0.001	NC	<0.002	NC
PFDS	µg/L	0.0002	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
PFDA	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
PFDoDA	µg/L	0.0002 : 0.002 (Interlab)	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC
PFHpS	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
PFHpA	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
PFHxA	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	0.0004	<0.0002	NC	<0.001	NC
PFNA	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
FOSA	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
PFPeS	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
PFPeA	µg/L	0.0002 : 0.002 (Interlab)	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC
PFTeDA	µg/L	0.0005 : 0.002 (Interlab)	<0.0005	<0.0005	NC	<0.002	NC	<0.0005	<0.0005	NC	<0.002	NC	<0.0005	<0.0005	NC	<0.002	NC
PFTrDA	µg/L	0.0002 : 0.002 (Interlab)	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC
PFUnDA	µg/L	0.0002 : 0.002 (Interlab)	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC
PFOS	µg/L	0.0002 : 0.002 (Interlab)	0.0005	0.0005	0	<0.002	NC	<0.0002	<0.0002	NC	<0.002	NC	0.0003	<0.0002	NC	<0.002	NC
PFOA	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC
PFHxS	µg/L	0.0002 : 0.001 (Interlab)	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC	<0.0002	<0.0002	NC	<0.001	NC

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

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: no limit (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 C4
Rinsate Analytical Results

Lab Report Number		EB2114449	EB2114449	EB2114449	EB2114449
Sample ID		0224_QC306_210518	0224_QC307_210519	0224_QC308_210520	0224_QC309_210521
Sample Date		18/05/2021	19/05/2021	20/05/2021	21/05/2021
Sample Type		Rinsate	Rinsate	Rinsate	Rinsate
Analyte	**Units**	**LOR**				
10:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001
8:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001
EtFOSA	µg/L	0.001	<0.001	<0.001	<0.001	<0.001
EtFOSAA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EtFOSE	µg/L	0.001	<0.001	<0.001	<0.001	<0.001
MeFOSA	µg/L	0.001	<0.001	<0.001	<0.001	<0.001
MFOSAA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MeFOSE	µg/L	0.001	<0.001	<0.001	<0.001	<0.001
PFBS	µg/L	0.0005	<0.0005	<0.0005	<0.0005	**0.0005**
PFBA	µg/L	0.002	<0.002	<0.002	<0.002	<0.002
PFDS	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFDA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFDoDA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFHpS	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFHpA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFHxA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	**0.0013**
PFNA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
FOSA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFPeS	µg/L	0.0005	<0.0005	<0.0005	<0.0005	**0.0006**
PFPeA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFTeDA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFTrDA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFUnDA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFOS	µg/L	0.0003	<0.0003	**0.0004**	<0.0003	**0.0015**
PFOA	µg/L	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFHxS	µg/L	0.0005	<0.0005	**0.0017**	<0.0005	**0.0046**

Appendix D

Chain of Custody Forms

Appendix D Chain of Custody Forms

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name: ALS
Lab. Address: Brisbane
Contact Name: [redacted]
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted] **Project Name:** QLD_0224_PFASOMP **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Mobile Number: [redacted]

Specificatic Please report in ESdat format	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: .....)	
6. Report Format: ESdat	7. Project Manager: [redacted]

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filtered	acid	ice	other	Container (No. & type)	Analysis Request - Waters: EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	HOLD	Notes
1	0224_MW117_210518	18/05/2021		x				x		2 x 20 ml PFAS	x			
2	0224_MW109_210519	19/05/2021		x				x		2 x 20 ml PFAS	x			
3	0224_MW110_210519	19/05/2021		x				x		2 x 20 ml PFAS	x			
4	0224_MW103_210519	19/05/2021		x				x		2 x 20 ml PFAS	x			
5	0224_MW104_210519	19/05/2021		x				x		2 x 20 ml PFAS	x			
6	0224_MW116_210519	19/05/2021		x				x		2 x 20 ml PFAS	x			
7	0224_MW111_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
8	0224_MW108_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
9	0224_MW107_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
10	0224_MW119_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
11	0224_MW115_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
12	0224_MW106_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
13	0224_MW105_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
14	0224_MW112_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
15	0224_OTH001_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
16	0224_POT001_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
17	0224_POT005_210520	20/05/2021		x				x		2 x 20 ml PFAS	x			
18	0224_MW121_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
19	0224_MW122_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
20	0224_MW120_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
21	0224_MW113_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
22	0224_MW114_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
23	0224_MW118_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
24	0224_MW101_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
25	0224_QC112_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
26	0224_QC113_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			
27	0224_QC114_210521	21/05/2021		x				x		2 x 20 ml PFAS	x			

Comments: Please send ESdat files to [redacted] and ensure that the files are the PROJECT NAME

Temp. received: °C

Report & Invoice: [redacted]

Lab Report Y Esky-ID

Relinquished by: [redacted]	Signed: [redacted]	Date: 21/5/21	Relinquished by:	Signed:	Date:		
Received by:	Signed:	Date:	Received by:	Signed:	Date:		

Environmental Division
Brisbane
Work Order Reference
EB2114447

Telephone : [redacted]

1/6

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street .
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name: ALS
Lab. Address: Brisbane
Contact Name: [redacted]
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted]
Mobile Number: [redacted]
Project Name: QLD_0224_PFASOMP
AECOM Project #: 60612563 4.1
Purchase Order No: 60612563 4.1

Specificati Please report in ESdat format	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat
7. Project Manager: [redacted]

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: sed	Preservation: filtered	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Analysis Request - Waters: EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	HOLD	Notes
1	0224_SW027_210518	18/05/2021		x				x		2 x 125 ml PFAS		x		
2	0224_SW012_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
3	0224_SW009_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
4	0224_SW008_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
5	0224_SW014_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
6	0224_SW013_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
7	0224_SW005_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
8	0224_SW004_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
9	0224_SW016_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
10	0224_SW025_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
11	0224_SW006_210520	20/05/2021		x				x		2 x 125 ml PFAS		x		
12	0224_SW018_210520	20/05/2021		x				x		2 x 125 ml PFAS		x		
13	0224_SW019_210520	20/05/2021		x				x		2 x 125 ml PFAS		x		
14	0224_SW007_210520	20/05/2021		x				x		2 x 125 ml PFAS		x		
15	0224_SW017_210521	21/05/2021		x				x		2 x 125 ml PFAS		x		
16	0224_QC106_210518	18/05/2021		x				x		2 x 125 ml PFAS		x		
17	0224_QC109_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
18	0224_QC110_210520	20/05/2021		x				x		2 x 125 ml PFAS		x		
19	0224_QC306_210518	18/05/2021		x				x		2 x 125 ml PFAS		x		
20	0224_QC307_210519	19/05/2021		x				x		2 x 125 ml PFAS		x		
21	0224_QC308_210520	20/05/2021		x				x		2 x 125 ml PFAS		x		
22	0224_QC309_210521	21/05/2021		x				x		2 x 125 ml PFAS		x		

Comments: Please send ESdat files to [redacted] and ensure that the files use the PROJECT NAME

Temp. received: °C

Report & Invoice: [redacted]

Lab Report # | Entry ID

Relinquished by: [redacted] Signed: [redacted] Date: 21/5/21
Received by: Signed: [redacted] Date:

Relinquished by: Signed: Date:
Received by: Signed: Date:

Environmental Division
Brisbane
Work Order Reference
EB2114449

Telephone [redacted]

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name: ALS
Lab. Address: Brisbane
Contact Name: [redacted]
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted]
Mobile Number: [redacted]

Project Name: QLD_0224_PFASOMP
AECOM Project #: 60612563 4.1
Purchase Order No: 60612563 4.1

Specifications: Please report in ESdat format

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details:)	
6. Report Format: ESdat	7. Project Manager: [redacted]

Analysis Request - SEDIMENTS

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: sed	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	EP231X (PFAS Std 28)	#	#	#	#	#	#	#	HOLD	Notes
1	0224_SD027_210518	18/05/2021			x			x		1x250 plastic PFAS	x									
2	0224_SD012_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
3	0224_SD009_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
4	0224_SD008_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
5	0224_SD014_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
6	0224_SD013_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
7	0224_SD005_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
8	0224_SD004_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
9	0224_SD016_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
10	0224_SD025_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
11	0224_SD006_210520	20/05/2021			x			x		1x250 plastic PFAS	x									
12	0224_SD018_210520	20/05/2021			x			x		1x250 plastic PFAS	x									
13	0224_SD019_210520	20/05/2021			x			x		1x250 plastic PFAS	x									
14	0224_SD007_210520	20/05/2021			x			x		1x250 plastic PFAS	x									
15	0224_SD017_210521	21/05/2021			x			x		1x250 plastic PFAS	x									
16	0224_QC107_210518	18/05/2021			x			x		1x250 plastic PFAS	x									
17	0224_QC108_210519	19/05/2021			x			x		1x250 plastic PFAS	x									
18	0224_QC111_210520	20/05/2021			x			x		1x250 plastic PFAS	x									

Comments: Please send ESdat files to [redacted] and ensure that the files use the PROJECT NAME

Temp. received:

Report & Invoice: [redacted]

Lab Report No. / Entry ID

Relinquished by: [redacted]	Signed: [redacted]	Date: 21/5/21	Relinquished by:	Signed:	Date:
Received by:	Signed:	Date:	Received by:	Signed:	Date:

Environmental Division
Brisbane
Work Order Reference
EB2114450

Telephone: [redacted]

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name: ALS
Lab. Address: Brisbane
Contact Name: [redacted]
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted]
Mobile Number: [redacted]
Project Name: QLD_0224_PFASOMP
AECOM Project #: 60612563 4.1
Purchase Order No: 60612563 4.1

Specifications: Please report in ESdat format

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat
7. Project Manager: [redacted]

Analysis Request - SEDIMENTS

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: sed	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	EP231X (PFAS Std 26)	HOLD	Notes
1	0224_SW021_210518	18/05/2021		x				x		2x 125ml	x		
2	0224_SD021_210518	18/05/2021			x			x		1x 250 ml	x		
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												

Comments: Please send ESdat files to [redacted] and ensure that the files use the PROJECT NAME

Temp. received: °C

Report & invoice: [redacted]

Lab Report No / Eskey ID

Relinquished by: [redacted] Signed: [redacted] Date: 21/5/21
Received by: Signed: Date:

Relinquished by: Signed: Date:
Received by: Signed: Date:

Environmental Division
Brisbane
Work Order Reference
EB2114077

Telephone: [redacted]

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name: ALS
Lab. Address: Brisbane
Contact Name: [redacted]
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted]
Mobile Number: [redacted]

Project Name: QLD_0224_PFASOMP
AECOM Project #: 60612563 4.1
Purchase Order No: 60612563 4.1

Specifications: Please report in ESdat format

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat
7. Project Manager: [redacted]

Environmental Division
Brisbane
Work Order Reference
EB2114445

Telephone: [redacted]

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: sed	Preservation: filtered	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	Analysis Request - SEDIMENTS: EP231X (PFAS Std 26)	Analysis Request - SEDIMENTS: HOLD
1	0224_SW022_210518	18/05/2021		x				x		2x 125ml	x	
2	0224_SD022_210518	18/05/2021			x			x		1x 250 ml	x	
3	0224_SW023_210518	18/05/2021		x				x		2x 125ml	x	
4	0224_SD023_210518	18/05/2021			x			x		1x 250 ml	x	
	0224_											
	0224_											
	0224_											
	0224_											
	0224_											
	0224_											
	0224_											
	0224_											
	0224_											

Comments: **Please send ESdat files to** [redacted] **and ensure that the files use the PROJECT NAME**

Temp. received: °C

Report & Invoice: [redacted]

Lab Report No: Esky ID:

Relinquished by: [redacted]	Signed: [redacted]	Date: 18/5/21	Relinquished by:	Signed:	Date:
Received by:	Signed:	Date:	Received by:	Signed:	Date:

AECOM

Chain of Custody

COC Page 1 of 1

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street
Fortitude Valley, QLD, 4006
PO Box 1307 Fortitude Valley QLD 4006

Email reports to: [redacted]

Laboratory Details
Lab. Name: ALS
Lab. Address: Brisbane
Contact Name: [redacted]
Lab. Ref:

Tel:
Fax:
Preliminary Report by:
Final Report by:
Lab Quote No: SY/139/19

Sampled By: [redacted]
Mobile Number: [redacted]

Project Name: QLD_0224_PFASOMP
AECOM Project #: 60612563 4.1
Purchase Order No: 60612563 4.1

Specifications: Please report in ESdat format

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat
7. Project Manager: [redacted]

Analysis Request - SEDIMENTS

Lab. ID	Sample ID	Sampling Date	Matrix: soil	Matrix: water	Matrix: sed	Preservation: filt'ed	Preservation: acid	Preservation: ice	Preservation: other	Container (No. & type)	EP231X (PFAS Std 28)	HOLD	Notes
1	0224_SW024_210519	19/05/2021		x				x		2x 125ml	x		
2	0224_SD024_210519	19/05/2021			x			x		1x 250 ml	x		
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												
	0224_												

Environmental Division
Brisbane
Work Order Reference
EB2114446

Telephone [redacted]

Comments: Please send ESdat files to [redacted] and ensure that the files use the PROJECT NAME

Temp. received: °C

Report & Invoice: [redacted]

Lab Report No. | Esky ID

Relinquished by: [redacted] Signed: [redacted] Date: 21/5/21
Received by: Signed: Date:

Relinquished by: Signed: Date:
Received by: Signed: Date:

AECOM

Chain of Custody

AECOD6 / 210527 Am

Due 07/06/21

COC Page 1 of 1

AECOM Australia Pty Ltd Level 8, 540 Wickham Street Fortitude Valley, QLD, 4006 PO Box 1307 Fortitude Valley QLD 4006	**Email reports to:** [redacted]
Laboratory Details Lab. Name: National Institute of Measurement (NMI) Lab. Address: Sydney Contact Name: Lab. Ref:	Tel: Fax: Preliminary Report by: Final Report by: Lab Quote No: SY/139/19

Sampled By: [redacted] **Project Name:** QLD_0224_PFASOMP **AECOM Project #:** 60612563 4.1 **Purchase Order No:** 60612563 4.1

Mobile Number: [redacted]

Specificati Please report in ESdat format

	Yes (tick)
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)	
2. Fast TAT Guarantee Required?	
3. Is any sediment layer present in waters to be excluded from extractions?	
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?	
5. Special storage requirements? (details: _____)	

6. Report Format: ESdat 7. Project Manager [redacted]

Analysis Request - Waters

Lab. ID	Sample ID	Sampling Date	Matrix: soil	water	sed	Preservation: filtered	acid	ice	other	Container (No. & type)	EP231X (PFAS Std 28)	EP231X-ST (PFAS 28 - Super Trace)	HOLD	Notes
Water	QC206_210518 N21/013597	18/05/2021		x	x			x		1x 250 ml		x		on sample 18/05/21
Water	QC209_210519 N21/013598	19/05/2021		x	x			x		1x 250 ml		x		19/05/21
Water	QC210_210520 N21/013599	20/05/2021		x	x			x		1x 250 ml		x		20/05/21
Soil	QC207_210518 N21/013600	18/05/2021		x	x			x		2 x 120 ml	x			
Soil	QC208_210519 N21/013601	19/05/2021		x	x			x		2 x 120 ml	x			
Soil	QC211_210520 N21/013602	20/05/2021		x	x			x		2 x 120 ml	x			
Water	QC212_210521 N21/013603	21/05/2021		x				x		2x20 ml	x			
Water	QC213_210521 N21/013604	21/05/2021		x				x		2x20 ml	x			
Water	QC214_210521 N21/013605	21/05/2021		x				x		2x20 ml	x			

RECEIVED 27 MAY 2021 BY: 11:55

Comments: Please send ESdat files to [redacted] and ensure that the files use the PROJECT NAME

Temp. received: °C

Report & invoice: [redacted]

Lab Report No: Esdy ID:

Relinquished by: [redacted]	Signed: [redacted]	Date: 21/5/21	Relinquished by:	Signed:	Date:
Received by:	Signed:	Date:	Received by:	Signed:	Date:

[redacted]

From: ALSEnviro Brisbane
Sent: Tuesday, 25 May 2021 11:49 AM
To: Samples Brisbane
Subject: COC - Client: AECOMAU - Project Ref: 60612563, sample dropped on Friday 210521
Attachments: Field COCs.pdf; 0224_WBTA_COC_Waters.xlsx; 0224_WBTA_COC_Sediment.xlsx

Hi Team,

FYI Below and attached:

I dropped 3 eskies full of water and sediment samples for project 60612563. Please find attached the COCs (seven separate COCs) for these samples (soft and hard copy). Also, please forward the following samples to NMI, (I've attached a separate COC for these samples):

Sample ID		Sampling Date	
QC206_210518	N21/013597	18/05/2021	Water
QC209_210519	N21/013598	19/05/2021	
QC210_210520	N21/013599	20/05/2021	
QC207_210518	N21/013600	18/05/2021	Soil
QC208_210519	N21/013601	19/05/2021	
QC211_210520	N21/013602	20/05/2021	
QC212_210521	N21/013603	21/05/2021	Water
QC213_210521	N21/013604	21/05/2021	
QC214_210521	N21/013605	21/05/2021	

RECEIVED
27 MAY 2021
BY: Rv 11:55

Regards,

[redacted]

From: [redacted]
Sent: Thursday, 27 May 2021 4:18 PM
To: [redacted]
Cc: NMI - ASB - Lab Services - North Ryde
Subject: RE: Matrix clarification [SEC=OFFICIAL]

Hi [redacted]

Thanks for sending thee through to confirm. Please note that accidently the sample matrix were ticked wrong. Please see below for the correct version.
Also, can you add the prefix 0224 in front of all the samples as shown below:

Specificati	Please report in ESdat format								Yes (tick)		
1. Urgent TAT required? (please circle: 24hr 48hr 5 days)											
2. Fast TAT Guarantee Required?											
3. Is any sediment layer present in waters to be excluded from extractions?											
4. % extraneous material removed from samples to be reported as per NEPM 5.1.1?											
5. Special storage requirements? (details: _____)											
6. Report Format: ESdat				7. Project Manager: [redacted]							

Lab ID	Sample ID	Sampling Date	Matrix				Preservation		Container		
			soil	water	sed	sludge	acid	ice	other	(No. & type)	
	0224_QC206_210518	18/05/2021		x				x		250 ml	x
	0224_QC209_210519	19/05/2021		x				x		1x 250 ml	x
	0224_QC210_210520	20/05/2021		x				x		1x 250 ml	x
	0224_QC207_210518	18/05/2021			x			x		2 x 120 ml	x
	0224_QC208_210519	19/05/2021			x			x		2 x 120 ml	x
	0224_QC211_210520	20/05/2021			x			x		2 x 120 ml	x
	0224_QC212_210521	21/05/2021		x				x		2x20 ml	x
	0224_QC213_210521	21/05/2021		x				x		2x20 ml	x
	0224_QC214_210521	21/05/2021		x				x		2x20 ml	x

Regards

[redacted]

AECOM
Level 8, 540 Wickham Street, Fortitude Valley, QLD 4006
PO Box 1307 Fortitude Valley QLD 4006
[redacted]
www.aecom.com

From: [redacted]
Sent: Thursday, 27 May 2021 3:16 PM
To: [redacted]

Cc: NMI - ASB - Lab Services - North Ryde <[redacted]>
Subject: [EXTERNAL] Matrix clarification [SEC=OFFICIAL]

Hi [redacted]

As per our discussion over the phone, please clarify the matrices against sample submitted. We've written what we have received. Please also check notes on COC. We will be waiting for your clarification, thanks.

Regards,

[redacted]
Laboratory Services Unit Officer
LSU-Analytical Services Branch
[redacted]

105 Delhi Rd, Riverside Corporate Park
NORTH RYDE NSW 2113
Australia
ABN 74 599 608 295

National Measurement Institute | www.measurement.gov.au

Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

The department acknowledges the traditional owners of the country throughout Australia and their continuing connection to land, sea and community. We pay our respect to them and their cultures and to the elders past and present.

For customer enquiries e-mail [redacted] or phone [redacted]

DRAFT

Appendix E

Laboratory Analytical Certificates and QA/QC Reports

D R A F T

Appendix E Laboratory Analytical Certificates and QA/QC Reports

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2114447**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	:	Telephone	:
Facsimile	:	Facsimile	:
Project	: QLD_0224_PFASOMP	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 21-May-2021 17:02	Issue Date	: 26-May-2021
Client Requested Due Date	: 02-Jun-2021	Scheduled Reporting Date	: **02-Jun-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 12.8°C, 4.8°C, 12.1°C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 27 / 27

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EB2114447-001	18-May-2021 00:00	0224_MW117_210518	✓
EB2114447-002	19-May-2021 00:00	0224_MW109_210519	✓
EB2114447-003	19-May-2021 00:00	0224_MW110_210519	✓
EB2114447-004	19-May-2021 00:00	0224_MW103_210519	✓
EB2114447-005	19-May-2021 00:00	0224_MW104_210519	✓
EB2114447-006	19-May-2021 00:00	0224_MW116_210519	✓
EB2114447-007	20-May-2021 00:00	0224_MW111_210520	✓
EB2114447-008	20-May-2021 00:00	0224_MW108_210520	✓
EB2114447-009	20-May-2021 00:00	0224_MW107_210520	✓
EB2114447-010	20-May-2021 00:00	0224_MW119_210520	✓
EB2114447-011	20-May-2021 00:00	0224_MW115_210520	✓
EB2114447-012	20-May-2021 00:00	0224_MW106_210520	✓
EB2114447-013	20-May-2021 00:00	0224_MW105_210520	✓
EB2114447-014	20-May-2021 00:00	0224_MW112_210520	✓
EB2114447-015	20-May-2021 00:00	0224_OTH001_210520	✓
EB2114447-016	20-May-2021 00:00	0224_POT001_210520	✓
EB2114447-017	20-May-2021 00:00	0224_POT005_210520	✓
EB2114447-018	21-May-2021 00:00	0224_MW121_210521	✓
EB2114447-019	21-May-2021 00:00	0224_MW122_210521	✓
EB2114447-020	21-May-2021 00:00	0224_MW120_210521	✓
EB2114447-021	21-May-2021 00:00	0224_MW113_210521	✓
EB2114447-022	21-May-2021 00:00	0224_MW114_210521	✓
EB2114447-023	21-May-2021 00:00	0224_MW118_210521	✓
EB2114447-024	21-May-2021 00:00	0224_MW101_210521	✓
EB2114447-025	21-May-2021 00:00	0224_QC112_210521	✓
EB2114447-026	21-May-2021 00:00	0224_QC113_210521	✓
EB2114447-027	21-May-2021 00:00	0224_QC114_210521	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT) Email

[redacted]

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

[redacted]

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2114447**	Page	: 1 of 15
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021 17:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 01-Jun-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021 12:44
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 27		
No. of samples analysed	: 27		

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*
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- Amendment (15/06/2021): This report has been amended to alter the project reference number. All analysis results are as per the previous report.
- EP231X PFAS: Sample "0224_OTH001_210520": Limits of reporting (LORs) for PFBS and PFHxA have been raised due to the presence of sample matrix interference.
- 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**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_MW117_210518	0224_MW109_210519	0224_MW110_210519	0224_MW103_210519	0224_MW104_210519
				Sampling date / time	18-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
					EB2114447-001	EB2114447-002	EB2114447-003	EB2114447-004	EB2114447-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<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	0224_MW117_210518	0224_MW109_210519	0224_MW110_210519	0224_MW103_210519	0224_MW104_210519
				Sampling date / time	18-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114447-001	EB2114447-002	EB2114447-003	EB2114447-004	EB2114447-005
					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	%		**99.7**	**87.5**	**98.0**	**100**	**94.7**
13C8-PFOA	----	0.02	%		**97.8**	**91.6**	**93.4**	**100**	**96.1**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_MW116_210519	0224_MW111_210520	0224_MW108_210520	0224_MW107_210520	0224_MW119_210520
				Sampling date / time	19-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
					EB2114447-006	EB2114447-007	EB2114447-008	EB2114447-009	EB2114447-010
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<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	0224_MW116_210519	0224_MW111_210520	0224_MW108_210520	0224_MW107_210520	0224_MW119_210520
				Sampling date / time	19-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114447-006	EB2114447-007	EB2114447-008	EB2114447-009	EB2114447-010
					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	<0.01	<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	%		**97.4**	**91.3**	**101**	**102**	**104**
13C8-PFOA	----	0.02	%		**97.3**	**97.1**	**102**	**96.7**	**99.6**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

				Sample ID	0224_MW115_210520	0224_MW106_210520	0224_MW105_210520	0224_MW112_210520	0224_OTH001_210520
				Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114447-011	EB2114447-012	EB2114447-013	EB2114447-014	EB2114447-015
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.04
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<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	<0.03
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**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_MW115_210520	0224_MW106_210520	0224_MW105_210520	0224_MW112_210520	0224_OTH001_210520
				Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00
					EB2114447-011	EB2114447-012	EB2114447-013	EB2114447-014	EB2114447-015
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**96.7**	**94.0**	**102**	**98.5**	**89.8**
13C8-PFOA	----	0.02	%		**99.6**	**96.8**	**98.3**	**95.0**	**98.9**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_POT001_210520	0224_POT005_210520	0224_MW121_210521	0224_MW122_210521	0224_MW120_210521
				Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
					EB2114447-016	EB2114447-017	EB2114447-018	EB2114447-019	EB2114447-020
					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	0.02	µg/L		<0.02	<0.02	**0.07**	**0.17**	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	**0.02**	**0.03**	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_POT001_210520	0224_POT005_210520	0224_MW121_210521	0224_MW122_210521	0224_MW120_210521
				Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
					EB2114447-016	EB2114447-017	EB2114447-018	EB2114447-019	EB2114447-020
					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		<0.01	<0.01	**0.09**	**0.20**	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	**0.09**	**0.20**	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	**0.09**	**0.20**	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**107**	**96.8**	**100**	**97.2**	**112**
13C8-PFOA	----	0.02	%		**92.9**	**96.4**	**102**	**104**	**101**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_MW113_210521	0224_MW114_210521	0224_MW118_210521	0224_MW101_210521	0224_QC112_210521
				Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
					EB2114447-021	EB2114447-022	EB2114447-023	EB2114447-024	EB2114447-025
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	**0.02**	<0.02	**0.07**
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	**0.02**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<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	0224_MW113_210521	0224_MW114_210521	0224_MW118_210521	0224_MW101_210521	0224_QC112_210521
				Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114447-021	EB2114447-022	EB2114447-023	EB2114447-024	EB2114447-025
					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		<0.01	<0.01	**0.03**	<0.01	**0.09**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	**0.03**	<0.01	**0.09**
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	**0.03**	<0.01	**0.09**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**110**	**105**	**100**	**109**	**90.5**
13C8-PFOA	----	0.02	%		**98.9**	**101**	**98.6**	**100**	**102**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_QC113_210521	0224_QC114_210521	----	----	----
				Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2114447-026	EB2114447-027	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.16**	<0.02	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.03**	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_QC113_210521	0224_QC114_210521	----	----	----
				Sampling date / time	21-May-2021 00:00	21-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2114447-026	EB2114447-027	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**0.19**	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.19**	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.19**	<0.01	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**114**	**92.2**	----	----	----
13C8-PFOA	----	0.02	%		**101**	**98.4**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2114447**	Page	: 1 of 8
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 01-Jun-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 27		
No. of samples analysed	: 27		

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*
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3707039)									
EB2114447-015	0224_OTH001_210520	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.04	<0.04	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EB2114447-017	0224_POT005_210520	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3707039)									
EB2114447-015	0224_OTH001_210520	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	<0.03	<0.03	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EB2114447-017	0224_POT005_210520	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	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: 3707039) - continued									
EB2114447-017	0224_POT005_210520	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3707039)									
EB2114447-015	0224_OTH001_210520	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
EB2114447-017	0224_POT005_210520	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3707039)									
EB2114447-015	0224_OTH001_210520	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3707039) - continued									
EB2114447-015	0224_OTH001_210520	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
EB2114447-017	0224_POT005_210520	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: 3707039)									
EB2114447-015	0224_OTH001_210520	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
EB2114447-017	0224_POT005_210520	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				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: 3707039)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	89.9	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	96.9	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.2373 µg/L	84.9	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	97.5	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	84.3	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	85.1	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3707043)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	98.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	99.3	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.2373 µg/L	89.5	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	92.0	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	109	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	85.9	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707039)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	85.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	89.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	95.0	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	91.4	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	94.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	93.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	89.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	99.8	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	96.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	92.0	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707043)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	96.4	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	98.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	95.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.8	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	96.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	97.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.6	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: 3707043) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	93.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	87.6	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	104	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707039)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	89.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	74.3	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	86.2	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	90.6	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	90.3	62.6	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	98.0	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	95.4	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707043)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	95.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	105	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	98.8	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	97.0	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	94.4	62.6	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	92.8	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	92.6	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707039)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	96.4	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	94.0	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	92.5	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	79.9	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707043)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	92.6	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	102	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	101	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	90.0	64.2	133
EP231P: PFAS Sums (QCLot: 3707039)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----

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
EP231P: PFAS Sums (QCLot: 3707039) - continued								
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 3707043)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

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: 3707039)							
EB2114447-016	0224_POT001_210520	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	95.1	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	102	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	94.2	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	103	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	86.0	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	96.9	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707039)							
EB2114447-016	0224_POT001_210520	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	87.1	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	91.6	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	95.0	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	97.8	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	92.2	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	96.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	100	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	111	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	98.4	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	89.2	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	89.7	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707039)							
EB2114447-016	0224_POT001_210520	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	90.6	59.0	135

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707039) - continued							
EB2114447-016	0224_POT001_210520	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	89.9	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.8	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	97.7	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	77.8	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	108	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	90.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707039)							
EB2114447-016	0224_POT001_210520	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	97.0	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	88.1	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	89.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	85.1	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2114447**	Page	: 1 of 6
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Site	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]	No. of samples received	: 27
Order number	: 60612563 4.1	No. of samples analysed	: 27

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
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	2	32	6.25	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	32	3.13	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	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0224_MW117_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW109_210519, 0224_MW110_210519, 0224_MW103_210519, 0224_MW104_210519, 0224_MW116_210519	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW111_210520, 0224_MW108_210520, 0224_MW107_210520, 0224_MW119_210520, 0224_MW115_210520, 0224_MW106_210520, 0224_MW105_210520, 0224_MW112_210520, 0224_OTH001_210520, 0224_POT001_210520, 0224_POT005_210520	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW121_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW122_210521, 0224_MW120_210521, 0224_MW113_210521, 0224_MW114_210521, 0224_MW118_210521, 0224_MW101_210521, 0224_QC112_210521, 0224_QC113_210521, 0224_QC114_210521	**21-May-2021**	**02-Jun-2021**	17-Nov-2021	✓	**02-Jun-2021**	17-Nov-2021	✓

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) 0224_MW117_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW109_210519, 0224_MW110_210519, 0224_MW103_210519, 0224_MW104_210519, 0224_MW116_210519	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW111_210520, 0224_MW108_210520, 0224_MW107_210520, 0224_MW119_210520, 0224_MW115_210520, 0224_MW106_210520, 0224_MW105_210520, 0224_MW112_210520, 0224_OTH001_210520, 0224_POT001_210520, 0224_POT005_210520	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW121_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW122_210521, 0224_MW120_210521, 0224_MW113_210521, 0224_MW114_210521, 0224_MW118_210521, 0224_MW101_210521, 0224_QC112_210521, 0224_QC113_210521, 0224_QC114_210521	**21-May-2021**	**02-Jun-2021**	17-Nov-2021	✓	**02-Jun-2021**	17-Nov-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0224_MW117_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW109_210519, 0224_MW110_210519, 0224_MW103_210519, 0224_MW104_210519, 0224_MW116_210519	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW111_210520, 0224_MW108_210520, 0224_MW107_210520, 0224_MW119_210520, 0224_MW115_210520, 0224_MW106_210520, 0224_MW105_210520, 0224_MW112_210520, 0224_OTH001_210520, 0224_POT001_210520, 0224_POT005_210520	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW121_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW122_210521, 0224_MW120_210521, 0224_MW113_210521, 0224_MW114_210521, 0224_MW118_210521, 0224_MW101_210521, 0224_QC112_210521, 0224_QC113_210521, 0224_QC114_210521	**21-May-2021**	**02-Jun-2021**	17-Nov-2021	✓	**02-Jun-2021**	17-Nov-2021	✓

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) 0224_MW117_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW109_210519, 0224_MW110_210519, 0224_MW103_210519, 0224_MW104_210519, 0224_MW116_210519	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW111_210520, 0224_MW108_210520, 0224_MW107_210520, 0224_MW119_210520, 0224_MW115_210520, 0224_MW106_210520, 0224_MW105_210520, 0224_MW112_210520, 0224_OTH001_210520, 0224_POT001_210520, 0224_POT005_210520	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW121_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW122_210521, 0224_MW120_210521, 0224_MW113_210521, 0224_MW114_210521, 0224_MW118_210521, 0224_MW101_210521, 0224_QC112_210521, 0224_QC113_210521, 0224_QC114_210521	**21-May-2021**	**02-Jun-2021**	17-Nov-2021	✓	**02-Jun-2021**	17-Nov-2021	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0224_MW117_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW109_210519, 0224_MW110_210519, 0224_MW103_210519, 0224_MW104_210519, 0224_MW116_210519	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW111_210520, 0224_MW108_210520, 0224_MW107_210520, 0224_MW119_210520, 0224_MW115_210520, 0224_MW106_210520, 0224_MW105_210520, 0224_MW112_210520, 0224_OTH001_210520, 0224_POT001_210520, 0224_POT005_210520	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW121_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓
HDPE (no PTFE) (EP231X) 0224_MW122_210521, 0224_MW120_210521, 0224_MW113_210521, 0224_MW114_210521, 0224_MW118_210521, 0224_MW101_210521, 0224_QC112_210521, 0224_QC113_210521, 0224_QC114_210521	**21-May-2021**	**02-Jun-2021**	17-Nov-2021	✓	**02-Jun-2021**	17-Nov-2021	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**6.25**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	32	**3.13**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

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

Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2114449**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: j[redacted]	E-mail	: [redacted]
Telephone	: [redacted]	Telephone	:
Facsimile	: [redacted]	Facsimile	:
Project	: QLD_0224_PFASOMP	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 21-May-2021 17:02	Issue Date	: 26-May-2021
Client Requested Due Date	: 02-Jun-2021	Scheduled Reporting Date	: **02-Jun-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 12.8°C, 4.8°C, 12.1°C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 22 / 22

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **26/05/2021: SRN has been resent to acknowledge ID allocation to sample #22. For any further information regarding these adjustments please contact client services at** [redacted]
- Please note that where 2 sample sets were received labelled as 0224_QC308_210520, sampling date (21/05/21) was used to allocate samples to 0224_QC309_210521 which had not received containers under this ID.
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2114449-001	18-May-2021 00:00	0224_SW027_210518	✓
EB2114449-002	19-May-2021 00:00	0224_SW012_210519	✓
EB2114449-003	19-May-2021 00:00	0224_SW009_210519	✓
EB2114449-004	19-May-2021 00:00	0224_SW008_210519	✓
EB2114449-005	19-May-2021 00:00	0224_SW014_210519	✓
EB2114449-006	19-May-2021 00:00	0224_SW013_210519	✓
EB2114449-007	19-May-2021 00:00	0224_SW005_210519	✓
EB2114449-008	19-May-2021 00:00	0224_SW004_210519	✓
EB2114449-009	19-May-2021 00:00	0224_SW016_210519	✓
EB2114449-010	19-May-2021 00:00	0224_SW025_210519	✓
EB2114449-011	20-May-2021 00:00	0224_SW006_210520	✓
EB2114449-012	20-May-2021 00:00	0224_SW018_210520	✓
EB2114449-013	20-May-2021 00:00	0224_SW019_210520	✓
EB2114449-014	20-May-2021 00:00	0224_SW007_210520	✓
EB2114449-015	21-May-2021 00:00	0224_SW017_210521	✓
EB2114449-016	18-May-2021 00:00	0224_QC106_210518	✓
EB2114449-017	19-May-2021 00:00	0224_QC109_210519	✓
EB2114449-018	20-May-2021 00:00	0224_QC110_210520	✓
EB2114449-019	18-May-2021 00:00	0224_QC306_210518	✓
EB2114449-020	19-May-2021 00:00	0224_QC307_210519	✓
EB2114449-021	20-May-2021 00:00	0224_QC308_210520	✓
EB2114449-022	21-May-2021 00:00	0224_QC309_210521	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT)	Email

[redacted]

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

[redacted]

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2114449**	Page	: 1 of 13
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021 17:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 01-Jun-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021 12:35
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 22		
No. of samples analysed	: 22		

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*
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- **Amendment (15/06/2021): This report has been amended to alter the project reference number. All analysis results are as per the previous report.**
- EP231X-ST PFAS Super Trace: Particular samples required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly. Particular analytes have been raised further due to matrix interference.
- 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**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_SW027_210518	0224_SW012_210519	0224_SW009_210519	0224_SW008_210519	0224_SW014_210519
				Sampling date / time	18-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
					EB2114449-001	EB2114449-002	EB2114449-003	EB2114449-004	EB2114449-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		**0.0021**	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0125**	<0.0016	<0.0016	<0.0016	**0.0016**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		**0.0077**	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.020	<0.010	<0.006	<0.002	<0.002
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		**0.0072**	<0.0035	<0.0016	<0.0030	**0.0068**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		**0.0066**	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		**0.0021**	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0040	<0.0040	<0.108	<0.0040	<0.0055
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	<0.004	<0.004	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	<0.004	<0.004	<0.004	<0.004

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW027_210518	0224_SW012_210519	0224_SW009_210519	0224_SW008_210519	0224_SW014_210519
				Sampling date / time	18-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114449-001	EB2114449-002	EB2114449-003	EB2114449-004	EB2114449-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	<0.004	<0.004	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.004	<0.004	<0.004	<0.004	<0.004
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	<0.002	<0.002	<0.002	<0.002
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	<0.002	<0.002	<0.002	<0.002
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	<0.002	<0.002	<0.002	<0.002
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	<0.002	<0.002	<0.002	<0.002
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		**0.0382**	<0.0016	<0.0016	<0.0016	**0.0084**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		**0.0202**	<0.0016	<0.0016	<0.0016	**0.0016**
Sum of PFAS (WA DER List)	----	0.0003	µg/L		**0.0382**	<0.0016	<0.0016	<0.0016	**0.0084**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**97.9**	**106**	**108**	**95.0**	**93.4**
13C8-PFOA	----	0.0005	%		**95.9**	**102**	**97.3**	**99.8**	**102**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_SW013_210519	0224_SW005_210519	0224_SW004_210519	0224_SW016_210519	0224_SW025_210519
				Sampling date / time	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
					EB2114449-006	EB2114449-007	EB2114449-008	EB2114449-009	EB2114449-010
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0030**	<0.0016	<0.0016	<0.0016	**0.0017**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	**0.0034**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.002	<0.002	<0.004	<0.002	<0.008
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		**0.0027**	**0.0051**	<0.0030	<0.0020	<0.0045
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	**0.0017**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	**0.0016**
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0040	<0.0040	<0.0045	<0.0705	<0.0039
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	<0.004	<0.004	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	<0.004	<0.005	<0.004	<0.004

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW013_210519	0224_SW005_210519	0224_SW004_210519	0224_SW016_210519	0224_SW025_210519
				Sampling date / time	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114449-006	EB2114449-007	EB2114449-008	EB2114449-009	EB2114449-010
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	<0.004	<0.004	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.004	<0.004	<0.004	<0.004	<0.004
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	<0.0016	<0.0016	<0.0016	<0.0016
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	<0.002	<0.002	<0.002	<0.002
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	<0.002	<0.002	<0.002	<0.002
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	<0.002	<0.002	<0.002	<0.002
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	<0.002	<0.002	<0.002	<0.002
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		**0.0057**	**0.0051**	<0.0016	<0.0016	**0.0084**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		**0.0030**	<0.0016	<0.0016	<0.0016	**0.0051**
Sum of PFAS (WA DER List)	----	0.0003	µg/L		**0.0057**	**0.0051**	<0.0016	<0.0016	**0.0084**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**96.6**	**102**	**103**	**94.3**	**110**
13C8-PFOA	----	0.0005	%		**94.9**	**97.4**	**102**	**91.0**	**93.7**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_SW006_210520	0224_SW018_210520	0224_SW019_210520	0224_SW007_210520	0224_SW017_210521
				Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	21-May-2021 00:00
					EB2114449-011	EB2114449-012	EB2114449-013	EB2114449-014	EB2114449-015
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	**0.0169**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	**0.0022**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0016**	**0.0159**	**0.0036**	<0.0016	**0.0151**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0016	<0.0079	**0.0027**	<0.0016	<0.0030
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.008	<0.040	<0.008	<0.008	<0.008
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0035	<0.0079	<0.0025	<0.0030	**0.0170**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0016	**0.0143**	<0.0020	<0.0016	**0.0059**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	**0.0072**
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	**0.0029**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0040	<0.0198	<0.0040	<0.0040	<0.0060
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	<0.020	<0.004	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	<0.020	<0.004	<0.004	<0.004

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW006_210520	0224_SW018_210520	0224_SW019_210520	0224_SW007_210520	0224_SW017_210521
				Sampling date / time	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	20-May-2021 00:00	21-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114449-011	EB2114449-012	EB2114449-013	EB2114449-014	EB2114449-015
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	<0.020	<0.004	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.004	<0.020	<0.004	<0.004	<0.004
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	<0.0079	<0.0016	<0.0016	<0.0016
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	<0.008	<0.002	<0.002	<0.002
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	**0.013**	<0.002	<0.002	<0.002
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	<0.008	<0.002	<0.002	<0.002
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	<0.008	<0.002	<0.002	<0.002
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		**0.0016**	**0.0432**	**0.0063**	<0.0016	**0.0672**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		**0.0016**	**0.0159**	**0.0063**	<0.0016	**0.0151**
Sum of PFAS (WA DER List)	----	0.0003	µg/L		**0.0016**	**0.0432**	**0.0063**	<0.0016	**0.0621**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**113**	**95.4**	**100**	**110**	**105**
13C8-PFOA	----	0.0005	%		**98.3**	**98.7**	**100**	**95.5**	**92.7**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_QC106_210518	0224_QC109_210519	0224_QC110_210520	0224_QC306_210518	0224_QC307_210519
				Sampling date / time	18-May-2021 00:00	19-May-2021 00:00	20-May-2021 00:00	18-May-2021 00:00	19-May-2021 00:00
					EB2114449-016	EB2114449-017	EB2114449-018	EB2114449-019	EB2114449-020
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		**0.0019**	<0.0008	<0.0016	<0.0005	<0.0005
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		**0.0016**	<0.0008	<0.0016	<0.0005	<0.0005
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0147**	**0.0032**	<0.0016	<0.0005	**0.0017**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		**0.0104**	**0.0010**	<0.0016	<0.0003	**0.0004**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		**0.010**	<0.004	<0.008	<0.002	<0.002
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		**0.0098**	**0.0028**	**0.0033**	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		**0.0066**	<0.0008	<0.0016	<0.0005	<0.0005
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		**0.0025**	<0.0008	<0.0016	<0.0005	<0.0005
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		**0.0022**	<0.0008	<0.0016	<0.0005	<0.0005
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0039	<0.0020	<0.0051	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	<0.002	<0.004	<0.001	<0.001
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	<0.002	<0.004	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_QC106_210518	0224_QC109_210519	0224_QC110_210520	0224_QC306_210518	0224_QC307_210519
				Sampling date / time	18-May-2021 00:00	19-May-2021 00:00	20-May-2021 00:00	18-May-2021 00:00	19-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114449-016	EB2114449-017	EB2114449-018	EB2114449-019	EB2114449-020
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	<0.002	<0.004	<0.001	<0.001
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.004	<0.002	<0.004	<0.001	<0.001
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	<0.0008	<0.0016	<0.0005	<0.0005
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	<0.001	<0.002	<0.001	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	<0.001	<0.002	<0.001	<0.001
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	<0.001	<0.002	<0.001	<0.001
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	<0.001	<0.002	<0.001	<0.001
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		**0.0597**	**0.0070**	**0.0033**	<0.0003	**0.0021**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		**0.0251**	**0.0042**	<0.0016	<0.0003	**0.0021**
Sum of PFAS (WA DER List)	----	0.0003	µg/L		**0.0581**	**0.0070**	**0.0033**	<0.0003	**0.0021**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**104**	**85.3**	**112**	**114**	**102**
13C8-PFOA	----	0.0005	%		**95.2**	**101**	**94.3**	**102**	**98.2**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_QC308_210520	0224_QC309_210521	----	----	----
				Sampling date / time	20-May-2021 00:00	21-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2114449-021	EB2114449-022	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0005	**0.0005**	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0005	**0.0006**	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0005	**0.0046**	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0003	**0.0015**	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0005	<0.0005	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.002	<0.002	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0005	**0.0013**	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.001	<0.001	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.001	<0.001	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_QC308_210520	0224_QC309_210521	----	----	----
				Sampling date / time	20-May-2021 00:00	21-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2114449-021	EB2114449-022	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.001	<0.001	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.001	<0.001	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0005	<0.0005	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.001	<0.001	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.001	<0.001	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.001	<0.001	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	<0.001	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		<0.0003	**0.0085**	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		<0.0003	**0.0061**	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L		<0.0003	**0.0079**	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**98.2**	**112**	----	----	----
13C8-PFOA	----	0.0005	%		**100**	**99.1**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2114449**	Page	: 1 of 5
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 01-Jun-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 22		
No. of samples analysed	: 22		

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*
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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: 3707052)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	94.2	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	83.0	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	97.1	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	101	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	101	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	84.4	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3707053)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	95.1	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	84.7	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	88.2	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	90.7	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	81.9	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	74.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707052)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	97.5	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	111	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	93.6	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	102	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707053)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	83.0	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	94.4	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	88.8	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	91.2	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	94.4	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	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: 3707053) - continued								
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	80.4	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	68.4	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	92.2	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707052)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	85.6	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	104	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	107	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	96.8	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	103	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	90.4	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707053)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	88.8	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	95.7	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	93.8	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	83.0	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	96.0	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	81.2	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	82.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707052)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	90.7	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	99.8	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	100	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	108	53.1	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707053)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	94.5	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	96.4	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	92.5	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	69.2	53.1	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
EP231P: PFAS Sums (QCLot: 3707052)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231P: PFAS Sums (QCLot: 3707053)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2114449**	Page	: 1 of 6
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Site	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]	No. of samples received	: 22
Order number	: 60612563 4.1	No. of samples analysed	: 22

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
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	26	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	26	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	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X-ST)								
0224_QC106_210518,	0224_QC306_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST)								
0224_SW027_210518		**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST)								
0224_SW025_210519,	0224_QC109_210519,	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
0224_QC307_210519								
HDPE (no PTFE) (EP231X-ST)								
0224_SW012_210519,	0224_SW009_210519,	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
0224_SW008_210519,	0224_SW014_210519,							
0224_SW013_210519,	0224_SW005_210519,							
0224_SW004_210519,	0224_SW016_210519							
HDPE (no PTFE) (EP231X-ST)								
0224_SW006_210520,	0224_SW018_210520,	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
0224_SW019_210520,	0224_SW007_210520,							
0224_QC110_210520,	0224_QC308_210520							
HDPE (no PTFE) (EP231X-ST)								
0224_SW017_210521,	0224_QC309_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓

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-ST) 0224_QC106_210518, 0224_QC306_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW027_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW025_210519, 0224_QC109_210519, 0224_QC307_210519	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW012_210519, 0224_SW009_210519, 0224_SW008_210519, 0224_SW014_210519, 0224_SW013_210519, 0224_SW005_210519, 0224_SW004_210519, 0224_SW016_210519	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW006_210520, 0224_SW018_210520, 0224_SW019_210520, 0224_SW007_210520, 0224_QC110_210520, 0224_QC308_210520	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW017_210521, 0224_QC309_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST) 0224_QC106_210518, 0224_QC306_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW027_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW025_210519, 0224_QC109_210519, 0224_QC307_210519	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW012_210519, 0224_SW009_210519, 0224_SW008_210519, 0224_SW014_210519, 0224_SW013_210519, 0224_SW005_210519, 0224_SW004_210519, 0224_SW016_210519	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW006_210520, 0224_SW018_210520, 0224_SW019_210520, 0224_SW007_210520, 0224_QC110_210520, 0224_QC308_210520	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST) 0224_SW017_210521, 0224_QC309_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓

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-ST)								
0224_QC106_210518,	0224_QC306_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST)								
0224_SW027_210518		**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST)								
0224_SW025_210519,	0224_QC109_210519,	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
0224_QC307_210519								
HDPE (no PTFE) (EP231X-ST)								
0224_SW012_210519,	0224_SW009_210519,	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
0224_SW008_210519,	0224_SW014_210519,							
0224_SW013_210519,	0224_SW005_210519,							
0224_SW004_210519,	0224_SW016_210519							
HDPE (no PTFE) (EP231X-ST)								
0224_SW006_210520,	0224_SW018_210520,	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
0224_SW019_210520,	0224_SW007_210520,							
0224_QC110_210520,	0224_QC308_210520							
HDPE (no PTFE) (EP231X-ST)								
0224_SW017_210521,	0224_QC309_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X-ST)								
0224_QC106_210518,	0224_QC306_210518	**18-May-2021**	**01-Jun-2021**	14-Nov-2021	✓	**01-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST)								
0224_SW027_210518		**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
HDPE (no PTFE) (EP231X-ST)								
0224_SW025_210519,	0224_QC109_210519,	**19-May-2021**	**01-Jun-2021**	15-Nov-2021	✓	**01-Jun-2021**	15-Nov-2021	✓
0224_QC307_210519								
HDPE (no PTFE) (EP231X-ST)								
0224_SW012_210519,	0224_SW009_210519,	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
0224_SW008_210519,	0224_SW014_210519,							
0224_SW013_210519,	0224_SW005_210519,							
0224_SW004_210519,	0224_SW016_210519							
HDPE (no PTFE) (EP231X-ST)								
0224_SW006_210520,	0224_SW018_210520,	**20-May-2021**	**01-Jun-2021**	16-Nov-2021	✓	**01-Jun-2021**	16-Nov-2021	✓
0224_SW019_210520,	0224_SW007_210520,							
0224_QC110_210520,	0224_QC308_210520							
HDPE (no PTFE) (EP231X-ST)								
0224_SW017_210521,	0224_QC309_210521	**21-May-2021**	**01-Jun-2021**	17-Nov-2021	✓	**01-Jun-2021**	17-Nov-2021	✓

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-ST	0	26	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	2	26	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	26	**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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2114450**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: [redacted]	Telephone	:
Facsimile	: [redacted]	Facsimile	:
Project	: QLD_0224_PFASOMP	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 21-May-2021 17:02	Issue Date	: 26-May-2021
Client Requested Due Date	: 02-Jun-2021	Scheduled Reporting Date	: **02-Jun-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 12.8°C, 4.8°C, 12.1C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 18 / 18

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EB2114450-001	18-May-2021 00:00	0224_SD027_210518	✓	✓
EB2114450-002	18-May-2021 00:00	0224_SD012_210519	✓	✓
EB2114450-003	18-May-2021 00:00	0224_SD009_210519	✓	✓
EB2114450-004	18-May-2021 00:00	0224_SD008_210519	✓	✓
EB2114450-005	18-May-2021 00:00	0224_SD014_210519	✓	✓
EB2114450-006	18-May-2021 00:00	0224_SD013_210519	✓	✓
EB2114450-007	18-May-2021 00:00	0224_SD005_210519	✓	✓
EB2114450-008	18-May-2021 00:00	0224_SD004_210519	✓	✓
EB2114450-009	18-May-2021 00:00	0224_SD016_210519	✓	✓
EB2114450-010	18-May-2021 00:00	0224_SD025_210519	✓	✓
EB2114450-011	18-May-2021 00:00	0224_SD006_210520	✓	✓
EB2114450-012	18-May-2021 00:00	0224_SD018_210520	✓	✓
EB2114450-013	18-May-2021 00:00	0224_SD019_210520	✓	✓
EB2114450-014	18-May-2021 00:00	0224_SD007_210520	✓	✓
EB2114450-015	18-May-2021 00:00	0224_SD017_210521	✓	✓
EB2114450-016	18-May-2021 00:00	0224_QC107_210518	✓	✓
EB2114450-017	18-May-2021 00:00	0224_QC108_210519	✓	✓
EB2114450-018	18-May-2021 00:00	0224_QC111_210520	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT)	Email

[redacted]

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

[redacted]

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2114450**	Page	: 1 of 11
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021 17:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 26-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021 12:46
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 18		
No. of samples analysed	: 18		

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*
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- **Amendment (15/06/2021): This report has been amended to alter the project reference number. All analysis results are as per the previous report.**
- EP231X PFAS: The LOR of particular analytes have been raised on samples '0224_SD009_210519' and '0224_SD018_210520' due to sample matrix interferences.
- EP231X PFAS: High Matrix Spike recovery deemed acceptable as all associated analyte results are less than LOR
- 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**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_SD027_210518	0224_SD012_210519	0224_SD009_210519	0224_SD008_210519	0224_SD014_210519
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
					EB2114450-001	EB2114450-002	EB2114450-003	EB2114450-004	EB2114450-005
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**20.9**	**26.7**	**68.9**	**41.3**	**22.2**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	**0.0005**	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD027_210518	0224_SD012_210519	0224_SD009_210519	0224_SD008_210519	0224_SD014_210519
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114450-001	EB2114450-002	EB2114450-003	EB2114450-004	EB2114450-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0012	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0005**	<0.0002	**0.0005**	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0005**	<0.0002	**0.0005**	<0.0002	<0.0002
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**114**	**86.0**	**110**	**106**	**113**
13C8-PFOA	----	0.0002	%		**101**	**104**	**106**	**104**	**106**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0224_SD013_210519	0224_SD005_210519	0224_SD004_210519	0224_SD016_210519	0224_SD025_210519
			Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit	EB2114450-006	EB2114450-007	EB2114450-008	EB2114450-009	EB2114450-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**32.2**	**17.6**	**22.0**	**52.1**	**23.4**
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD013_210519	0224_SD005_210519	0224_SD004_210519	0224_SD016_210519	0224_SD025_210519
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114450-006	EB2114450-007	EB2114450-008	EB2114450-009	EB2114450-010
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**104**	**102**	**113**	**97.5**	**118**
13C8-PFOA	----	0.0002	%		**104**	**106**	**104**	**102**	**102**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD006_210520	0224_SD018_210520	0224_SD019_210520	0224_SD007_210520	0224_SD017_210521
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114450-011	EB2114450-012	EB2114450-013	EB2114450-014	EB2114450-015
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**30.1**	**20.6**	**31.0**	**21.4**	**39.6**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0003**	<0.0004	**0.0008**	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0004**	**0.0003**	<0.0002	<0.0002	**0.0003**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD006_210520	0224_SD018_210520	0224_SD019_210520	0224_SD007_210520	0224_SD017_210521
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114450-011	EB2114450-012	EB2114450-013	EB2114450-014	EB2114450-015
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0007**	**0.0003**	**0.0008**	<0.0002	**0.0003**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0003**	<0.0002	**0.0008**	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0007**	**0.0003**	**0.0008**	<0.0002	**0.0003**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**119**	**94.5**	**117**	**95.5**	**110**
13C8-PFOA	----	0.0002	%		**108**	**107**	**110**	**102**	**110**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0224_QC107_210518	0224_QC108_210519	0224_QC111_210520	----	----
			Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2114450-016	EB2114450-017	EB2114450-018	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**19.5**	**20.1**	**25.1**	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	**0.0005**	<0.0002	<0.0002	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_QC107_210518	0224_QC108_210519	0224_QC111_210520	----	----
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	----	----
Compound	CAS Number	LOR	Unit		EB2114450-016	EB2114450-017	EB2114450-018	--------	--------
					Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**114**	**97.0**	**131**	----	----
13C8-PFOA	----	0.0002	%		**103**	**97.0**	**100**	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2114450**	Page	: 1 of 7
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 26-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 18		
No. of samples analysed	: 18		

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*
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]		Brisbane Organics, Stafford, QLD

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

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: 3699801)									
EB2114445-002	Anonymous	EA055: Moisture Content	----	0.1	%	61.5	58.9	4.4	0% - 20%
EB2114450-009	0224_SD016_210519	EA055: Moisture Content	----	0.1	%	52.1	47.5	9.3	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3699800)									
EB2114445-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0009	0.0011	19.3	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EB2114450-009	0224_SD016_210519	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699800)									
EB2114445-002	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	0.0007	0.0007	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699800) - continued									
EB2114445-002	Anonymous	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EB2114450-009	0224_SD016_210519	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3699800)									
EB2114445-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EB2114450-009	0224_SD016_210519	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3699800)									
EB2114445-002	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
EB2114450-009	0224_SD016_210519	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

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: 3699800)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	84.5	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00117 mg/kg	75.2	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	81.4	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	83.2	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	83.2	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	87.1	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699800)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	73.3	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.2	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.2	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.8	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.8	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.0	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	81.7	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.8	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	76.1	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	73.9	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	84.3	61.9	137
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.4	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699800)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	79.9	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	81.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	96.7	65.0	137

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: 3699800) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	110	54.8	124

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: 3699800)							
EB2114445-004	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	83.6	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	81.2	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	79.7	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	85.3	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	80.6	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	87.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699800)							
EB2114445-004	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	73.7	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	80.8	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	70.8	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	84.8	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	82.4	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	83.2	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	86.8	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	84.4	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	82.0	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	# 160	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	85.9	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800)							
EB2114445-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	87.6	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	93.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	89.1	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	71.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	79.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	83.2	63.0	144

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800) - continued							
EB2114445-004	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	86.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699800)							
EB2114445-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	85.9	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	87.7	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	87.9	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	76.2	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2114450**	Page	: 1 of 6
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Site	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]	No. of samples received	: 18
Order number	: 60612563 4.1	No. of samples analysed	: 18

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231B: Perfluoroalkyl Carboxylic Acids	EB2114445--004	Anonymous	**Perfluorotridecanoic acid (PFTrDA)**	72629-94-8	160 %	66.0-139%	**Recovery greater than upper data quality objective**

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)								
0224_SD027_210518,	0224_SD012_210519,	**18-May-2021**	**----**	----	----	**26-May-2021**	01-Jun-2021	✓
0224_SD009_210519,	0224_SD008_210519,							
0224_SD014_210519,	0224_SD013_210519,							
0224_SD005_210519,	0224_SD004_210519,							
0224_SD016_210519,	0224_SD025_210519,							
0224_SD006_210520,	0224_SD018_210520,							
0224_SD019_210520,	0224_SD007_210520,							
0224_SD017_210521,	0224_QC107_210518,							
0224_QC108_210519,	0224_QC111_210520							
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0224_SD027_210518,	0224_SD012_210519,	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
0224_SD009_210519,	0224_SD008_210519,							
0224_SD014_210519,	0224_SD013_210519,							
0224_SD005_210519,	0224_SD004_210519,							
0224_SD016_210519,	0224_SD025_210519,							
0224_SD006_210520,	0224_SD018_210520,							
0224_SD019_210520,	0224_SD007_210520,							
0224_SD017_210521,	0224_QC107_210518,							
0224_QC108_210519,	0224_QC111_210520							

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
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
0224_SD027_210518, 0224_SD012_210519, 0224_SD009_210519, 0224_SD008_210519, 0224_SD014_210519, 0224_SD013_210519, 0224_SD005_210519, 0224_SD004_210519, 0224_SD016_210519, 0224_SD025_210519, 0224_SD006_210520, 0224_SD018_210520, 0224_SD019_210520, 0224_SD007_210520, 0224_SD017_210521, 0224_QC107_210518, 0224_QC108_210519, 0224_QC111_210520	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X)							
0224_SD027_210518, 0224_SD012_210519, 0224_SD009_210519, 0224_SD008_210519, 0224_SD014_210519, 0224_SD013_210519, 0224_SD005_210519, 0224_SD004_210519, 0224_SD016_210519, 0224_SD025_210519, 0224_SD006_210520, 0224_SD018_210520, 0224_SD019_210520, 0224_SD007_210520, 0224_SD017_210521, 0224_QC107_210518, 0224_QC108_210519, 0224_QC111_210520	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X)							
0224_SD027_210518, 0224_SD012_210519, 0224_SD009_210519, 0224_SD008_210519, 0224_SD014_210519, 0224_SD013_210519, 0224_SD005_210519, 0224_SD004_210519, 0224_SD016_210519, 0224_SD025_210519, 0224_SD006_210520, 0224_SD018_210520, 0224_SD019_210520, 0224_SD007_210520, 0224_SD017_210521, 0224_QC107_210518, 0224_QC108_210519, 0224_QC111_210520	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓

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
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
0224_SD027_210518, 0224_SD012_210519, 0224_SD009_210519, 0224_SD008_210519, 0224_SD014_210519, 0224_SD013_210519, 0224_SD005_210519, 0224_SD004_210519, 0224_SD016_210519, 0224_SD025_210519, 0224_SD006_210520, 0224_SD018_210520, 0224_SD019_210520, 0224_SD007_210520, 0224_SD017_210521, 0224_QC107_210518, 0224_QC108_210519, 0224_QC111_210520	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓

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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2114450**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: [redacted]	Telephone	:
Facsimile	: [redacted]	Facsimile	:
Project	: QLD_0224_PFASOMP	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 21-May-2021 17:02	Issue Date	: 26-May-2021
Client Requested Due Date	: 02-Jun-2021	Scheduled Reporting Date	: **02-Jun-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 12.8°C, 4.8°C, 12.1C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 18 / 18

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EB2114450-001	18-May-2021 00:00	0224_SD027_210518	✓	✓
EB2114450-002	18-May-2021 00:00	0224_SD012_210519	✓	✓
EB2114450-003	18-May-2021 00:00	0224_SD009_210519	✓	✓
EB2114450-004	18-May-2021 00:00	0224_SD008_210519	✓	✓
EB2114450-005	18-May-2021 00:00	0224_SD014_210519	✓	✓
EB2114450-006	18-May-2021 00:00	0224_SD013_210519	✓	✓
EB2114450-007	18-May-2021 00:00	0224_SD005_210519	✓	✓
EB2114450-008	18-May-2021 00:00	0224_SD004_210519	✓	✓
EB2114450-009	18-May-2021 00:00	0224_SD016_210519	✓	✓
EB2114450-010	18-May-2021 00:00	0224_SD025_210519	✓	✓
EB2114450-011	18-May-2021 00:00	0224_SD006_210520	✓	✓
EB2114450-012	18-May-2021 00:00	0224_SD018_210520	✓	✓
EB2114450-013	18-May-2021 00:00	0224_SD019_210520	✓	✓
EB2114450-014	18-May-2021 00:00	0224_SD007_210520	✓	✓
EB2114450-015	18-May-2021 00:00	0224_SD017_210521	✓	✓
EB2114450-016	18-May-2021 00:00	0224_QC107_210518	✓	✓
EB2114450-017	18-May-2021 00:00	0224_QC108_210519	✓	✓
EB2114450-018	18-May-2021 00:00	0224_QC111_210520	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) — Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT) — Email

[redacted]

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

[redacted]

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2114450**	Page	: 1 of 11
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021 17:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 26-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021 12:46
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 18		
No. of samples analysed	: 18		

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*
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- **Amendment (15/06/2021): This report has been amended to alter the project reference number. All analysis results are as per the previous report.**
- EP231X PFAS: The LOR of particular analytes have been raised on samples '0224_SD009_210519' and '0224_SD018_210520' due to sample matrix interferences.
- EP231X PFAS: High Matrix Spike recovery deemed acceptable as all associated analyte results are less than LOR
- 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**)

Compound	CAS Number	LOR	Unit	Sample ID	0224_SD027_210518	0224_SD012_210519	0224_SD009_210519	0224_SD008_210519	0224_SD014_210519
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
					EB2114450-001	EB2114450-002	EB2114450-003	EB2114450-004	EB2114450-005
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**20.9**	**26.7**	**68.9**	**41.3**	**22.2**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	**0.0005**	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0004	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD027_210518	0224_SD012_210519	0224_SD009_210519	0224_SD008_210519	0224_SD014_210519
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114450-001	EB2114450-002	EB2114450-003	EB2114450-004	EB2114450-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0012	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0005**	<0.0002	**0.0005**	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0005**	<0.0002	**0.0005**	<0.0002	<0.0002
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**114**	**86.0**	**110**	**106**	**113**
13C8-PFOA	----	0.0002	%		**101**	**104**	**106**	**104**	**106**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0224_SD013_210519	0224_SD005_210519	0224_SD004_210519	0224_SD016_210519	0224_SD025_210519
			Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit	EB2114450-006	EB2114450-007	EB2114450-008	EB2114450-009	EB2114450-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**32.2**	**17.6**	**22.0**	**52.1**	**23.4**
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD013_210519	0224_SD005_210519	0224_SD004_210519	0224_SD016_210519	0224_SD025_210519
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114450-006	EB2114450-007	EB2114450-008	EB2114450-009	EB2114450-010
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0002**	<0.0002	<0.0002	<0.0002	<0.0002
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**104**	**102**	**113**	**97.5**	**118**
13C8-PFOA	----	0.0002	%		**104**	**106**	**104**	**102**	**102**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD006_210520	0224_SD018_210520	0224_SD019_210520	0224_SD007_210520	0224_SD017_210521
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114450-011	EB2114450-012	EB2114450-013	EB2114450-014	EB2114450-015
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**30.1**	**20.6**	**31.0**	**21.4**	**39.6**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0003**	<0.0004	**0.0008**	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0004**	**0.0003**	<0.0002	<0.0002	**0.0003**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD006_210520	0224_SD018_210520	0224_SD019_210520	0224_SD007_210520	0224_SD017_210521
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00
Compound	CAS Number	LOR	Unit		EB2114450-011	EB2114450-012	EB2114450-013	EB2114450-014	EB2114450-015
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0007**	**0.0003**	**0.0008**	<0.0002	**0.0003**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0003**	<0.0002	**0.0008**	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0007**	**0.0003**	**0.0008**	<0.0002	**0.0003**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**119**	**94.5**	**117**	**95.5**	**110**
13C8-PFOA	----	0.0002	%		**108**	**107**	**110**	**102**	**110**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0224_QC107_210518	0224_QC108_210519	0224_QC111_210520	----	----
			Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	EB2114450-016	EB2114450-017	EB2114450-018	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**19.5**	**20.1**	**25.1**	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	**0.0005**	<0.0002	<0.0002	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_QC107_210518	0224_QC108_210519	0224_QC111_210520	----	----
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	18-May-2021 00:00	----	----
Compound	CAS Number	LOR	Unit		EB2114450-016	EB2114450-017	EB2114450-018	--------	--------
					Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0005**	<0.0002	<0.0002	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**114**	**97.0**	**131**	----	----
13C8-PFOA	----	0.0002	%		**103**	**97.0**	**100**	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2114450**	Page	: 1 of 7
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 26-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 18		
No. of samples analysed	: 18		

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*
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]		Brisbane Organics, Stafford, QLD

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

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: 3699801)									
EB2114445-002	Anonymous	EA055: Moisture Content	----	0.1	%	61.5	58.9	4.4	0% - 20%
EB2114450-009	0224_SD016_210519	EA055: Moisture Content	----	0.1	%	52.1	47.5	9.3	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3699800)									
EB2114445-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0009	0.0011	19.3	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EB2114450-009	0224_SD016_210519	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699800)									
EB2114445-002	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	0.0007	0.0007	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699800) - continued									
EB2114445-002	Anonymous	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EB2114450-009	0224_SD016_210519	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3699800)									
EB2114445-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EB2114450-009	0224_SD016_210519	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3699800)									
EB2114445-002	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
EB2114450-009	0224_SD016_210519	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

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: 3699800)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	84.5	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00117 mg/kg	75.2	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	81.4	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	83.2	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	83.2	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	87.1	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699800)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	73.3	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.2	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.2	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.8	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.8	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.0	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	81.7	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.8	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	76.1	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	73.9	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	84.3	61.9	137
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.4	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699800)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	79.9	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	81.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	96.7	65.0	137

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: 3699800) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	110	54.8	124

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: 3699800)							
EB2114445-004	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	83.6	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	81.2	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	79.7	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	85.3	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	80.6	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	87.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699800)							
EB2114445-004	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	73.7	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	80.8	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	70.8	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	84.8	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	82.4	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	83.2	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	86.8	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	84.4	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	82.0	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	# 160	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	85.9	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800)							
EB2114445-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	87.6	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	93.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	89.1	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	71.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	79.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	83.2	63.0	144

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800) - continued							
EB2114445-004	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	86.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699800)							
EB2114445-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	85.9	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	87.7	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	87.9	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	76.2	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2114450**	Page	: 1 of 6
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Site	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]	No. of samples received	: 18
Order number	: 60612563 4.1	No. of samples analysed	: 18

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231B: Perfluoroalkyl Carboxylic Acids	EB2114445--004	Anonymous	**Perfluorotridecanoic acid (PFTrDA)**	72629-94-8	160 %	66.0-139%	**Recovery greater than upper data quality objective**

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)								
0224_SD027_210518,	0224_SD012_210519,	**18-May-2021**	**----**	----	----	**26-May-2021**	01-Jun-2021	✓
0224_SD009_210519,	0224_SD008_210519,							
0224_SD014_210519,	0224_SD013_210519,							
0224_SD005_210519,	0224_SD004_210519,							
0224_SD016_210519,	0224_SD025_210519,							
0224_SD006_210520,	0224_SD018_210520,							
0224_SD019_210520,	0224_SD007_210520,							
0224_SD017_210521,	0224_QC107_210518,							
0224_QC108_210519,	0224_QC111_210520							
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0224_SD027_210518,	0224_SD012_210519,	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
0224_SD009_210519,	0224_SD008_210519,							
0224_SD014_210519,	0224_SD013_210519,							
0224_SD005_210519,	0224_SD004_210519,							
0224_SD016_210519,	0224_SD025_210519,							
0224_SD006_210520,	0224_SD018_210520,							
0224_SD019_210520,	0224_SD007_210520,							
0224_SD017_210521,	0224_QC107_210518,							
0224_QC108_210519,	0224_QC111_210520							

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
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
0224_SD027_210518, 0224_SD012_210519, 0224_SD009_210519, 0224_SD008_210519, 0224_SD014_210519, 0224_SD013_210519, 0224_SD005_210519, 0224_SD004_210519, 0224_SD016_210519, 0224_SD025_210519, 0224_SD006_210520, 0224_SD018_210520, 0224_SD019_210520, 0224_SD007_210520, 0224_SD017_210521, 0224_QC107_210518, 0224_QC108_210519, 0224_QC111_210520	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X)							
0224_SD027_210518, 0224_SD012_210519, 0224_SD009_210519, 0224_SD008_210519, 0224_SD014_210519, 0224_SD013_210519, 0224_SD005_210519, 0224_SD004_210519, 0224_SD016_210519, 0224_SD025_210519, 0224_SD006_210520, 0224_SD018_210520, 0224_SD019_210520, 0224_SD007_210520, 0224_SD017_210521, 0224_QC107_210518, 0224_QC108_210519, 0224_QC111_210520	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X)							
0224_SD027_210518, 0224_SD012_210519, 0224_SD009_210519, 0224_SD008_210519, 0224_SD014_210519, 0224_SD013_210519, 0224_SD005_210519, 0224_SD004_210519, 0224_SD016_210519, 0224_SD025_210519, 0224_SD006_210520, 0224_SD018_210520, 0224_SD019_210520, 0224_SD007_210520, 0224_SD017_210521, 0224_QC107_210518, 0224_QC108_210519, 0224_QC111_210520	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓

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
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
0224_SD027_210518, 0224_SD012_210519, 0224_SD009_210519, 0224_SD008_210519, 0224_SD014_210519, 0224_SD013_210519, 0224_SD005_210519, 0224_SD004_210519, 0224_SD016_210519, 0224_SD025_210519, 0224_SD006_210520, 0224_SD018_210520, 0224_SD019_210520, 0224_SD007_210520, 0224_SD017_210521, 0224_QC107_210518, 0224_QC108_210519, 0224_QC111_210520	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓

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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2114077**

Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: [redacted]	Telephone	: [redacted]
Facsimile	: [redacted]	Facsimile	: [redacted]
Project	: QLD_0224_PFASOMP	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 21-May-2021 17:02	Issue Date	: 27-May-2021
Client Requested Due Date	: 02-Jun-2021	Scheduled Reporting Date	: **02-Jun-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 12.8°C, 4.8°C, 12.1°C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 2 / 2

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- ***27/05/2021*: SRN has been resent to acknowledge the change in PFAS analysis for submitted water sample to EP231X-ST as requested by [redacted]. For any further information regarding these adjustments please contact client services at [redacted].**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EB2114077-002	18-May-2021 00:00	0224_SD021_210518	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2114077-001	18-May-2021 00:00	0224_SW021_210518	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) — Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT) — Email

[redacted]

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

[redacted]

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2114077**	Page	: 1 of 7
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021 17:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 27-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021 11:55
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 2		
No. of samples analysed	: 2		

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*
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	Assistant Laboratory Manager	Brisbane Organics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- Amendment (15/06/2021): This report has been amended to alter the project reference. All analysis results are as per the previous report.
- EP231X-ST PFAS Super Trace: Sample '0224_SW021_210518' required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly. The LORs for PFBA, PFPeA and PFTeDA were raised further due to matrix interference.
- EP231X PFAS: Sample "0224_SD021_210518" required dilution due to sample matrix. LOR values have been adjusted accordingly.
- 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	0224_SD021_210518	----	----	----	----
				Sampling date / time	18-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114077-002	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**39.2**	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0012**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0005	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.002	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0005	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0013	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0013	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD021_210518	----	----	----	----
				Sampling date / time	18-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114077-002	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0013	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0013	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0013	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0005	----	----	----	----
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		**0.0012**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0012**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0012**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**130**	----	----	----	----
13C8-PFOA	----	0.0002	%		**85.0**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW021_210518	----	----	----	----
				Sampling date / time	18-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114077-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0016	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0016**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		**0.0040**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.008	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0040	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		**0.0021**	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.112	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW021_210518	----	----	----	----
				Sampling date / time	18-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114077-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.004	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		**0.0077**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		**0.0056**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L		**0.0077**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**96.4**	----	----	----	----
13C8-PFOA	----	0.0005	%		**100**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2114077**	Page	: 1 of 8
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 27-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 2		
No. of samples analysed	: 2		

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*
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	Assistant Laboratory Manager	Brisbane Organics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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: 3702229)									
EB2113878-015	Anonymous	EA055: Moisture Content	----	0.1	%	3.2	3.1	0.0	No Limit
EB2114194-101	Anonymous	EA055: Moisture Content	----	0.1	%	18.5	18.2	1.4	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3699892)									
EB2114077-002	0224_SD021_210518	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0012	0.0012	8.6	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0005	<0.0015	98.7	No Limit
EB2114513-011	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699892)									
EB2114077-002	0224_SD021_210518	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699892) - continued									
EB2114077-002	0224_SD021_210518	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	<0.0013	<0.0012	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.002	<0.002	0.0	No Limit
EB2114513-011	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3699892)									
EB2114077-002	0224_SD021_210518	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0013	<0.0012	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0013	<0.0012	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0013	<0.0012	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0013	<0.0012	0.0	No Limit
EB2114513-011	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3699892)									
EB2114077-002	0224_SD021_210518	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
EB2114513-011	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

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: 3699892)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	85.4	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00117 mg/kg	79.5	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	80.1	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	88.2	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	72.4	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	87.1	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699892)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	83.7	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.2	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.8	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.4	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.4	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.8	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.8	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.6	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.8	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699892)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	92.3	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	81.2	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	85.1	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	84.8	61.9	137
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699892)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	86.8	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	75.0	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	83.8	65.0	137

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: 3699892) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	97.5	54.8	124

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: 3707052)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	94.2	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	83.0	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	97.1	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	101	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	101	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	84.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707052)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	97.5	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	111	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	93.6	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707052)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	85.6	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	104	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	107	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	96.8	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	103	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	90.4	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707052)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	90.7	63.0	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707052) - continued								
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	99.8	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	100	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	108	53.1	133
EP231P: PFAS Sums (QCLot: 3707052)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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: 3699892)							
EB2114446-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	82.3	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	81.6	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	78.4	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	80.7	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	88.8	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	83.3	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699892)							
EB2114446-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	80.8	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	82.8	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	79.6	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	84.4	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	85.2	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	91.6	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	80.4	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	88.0	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	91.2	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	75.2	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	92.0	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699892)							
EB2114446-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	84.0	48.0	128

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699892) - continued							
EB2114446-002	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	87.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	77.9	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	83.8	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	79.6	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	66.0	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	79.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699892)							
EB2114446-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	88.0	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	77.5	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	88.8	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	72.5	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2114077**	Page	: 1 of 5
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Site	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]	No. of samples received	: 2
Order number	: 60612563 4.1	No. of samples analysed	: 2

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055)							
0224_SD021_210518	**18-May-2021**	**----**	----	----	**27-May-2021**	01-Jun-2021	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X)							
0224_SD021_210518	**18-May-2021**	**28-May-2021**	14-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
0224_SD021_210518	**18-May-2021**	**28-May-2021**	14-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X)							
0224_SD021_210518	**18-May-2021**	**28-May-2021**	14-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X)							
0224_SD021_210518	**18-May-2021**	**28-May-2021**	14-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
0224_SD021_210518	**18-May-2021**	**28-May-2021**	14-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	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-ST)							
0224_SW021_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW021_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST)							
0224_SW021_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW021_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST)							
0224_SW021_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓

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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	11	**9.09**	**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-ST	0	13	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	13	**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
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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EB2114445**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: [redacted]	Telephone	: [redacted]
Facsimile	: [redacted]	Facsimile	: [redacted]
Project	: QLD_0224_PFASOMP	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 21-May-2021 17:02	Issue Date	: 26-May-2021
Client Requested Due Date	: 02-Jun-2021	Scheduled Reporting Date	: **02-Jun-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 12.8°C, 4.8°C, 12.1°C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 4 / 4

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- ***26/05/2021*: SRN has been resent to acknowledge the change in PFAS analysis for the water samplers submited to EB231X-ST as per email received from [redacted]. For any further information regarding these adjustments please contact client services at [redacted].**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EB2114445-002	18-May-2021 00:00	0224_SD022_210518	✓	✓
EB2114445-004	18-May-2021 00:00	0224_SD023_210518	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2114445-001	18-May-2021 00:00	0224_SW022_210518	✓
EB2114445-003	18-May-2021 00:00	0224_SW023_210518	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) — Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT) — Email

J[redacted]

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

[redacted]

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2114445**	Page	: 1 of 7
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021 17:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 26-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021 12:29
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- **Amendment (15/06/2021): This report has been amended to alter the project reference number. All analysis results are as per the previous report.**
- EP231X-ST PFAS Super Trace: Samples '0224_SW022_210518' and '0224_SW023_210518' required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly. The LORs for PFBA and PFTeDA were raised further due to matrix interference.
- EP231X PFAS: The LOR of PFHxA for sample “0224_SD023_210518” has been raised due to sample matrix interferences.
- EP231X PFAS: High Matrix Spike recovery deemed acceptable as all associated analyte results are less than LOR
- 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	0224_SD022_210518	0224_SD023_210518	----	----	----
			Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EB2114445-002	EB2114445-004	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**61.5**	**23.7**	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	**0.0009**	<0.0002	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	**0.0007**	<0.0004	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0224_SD022_210518	0224_SD023_210518	----	----	----
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2114445-002	EB2114445-004	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0016**	<0.0002	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0009**	<0.0002	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0016**	<0.0002	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**95.5**	**96.5**	----	----	----
13C8-PFOA	----	0.0002	%		**106**	**104**	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW022_210518	0224_SW023_210518	----	----	----
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2114445-001	EB2114445-003	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0030**	**0.0027**	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		**0.0046**	**0.0030**	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	<0.0016	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.016	<0.012	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		**0.0133**	**0.0177**	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		**0.0024**	**0.0032**	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0016	<0.0016	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0085	<0.0040	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	<0.0016	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	<0.004	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	<0.004	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW022_210518	0224_SW023_210518	----	----	----
				Sampling date / time	18-May-2021 00:00	18-May-2021 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EB2114445-001	EB2114445-003	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	<0.004	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.004	<0.004	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	<0.0016	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	<0.0016	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	<0.002	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	<0.002	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	<0.002	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	<0.002	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		**0.0233**	**0.0266**	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		**0.0076**	**0.0057**	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L		**0.0233**	**0.0266**	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**105**	**95.1**	----	----	----
13C8-PFOA	----	0.0005	%		**95.3**	**98.6**	----	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2114445**	Page	: 1 of 8
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 26-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 4		
No. of samples analysed	: 4		

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*
[redacted]	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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: 3699801)									
EB2114445-002	0224_SD022_210518	EA055: Moisture Content	----	0.1	%	61.5	58.9	4.4	0% - 20%
EB2114450-009	Anonymous	EA055: Moisture Content	----	0.1	%	52.1	47.5	9.3	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3699800)									
EB2114445-002	0224_SD022_210518	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0009	0.0011	19.3	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EB2114450-009	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699800)									
EB2114445-002	0224_SD022_210518	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	0.0007	0.0007	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699800) - continued									
EB2114445-002	0224_SD022_210518	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EB2114450-009	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3699800)									
EB2114445-002	0224_SD022_210518	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EB2114450-009	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3699800)									
EB2114445-002	0224_SD022_210518	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
EB2114450-009	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

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: 3699800)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	84.5	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00117 mg/kg	75.2	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	81.4	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	83.2	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	83.2	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	87.1	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699800)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	73.3	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.2	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.2	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.8	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.8	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.0	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	81.7	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.8	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	76.1	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	73.9	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	84.3	61.9	137
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.4	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699800)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	79.9	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	81.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	96.7	65.0	137

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: 3699800) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	110	54.8	124

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: 3707052)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	94.2	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	83.0	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	97.1	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	101	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	101	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	84.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707052)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	97.5	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	111	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	93.6	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707052)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	85.6	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	104	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	107	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	96.8	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	103	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	90.4	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707052)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	90.7	63.0	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707052) - continued								
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	99.8	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	100	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	108	53.1	133
EP231P: PFAS Sums (QCLot: 3707052)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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: 3699800)							
EB2114445-004	0224_SD023_210518	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	83.6	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	81.2	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	79.7	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	85.3	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	80.6	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	87.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699800)							
EB2114445-004	0224_SD023_210518	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	73.7	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	80.8	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	70.8	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	84.8	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	82.4	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	83.2	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	86.8	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	84.4	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	82.0	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	# 160	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	85.9	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800)							
EB2114445-004	0224_SD023_210518	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	87.6	48.0	128

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699800) - continued							
EB2114445-004	0224_SD023_210518	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	93.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	89.1	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	71.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	79.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	83.2	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	86.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699800)							
EB2114445-004	0224_SD023_210518	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	85.9	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	87.7	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	87.9	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	76.2	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2114445**	Page	: 1 of 5
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Site	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]	No. of samples received	: 4
Order number	: 60612563 4.1	No. of samples analysed	: 4

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							
EP231B: Perfluoroalkyl Carboxylic Acids	EB2114445--004	0224_SD023_210518	**Perfluorotridecanoic acid (PFTrDA)**	72629-94-8	160 %	66.0-139%	**Recovery greater than upper data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **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)								
0224_SD022_210518,	0224_SD023_210518	**18-May-2021**	**----**	----	----	**26-May-2021**	01-Jun-2021	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0224_SD022_210518,	0224_SD023_210518	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X)								
0224_SD022_210518,	0224_SD023_210518	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X)								
0224_SD022_210518,	0224_SD023_210518	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0224_SD022_210518,	0224_SD023_210518	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓

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
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
0224_SD022_210518, 0224_SD023_210518	**18-May-2021**	**29-May-2021**	14-Nov-2021	✓	**31-May-2021**	08-Jul-2021	✓

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-ST)							
0224_SW022_210518, 0224_SW023_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW022_210518, 0224_SW023_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST)							
0224_SW022_210518, 0224_SW023_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW022_210518, 0224_SW023_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST)							
0224_SW022_210518, 0224_SW023_210518	**18-May-2021**	**02-Jun-2021**	14-Nov-2021	✓	**02-Jun-2021**	14-Nov-2021	✓

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	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

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-ST	0	13	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	13	**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
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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EB2114446**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: [redacted]	Telephone	:
Facsimile	: [redacted]	Facsimile	:
Project	: QLD_0224_PFASOMP	Page	: 1 of 3
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 21-May-2021 17:02	Issue Date	: 26-May-2021
Client Requested Due Date	: 02-Jun-2021	Scheduled Reporting Date	: **02-Jun-2021**

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 12.8°C, 4.8°C, 12.1°C - Ice present
Receipt Detail	: MEDIUM ESKY	No. of samples received / analysed	: 2 / 2

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- ***26/05/2021*: SRN has been resent to acknowledge the change in PFAS analysis for the water samplers submited to EB231X-ST as per email received from [redacted]. For any further information regarding these adjustments please contact client services at [redacted].**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EB2114446-002	19-May-2021 00:00	0224_SD024_210519	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2114446-001	19-May-2021 00:00	0224_SW024_210519	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) — Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT) — Email

[redacted]

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

[redacted]

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2114446**	Page	: 1 of 7
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021 17:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 27-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021 12:41
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 2		
No. of samples analysed	: 2		

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*
[redacted]	2IC Organic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- **Amendment (15/06/2021): This report has been amended to alter the project reference number. All analysis results are as per the previous report.**
- EP231X-ST PFAS Super Trace: Sample '0224_SW024_210519' required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly. Some analytes have LOR raised further due to matrix interference.
- 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	0224_SD024_210519	----	----	----	----
				Sampling date / time	19-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114446-002	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**35.4**	----	----	----	----
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		<0.0002	----	----	----	----
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	0224_SD024_210519	----	----	----	----
				Sampling date / time	19-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114446-002	--------	--------	--------	--------
					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		**0.0002**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0002**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**108**	----	----	----	----
13C8-PFOA	----	0.0002	%		**110**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW024_210519	----	----	----	----
				Sampling date / time	19-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114446-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0016	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0016	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		**0.0025**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.012	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0050	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0030	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		**0.0025**	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		**0.0016**	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0025	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0350	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW024_210519	----	----	----	----
				Sampling date / time	19-May-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2114446-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		**0.0066**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		**0.0025**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L		**0.0050**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**93.3**	----	----	----	----
13C8-PFOA	----	0.0005	%		**99.5**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	76	136
13C8-PFOA	----	78	131

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2114446**	Page	: 1 of 8
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 27-May-2021
C-O-C number	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 2		
No. of samples analysed	: 2		

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*
[redacted]	2IC Organic Chemist	Brisbane Inorganics, Stafford, QLD
[redacted]	2IC Organic Chemist	Brisbane Organics, Stafford, QLD

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

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: 3702230)									
EB2114349-016	Anonymous	EA055: Moisture Content	----	0.1	%	12.6	12.2	3.6	0% - 50%
ET2102467-003	Anonymous	EA055: Moisture Content	----	0.1	%	7.4	8.6	15.5	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3699892)									
EB2114077-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0012	0.0012	8.6	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0005	<0.0015	98.7	No Limit
EB2114513-011	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699892)									
EB2114077-002	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3699892) - continued									
EB2114077-002	Anonymous	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	<0.0013	<0.0012	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.002	<0.002	0.0	No Limit
EB2114513-011	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3699892)									
EB2114077-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0013	<0.0012	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0013	<0.0012	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0013	<0.0012	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0013	<0.0012	0.0	No Limit
EB2114513-011	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3699892)									
EB2114077-002	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
EB2114513-011	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

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: 3699892)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	85.4	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00117 mg/kg	79.5	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	80.1	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	88.2	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	72.4	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	87.1	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699892)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	83.7	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.2	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.8	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.4	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.4	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.8	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.8	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.6	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.8	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699892)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	92.3	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	81.2	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	85.1	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	84.8	61.9	137
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699892)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	86.8	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00118 mg/kg	75.0	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	83.8	65.0	137

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: 3699892) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	97.5	54.8	124

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: 3707052)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	94.2	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	83.0	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	97.1	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	101	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	101	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	84.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3707052)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	97.5	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	98.8	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	111	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	93.6	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3707052)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	85.6	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	104	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	107	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	96.8	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	103	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	90.4	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707052)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	90.7	63.0	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3707052) - continued								
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	99.8	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	100	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	108	53.1	133
EP231P: PFAS Sums (QCLot: 3707052)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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: 3699892)							
EB2114446-002	0224_SD024_210519	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	82.3	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	81.6	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	78.4	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	80.7	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	88.8	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	83.3	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3699892)							
EB2114446-002	0224_SD024_210519	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	80.8	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	82.8	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	79.6	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	84.4	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	85.2	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	91.6	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	80.4	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	88.0	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	91.2	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	75.2	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	92.0	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699892)							
EB2114446-002	0224_SD024_210519	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	84.0	48.0	128

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3699892) - continued							
EB2114446-002	0224_SD024_210519	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	87.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	77.9	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	83.8	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	79.6	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	66.0	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	79.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3699892)							
EB2114446-002	0224_SD024_210519	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	88.0	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	77.5	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	88.8	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	72.5	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2114446**	Page	: 1 of 5
Amendment	: **1**		
Client	: **AECOM Australia Pty Ltd**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP_20	Date Samples Received	: 21-May-2021
Site	: ----	Issue Date	: 15-Jun-2021
Sampler	: [redacted]	No. of samples received	: 2
Order number	: 60612563 4.1	No. of samples analysed	: 2

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055)							
0224_SD024_210519	**19-May-2021**	**----**	----	----	**27-May-2021**	02-Jun-2021	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X)							
0224_SD024_210519	**19-May-2021**	**28-May-2021**	15-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
0224_SD024_210519	**19-May-2021**	**28-May-2021**	15-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X)							
0224_SD024_210519	**19-May-2021**	**28-May-2021**	15-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X)							
0224_SD024_210519	**19-May-2021**	**28-May-2021**	15-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X)							
0224_SD024_210519	**19-May-2021**	**28-May-2021**	15-Nov-2021	✓	**31-May-2021**	07-Jul-2021	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	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-ST)							
0224_SW024_210519	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_210519	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_210519	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_210519	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_210519	**19-May-2021**	**02-Jun-2021**	15-Nov-2021	✓	**02-Jun-2021**	15-Nov-2021	✓

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	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	11	**9.09**	**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-ST	0	13	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	13	**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
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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

Australian Government
Department of Industry, Innovation and Science

National Measurement Institute

SAMPLE RECEIPT NOTIFICATION

CUSTOMER DETAILS

Attention: [redacted]

Customer: AECOM AUSTRALIA PTY LTD

Address: LEVEL 8
FORTITUDE VALLEY QLD 4006

Email: [redacted]

Telephone:

Fax:

LABORATORY DETAILS

Lab: National Measurement Institute

Contact: [redacted]

Address: 105 Delhi Road, North Ryde, NSW
NSW 2113

Email: [redacted]

Telephone: [redacted]

Fax:

SAMPLE DETAILS

NMI Job Name: **AECO06/210527**

Total No. of Samples: **9**

LRNs	Estimated Report Date	Customer Sample ID	Lab Sample Description
N21/013597	7-JUN-2021	0224_QC206_210518	WATER 18/05/2021

N21/013598	7-JUN-2021	0224_QC209_210519	WATER 19/05/2021
N21/013599	7-JUN-2021	0224_QC210_210520	WATER 20/05/2021
N21/013600	7-JUN-2021	0224_QC207_210518	SEDIMENT 18/05/2021
N21/013601	7-JUN-2021	0224_QC208_210519	SEDIMENT 19/05/2021
N21/013602	7-JUN-2021	0224_QC211_210520	SEDIMENT 20/05/2021
N21/013603	7-JUN-2021	0224_QC212_210521	WATER 21/05/2021
N21/013604	7-JUN-2021	0224_QC213_210521	WATER 21/05/2021
N21/013605	7-JUN-2021	0224_QC214_210521	WATER 21/05/2021

SAMPLE RECEIVED CONDITION

Date samples received:	27-MAY-2021
Sample received in good order:	Yes
NMI Quotation no. provided:	QLD_0224_PFASOMP
Client purchase order number:	60612563_4_1
Temperature of samples:	Chilled
Comments:	Sample ID's were amended as per advised.
Mode of Delivery:	Courier

Additional Terms and Conditions

Incomplete / unclear information about samples or required testing will delay the start of the analysis work.

If you require your Purchase Order (PO) number to be included on our invoice, please provide the number during sample submission and before the completion of work to avoid unnecessary delays and/or additional processing/handling fees.

The lodgement of an order or receipt of samples for NMI services referenced in this Sample Receipt Notification constitutes an acceptence of the current version of NMI Terms and Conditions or other applicable Terms referenced in the NMI Quotation. NMI Terms and Conditions are available on the web at https://www.industry.gov.au/client-services/testing-and-analysis-services/chemical-and-biological-analysis-services-terms-and-conditions

REPORT OF ANALYSIS

Client	: AECOM AUSTRALIA PTY LTD	**Job No.**	: AECO06/210527
	LEVEL 8	**Quote No.**	: QT-02018
	540 WICKHAM STREET	**Order No.**	: 60612563_4_1
		Date Received	: 27-MAY-2021
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: QLD_0224_PFASOMP_20		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N21/013600	0224_QC207_210518	SEDIMENT 18/05/2021
N21/013601	0224_QC208_210519	SEDIMENT 19/05/2021
N21/013602	0224_QC211_210520	SEDIMENT 20/05/2021

Lab Reg No.		N21/013600	N21/013601	N21/013602		
Date Sampled		18-MAY-2021	19-MAY-2021	20-MAY-2021		
	Units					Method
PFAS (per-and poly-fluoroalkyl substances)						
PFBA (375-22-4)	mg/kg	<0.002	<0.002	<0.002		NR70
PFPeA (2706-90-3)	mg/kg	<0.002	<0.002	<0.002		NR70
PFHxA (307-24-4)	mg/kg	<0.001	<0.001	<0.001		NR70
PFHpA (375-85-9)	mg/kg	<0.001	<0.001	<0.001		NR70
PFOA (335-67-1)	mg/kg	<0.001	<0.001	<0.001		NR70
PFNA (375-95-1)	mg/kg	<0.001	<0.001	<0.001		NR70
PFDA (335-76-2)	mg/kg	<0.001	<0.001	<0.001		NR70
PFUdA (2058-94-8)	mg/kg	<0.002	<0.002	<0.002		NR70
PFDoA (307-55-1)	mg/kg	<0.002	<0.002	<0.002		NR70
PFTrDA (72629-94-8)	mg/kg	<0.002	<0.002	<0.002		NR70
PFTeDA (376-06-7)	mg/kg	<0.002	<0.002	<0.002		NR70
PFHxDA (67905-19-5)	mg/kg	<0.002	<0.002	<0.002		NR70
PFODA (16517-11-6)	mg/kg	<0.005	<0.005	<0.005		NR70
FOUEA (70887-84-2)	mg/kg	<0.001	<0.001	<0.001		NR70
PFBS (375-73-5)	mg/kg	<0.001	<0.001	<0.001		NR70
PFPeS (2706-91-4)	mg/kg	<0.001	<0.001	<0.001		NR70
PFHxS (355-46-4)	mg/kg	<0.001	<0.001	<0.001		NR70
PFHpS (375-92-8)	mg/kg	<0.001	<0.001	<0.001		NR70
PFOS (1763-23-1)	mg/kg	<0.002	<0.002	<0.002		NR70
PFNS (68259-12-1)	mg/kg	<0.001	<0.001	<0.001		NR70
PFDS (335-77-3)	mg/kg	<0.001	<0.001	<0.001		NR70
PFOSA (754-91-6)	mg/kg	<0.001	<0.001	<0.001		NR70
N-MeFOSA (31506-32-8)	mg/kg	<0.002	<0.002	<0.002		NR70
N-EtFOSA (4151-50-2)	mg/kg	<0.002	<0.002	<0.002		NR70
N-MeFOSAA (2355-31-9)	mg/kg	<0.002	<0.002	<0.002		NR70
N-EtFOSAA(2991-50-6)	mg/kg	<0.002	<0.002	<0.002		NR70
N-MeFOSE (24448-09-7)	mg/kg	<0.005	<0.005	<0.005		NR70
N-EtFOSE (1691-99-2)	mg/kg	<0.005	<0.005	<0.005		NR70

REPORT OF ANALYSIS

Lab Reg No.		N21/013600	N21/013601	N21/013602		
Date Sampled		18-MAY-2021	19-MAY-2021	20-MAY-2021		
	Units					Method
PFAS (per-and poly-fluoroalkyl substances)						
4:2 FTS (757124-72-4)	mg/kg	<0.001	<0.001	<0.001		NR70
6:2 FTS (27619-97-2)	mg/kg	<0.001	<0.001	<0.001		NR70
8:2 FTS (39108-34-4)	mg/kg	<0.001	<0.001	<0.001		NR70
10:2 FTS (120226-60-0)	mg/kg	<0.002	<0.002	<0.002		NR70
8:2 diPAP (678-41-1)	mg/kg	<0.002	<0.002	<0.002		NR70
PFBA (Surrogate Recovery)	%	109	116	120		NR70
PFPeA (Surrogate Recovery)	%	110	103	110		NR70
PFHxA (Surrogate Recovery)	%	108	98	117		NR70
PFHpA (Surrogate Recovery)	%	119	106	113		NR70
PFOA (Surrogate Recovery)	%	120	109	117		NR70
PFNA (Surrogate Recovery)	%	103	102	117		NR70
PFDA (Surrogate Recovery)	%	110	97	109		NR70
PFUdA (Surrogate Recovery)	%	115	108	129		NR70
PFDoA (Surrogate Recovery)	%	116	103	121		NR70
PFTeDA (Surrogate Recovery)	%	132	121	121		NR70
PFHxDA (Surrogate Recovery)	%	104	108	112		NR70
FOUEA (Surrogate Recovery)	%	63	63	128		NR70
PFBS (Surrogate Recovery)	%	107	92	109		NR70
PFHxS (Surrogate Recovery)	%	110	104	114		NR70
PFOS (Surrogate Recovery)	%	95	116	104		NR70
PFOSA (Surrogate Recovery)	%	89	100	99		NR70
N-MeFOSA (Surrogate Recovery)	%	104	92	116		NR70
N-EtFOSA (Surrogate Recovery)	%	106	133	102		NR70
N-MeFOSAA (Surrogate Recovery)	%	107	93	104		NR70
N-EtFOSAA (Surrogate Recovery)	%	139	98	132		NR70
N-MeFOSE (Surrogate Recovery)	%	94	103	99		NR70
N-EtFOSE (Surrogate Recovery)	%	94	108	72		NR70
4:2 FTS (Surrogate Recovery)	%	80	66	73		NR70
6:2 FTS (Surrogate Recovery)	%	87	94	72		NR70
8:2 FTS (Surrogate Recovery)	%	88	93	88		NR70
8:2 diPAP (Surrogate Recovery)	%	95	69	67		NR70
Dates						
Date extracted		31-MAY-2021	31-MAY-2021	31-MAY-2021		
Date analysed		1-JUN-2021	1-JUN-2021	1-JUN-2021		

N21/013600
to
N21/013602

REPORT OF ANALYSIS

PFOS and PFHxS are quantified using a combined branched and linear standard,
linear and branched isomers are totalled for reporting.
All results corrected for labelled surrogate recoveries.

[redacted]

Organics - NSW
Accreditation No. 198

04-JUN-2021

Lab Reg No.		N21/013600	N21/013601	N21/013602		
Date Sampled		18-MAY-2021	19-MAY-2021	20-MAY-2021		
	Units					Method
Trace Elements						
Total Solids	%	82.1	81.3	74.8		NT2_49
Dates						
Date extracted		31-MAY-2021	31-MAY-2021	31-MAY-2021		
Date analysed		1-JUN-2021	1-JUN-2021	1-JUN-2021		

[redacted]

Inorganics - NSW
Accreditation No. 198

04-JUN-2021

All results are expressed on a dry weight basis.

REPORT OF ANALYSIS

Report No. RN1316916

Client	: AECOM AUSTRALIA PTY LTD	**Job No.**	: AECO06/210527
	LEVEL 8	**Quote No.**	: QT-02018
	540 WICKHAM STREET	**Order No.**	: 60612563_4_1
		Date Received	: 27-MAY-2021
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: QLD_0224_PFASOMP_20		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N21/013597	0224_QC206_210518	WATER 18/05/2021
N21/013598	0224_QC209_210519	WATER 19/05/2021
N21/013599	0224_QC210_210520	WATER 20/05/2021

Lab Reg No.			N21/013597	N21/013598	N21/013599		
Date Sampled			18-MAY-2021	19-MAY-2021	20-MAY-2021		
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
PFBA (375-22-4)		ug/L	0.011	<0.005	<0.005		NR70
PFPeA (2706-90-3)		ug/L	0.0073	<0.002	<0.002		NR70
PFHxA (307-24-4)		ug/L	0.0051	<0.001	<0.001		NR70
PFHpA (375-85-9)		ug/L	0.0022	<0.001	<0.001		NR70
PFOA (335-67-1)		ug/L	0.0016	<0.001	<0.001		NR70
PFNA (375-95-1)		ug/L	<0.001	<0.001	<0.001		NR70
PFDA (335-76-2)		ug/L	<0.001	<0.001	<0.001		NR70
PFUdA (2058-94-8)		ug/L	<0.001	<0.001	<0.001		NR70
PFDoA (307-55-1)		ug/L	<0.001	<0.001	<0.001		NR70
PFTrDA (72629-94-8)		ug/L	<0.002	<0.002	<0.002		NR70
PFTeDA (376-06-7)		ug/L	<0.002	<0.002	<0.002		NR70
PFHxDA (67905-19-5)		ug/L	<0.002	<0.002	<0.002		NR70
PFODA (16517-11-6)		ug/L	<0.005	<0.005	<0.005		NR70
FOUEA (70887-84-2)		ug/L	<0.001	<0.001	<0.001		NR70
PFBS (375-73-5)		ug/L	0.0016	<0.001	<0.001		NR70
PFPeS (2706-91-4)		ug/L	0.0015	<0.001	<0.001		NR70
PFHxS (355-46-4)		ug/L	0.011	0.0015	<0.001		NR70
PFHpS (375-92-8)		ug/L	<0.001	<0.001	<0.001		NR70
PFOS (1763-23-1)		ug/L	0.0078	0.0023	<0.002		NR70
PFNS (68259-12-1)		ug/L	<0.001	<0.001	<0.001		NR70
PFDS (335-77-3)		ug/L	<0.001	<0.001	<0.001		NR70
PFOSA (754-91-6)		ug/L	<0.001	<0.001	<0.001		NR70
N-MeFOSA (31506-32-8)		ug/L	<0.002	<0.002	<0.002		NR70
N-EtFOSA (4151-50-2)		ug/L	<0.002	<0.002	<0.002		NR70
N-MeFOSAA (2355-31-9)		ug/L	<0.002	<0.002	<0.002		NR70
N-EtFOSAA(2991-50-6)		ug/L	<0.002	<0.002	<0.002		NR70
N-MeFOSE (24448-09-7)		ug/L	<0.005	<0.005	<0.005		NR70
N-EtFOSE (1691-99-2)		ug/L	<0.005	<0.005	<0.005		NR70

REPORT OF ANALYSIS

Lab Reg No.			N21/013597	N21/013598	N21/013599		
Date Sampled			18-MAY-2021	19-MAY-2021	20-MAY-2021		
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
4:2 FTS (757124-72-4)		ug/L	<0.001	<0.001	<0.001		NR70
6:2 FTS (27619-97-2)		ug/L	<0.001	<0.001	<0.001		NR70
8:2 FTS (39108-34-4)		ug/L	<0.001	<0.001	<0.001		NR70
10:2 FTS (120226-60-0)		ug/L	<0.001	<0.001	<0.001		NR70
8:2 diPAP (678-41-1)		ug/L	<0.002	<0.002	<0.002		NR70
PFBA (Surrogate Recovery)		%	88	95	91		NR70
PFPeA (Surrogate Recovery)		%	42	61	43		NR70
PFHxA (Surrogate Recovery)		%	69	82	68		NR70
PFHpA (Surrogate Recovery)		%	82	80	81		NR70
PFOA (Surrogate Recovery)		%	86	90	87		NR70
PFNA (Surrogate Recovery)		%	84	85	86		NR70
PFDA (Surrogate Recovery)		%	79	81	76		NR70
PFUdA (Surrogate Recovery)		%	78	80	72		NR70
PFDoA (Surrogate Recovery)		%	63	71	56		NR70
PFTeDA (Surrogate Recovery)		%	66	55	42		NR70
PFHxDA (Surrogate Recovery)		%	60	45	44		NR70
FOUEA (Surrogate Recovery)		%	73	63	58		NR70
PFBS (Surrogate Recovery)		%	66	81	69		NR70
PFHxS (Surrogate Recovery)		%	89	92	87		NR70
PFOS (Surrogate Recovery)		%	84	88	94		NR70
PFOSA (Surrogate Recovery)		%	63	63	57		NR70
N-MeFOSA (Surrogate Recovery)		%	47	35	38		NR70
N-EtFOSA (Surrogate Recovery)		%	62	37	46		NR70
N-MeFOSAA (Surrogate Recovery)		%	55	53	51		NR70
N-EtFOSAA (Surrogate Recovery)		%	67	54	52		NR70
N-MeFOSE (Surrogate Recovery)		%	54	68	47		NR70
N-EtFOSE (Surrogate Recovery)		%	55	42	46		NR70
4:2 FTS (Surrogate Recovery)		%	124	100	119		NR70
6:2 FTS (Surrogate Recovery)		%	88	52	62		NR70
8:2 FTS (Surrogate Recovery)		%	64	70	60		NR70
8:2 diPAP (Surrogate Recovery)		%	103	123	116		NR70
Dates							
Date extracted			2-JUN-2021	2-JUN-2021	2-JUN-2021		
Date analysed			3-JUN-2021	3-JUN-2021	3-JUN-2021		

N21/013597
to
N21/013599

PFOS and PFHxS are quantified using a combined branched and linear standard,
linear and branched isomers are totalled for reporting.
All results corrected for labelled surrogate recoveries.

Selected PFAS surrogate recoveries are biased due to matrix effects.ô
Surrogate recoveries low for selected analytes - PFAS LORs not raised since S/N >10.

[redacted]
Organics - NSW
Accreditation No. 198

04-JUN-2021

REPORT OF ANALYSIS

Report No. RN1316916

Client	: AECOM AUSTRALIA PTY LTD	**Job No.**	: AECO06/210527
	LEVEL 8	**Quote No.**	: QT-02018
	540 WICKHAM STREET	**Order No.**	: 60612563_4_1
		Date Received	: 27-MAY-2021
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: QLD_0224_PFASOMP_20		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N21/013603	0224_QC212_210521	WATER 21/05/2021
N21/013604	0224_QC213_210521	WATER 21/05/2021
N21/013605	0224_QC214_210521	WATER 21/05/2021

Lab Reg No.			N21/013603	N21/013604	N21/013605		
Date Sampled			21-MAY-2021	21-MAY-2021	21-MAY-2021		
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
PFBA (375-22-4)		ug/L	<0.05	<0.05	<0.05		NR70
PFPeA (2706-90-3)		ug/L	<0.02	<0.02	<0.02		NR70
PFHxA (307-24-4)		ug/L	<0.01	<0.01	<0.01		NR70
PFHpA (375-85-9)		ug/L	<0.01	<0.01	<0.01		NR70
PFOA (335-67-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFNA (375-95-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFDA (335-76-2)		ug/L	<0.01	<0.01	<0.01		NR70
PFUdA (2058-94-8)		ug/L	<0.01	<0.01	<0.01		NR70
PFDoA (307-55-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFTrDA (72629-94-8)		ug/L	<0.02	<0.02	<0.02		NR70
PFTeDA (376-06-7)		ug/L	<0.02	<0.02	<0.02		NR70
PFHxDA (67905-19-5)		ug/L	<0.02	<0.02	<0.02		NR70
PFODA (16517-11-6)		ug/L	<0.05	<0.05	<0.05		NR70
FOUEA (70887-84-2)		ug/L	<0.01	<0.01	<0.01		NR70
PFDS (335-77-3)		ug/L	<0.01	<0.01	<0.01		NR70
PFPeS (2706-91-4)		ug/L	<0.01	0.020	<0.01		NR70
PFHxS (355-46-4)		ug/L	0.064	0.17	<0.01		NR70
PFHpS (375-92-8)		ug/L	<0.01	<0.01	<0.01		NR70
PFOS (1763-23-1)		ug/L	0.028	0.025	<0.02		NR70
PFNS (68259-12-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFBS (375-73-5)		ug/L	<0.01	0.018	<0.01		NR70
PFOSA (754-91-6)		ug/L	<0.01	<0.01	<0.01		NR70
N-MeFOSA (31506-32-8)		ug/L	<0.02	<0.02	<0.02		NR70
N-EtFOSA (4151-50-2)		ug/L	<0.02	<0.02	<0.02		NR70
N-MeFOSAA (2355-31-9)		ug/L	<0.01	<0.01	<0.01		NR70
N-EtFOSAA(2991-50-6)		ug/L	<0.01	<0.01	<0.01		NR70
N-MeFOSE (24448-09-7)		ug/L	<0.05	<0.05	<0.05		NR70
N-EtFOSE (1691-99-2)		ug/L	<0.05	<0.05	<0.05		NR70

REPORT OF ANALYSIS

Lab Reg No.			N21/013603	N21/013604	N21/013605		
Date Sampled			21-MAY-2021	21-MAY-2021	21-MAY-2021		
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
4:2 FTS (757124-72-4)		ug/L	<0.01	<0.01	<0.01		NR70
6:2 FTS (27619-97-2)		ug/L	<0.01	<0.01	<0.01		NR70
8:2 FTS (39108-34-4)		ug/L	<0.01	<0.01	<0.01		NR70
10:2 FTS (120226-60-0)		ug/L	<0.01	<0.01	<0.01		NR70
8:2 diPAP (678-41-1)		ug/L	<0.02	<0.02	<0.02		NR70
PFBA (Surrogate Recovery)		%	89	95	89		NR70
PFPeA (Surrogate Recovery)		%	95	86	91		NR70
PFHxA (Surrogate Recovery)		%	99	86	90		NR70
PFHpA (Surrogate Recovery)		%	95	87	96		NR70
PFOA (Surrogate Recovery)		%	102	88	91		NR70
PFNA (Surrogate Recovery)		%	67	87	85		NR70
PFDA (Surrogate Recovery)		%	70	85	86		NR70
PFUdA (Surrogate Recovery)		%	70	89	79		NR70
PFDoA (Surrogate Recovery)		%	73	87	84		NR70
PFTeDA (Surrogate Recovery)		%	75	86	90		NR70
PFHxDA (Surrogate Recovery)		%	93	86	95		NR70
FOUEA (Surrogate Recovery)		%	76	67	68		NR70
PFBS (Surrogate Recovery)		%	83	79	77		NR70
PFHxS (Surrogate Recovery)		%	93	85	87		NR70
PFOS (Surrogate Recovery)		%	81	89	88		NR70
PFOSA (Surrogate Recovery)		%	57	68	67		NR70
N-MeFOSA (Surrogate Recovery)		%	60	44	51		NR70
N-EtFOSA (Surrogate Recovery)		%	71	64	54		NR70
N-MeFOSAA (Surrogate Recovery)		%	50	69	81		NR70
N-EtFOSAA (Surrogate Recovery)		%	68	80	74		NR70
N-MeFOSE (Surrogate Recovery)		%	88	65	48		NR70
N-EtFOSE (Surrogate Recovery)		%	63	56	78		NR70
4:2 FTS (Surrogate Recovery)		%	65	67	68		NR70
6:2 FTS (Surrogate Recovery)		%	71	71	66		NR70
8:2 FTS (Surrogate Recovery)		%	59	63	57		NR70
8:2 diPAP (Surrogate Recovery)		%	145	107	149		NR70
Dates							
Date extracted			1-JUN-2021	1-JUN-2021	1-JUN-2021		
Date analysed			1-JUN-2021	1-JUN-2021	1-JUN-2021		

N21/013603
to
N21/013605

REPORT OF ANALYSIS

PFOS and PFHxS are quantified using a combined branched and linear standard,
linear and branched isomers are totalled for reporting.
All results corrected for labelled surrogate recoveries.

Selected PFAS surrogate recoveries are biased due to matrix effects.ô
Surrogate recoveries low for selected analytes - PFAS LORs not raised since S/N >10.

[redacted]
Organics - NSW
Accreditation No. 198

04-JUN-2021

NATA
ACCREDITED FOR
TECHNICAL
COMPETENCE

Accredited for compliance with ISO/IEC 17025 - Testing.
This report shall not be reproduced except in full.
Results relate only to the sample(s) as received and tested.

This Report supersedes reports: *RN1316770*

Measurement Uncertainty is available upon request.
Chemical Accreditation 198: 105 Delhi Road, North Ryde, NSW, 2113

Australian Government

National Measurement Institute

QUALITY ASSURANCE REPORT

Client: AECOM AUSTRALIA PTY LTD

NMI QA Report No: AECO06/210527 **Sample Matrix:** Liquid

Analyte	Method	LOR	Blank	Sample Duplicates			Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		ug/L	ug/L	ug/L	ug/L	%	%	%
PFBA (375-22-4)	NR70	0.005	<0.005	NA	NA	NA	108	NA
PFPeA (2706-90-3)	NR70	0.002	<0.002	NA	NA	NA	104	NA
PFHxA (307-24-4)	NR70	0.001	<0.001	NA	NA	NA	109	NA
PFHpA (375-85-9)	NR70	0.001	<0.001	NA	NA	NA	102	NA
PFOA (335-67-1)	NR70	0.001	<0.001	NA	NA	NA	99	NA
PFNA (375-95-1)	NR70	0.001	<0.001	NA	NA	NA	102	NA
PFDA (335-76-2)	NR70	0.001	<0.001	NA	NA	NA	112	NA
PFUdA (2058-94-8)	NR70	0.001	<0.001	NA	NA	NA	99	NA
PFDoA (307-55-1)	NR70	0.001	<0.001	NA	NA	NA	104	NA
PFTrDA (72629-94-8)	NR70	0.002	<0.002	NA	NA	NA	99	NA
PFTeDA (376-06-7)	NR70	0.002	<0.002	NA	NA	NA	106	NA
PFHxDA (67905-19-5)	NR70	0.002	<0.002	NA	NA	NA	109	NA
PFODA (16517-11-6)	NR70	0.005	<0.005	NA	NA	NA	117	NA
FOUEA (70887-84-2)	NR70	0.001	<0.001	NA	NA	NA	113	NA
PFBS (375-73-5)	NR70	0.001	<0.001	NA	NA	NA	112	NA
PFPeS (2706-91-4)	NR70	0.001	<0.001	NA	NA	NA	111	NA
PFHxS (355-46-4)	NR70	0.001	<0.001	NA	NA	NA	102	NA
PFHpS (375-92-8)	NR70	0.001	<0.001	NA	NA	NA	101	NA
PFOS (1763-23-1)	NR70	0.002	<0.002	NA	NA	NA	121	NA
PFNS (68259-12-1)	NR70	0.001	<0.001	NA	NA	NA	106	NA
PFDS (335-77-3)	NR70	0.001	<0.001	NA	NA	NA	100	NA
PFOSA (754-91-6)	NR70	0.001	<0.001	NA	NA	NA	104	NA
N-MeFOSA (31506-32-8)	NR70	0.002	<0.002	NA	NA	NA	95	NA
N-EtFOSA (4151-50-2)	NR70	0.002	<0.002	NA	NA	NA	133	NA
N-MeFOSAA (2355-31-9)	NR70	0.002	<0.002	NA	NA	NA	102	NA
N-EtFOSAA(2991-50-6)	NR70	0.002	<0.002	NA	NA	NA	104	NA
N-MeFOSE (24448-09-7)	NR70	0.005	<0.005	NA	NA	NA	106	NA
N-EtFOSE (1691-99-2)	NR70	0.005	<0.005	NA	NA	NA	108	NA
4:2 FTS (757124-72-4)	NR70	0.001	<0.001	NA	NA	NA	122	NA
6:2 FTS (27619-97-2)	NR70	0.001	<0.001	NA	NA	NA	116	NA
8:2 FTS (39108-34-4)	NR70	0.001	<0.001	NA	NA	NA	86	NA
10:2 FTS (120226-60-0)	NR70	0.001	<0.001	NA	NA	NA	85	NA
8:2 diPAP (678-41-1)	NR70	0.002	<0.002	NA	NA	NA	102	NA

Results expressed in percentage (%) or ug/L wherever appropriate.
Acceptable Spike recovery is 50-150%.
Maximum acceptable RPDs on spikes and duplicates is 40%.
'NA ' = Not Applicable.
RPD= Relative Percentage Difference.

Signed: [redacted]

[redacted]
Organics Manager, NMI-North Ryde

Date: **3/06/2021**

Australian Government

National Measurement Institute

QUALITY ASSURANCE REPORT

Client: AECOM AUSTRALIA PTY LTD

NMI QA Report No: AECO06/210527 **Sample Matrix:** Liquid

Analyte	Method	LOR	Blank	Sample Duplicates			Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		ug/L	ug/L	ug/L	ug/L	%	%	%
PFBA (375-22-4)	NR70	0.05	<0.05	NA	NA	NA	112	NA
PFPeA (2706-90-3)	NR70	0.02	<0.02	NA	NA	NA	105	NA
PFHxA (307-24-4)	NR70	0.01	<0.01	NA	NA	NA	98	NA
PFHpA (375-85-9)	NR70	0.01	<0.01	NA	NA	NA	109	NA
PFOA (335-67-1)	NR70	0.01	<0.01	NA	NA	NA	110	NA
PFNA (375-95-1)	NR70	0.01	<0.01	NA	NA	NA	94	NA
PFDA (335-76-2)	NR70	0.01	<0.01	NA	NA	NA	110	NA
PFUdA (2058-94-8)	NR70	0.01	<0.01	NA	NA	NA	103	NA
PFDoA (307-55-1)	NR70	0.01	<0.01	NA	NA	NA	105	NA
PFTrDA (72629-94-8)	NR70	0.02	<0.02	NA	NA	NA	102	NA
PFTeDA (376-06-7)	NR70	0.02	<0.02	NA	NA	NA	102	NA
PFHxDA (67905-19-5)	NR70	0.02	<0.02	NA	NA	NA	109	NA
PFODA (16517-11-6)	NR70	0.05	<0.05	NA	NA	NA	117	NA
FOUEA (70887-84-2)	NR70	0.01	<0.01	NA	NA	NA	110	NA
PFBS (375-73-5)	NR70	0.01	<0.01	NA	NA	NA	116	NA
PFPeS (2706-91-4)	NR70	0.01	<0.01	NA	NA	NA	115	NA
PFHxS (355-46-4)	NR70	0.01	<0.01	NA	NA	NA	103	NA
PFHpS (375-92-8)	NR70	0.01	<0.01	NA	NA	NA	105	NA
PFOS (1763-23-1)	NR70	0.02	<0.02	NA	NA	NA	107	NA
PFNS (68259-12-1)	NR70	0.01	<0.01	NA	NA	NA	105	NA
PFDS (335-77-3)	NR70	0.01	<0.01	NA	NA	NA	110	NA
PFOSA (754-91-6)	NR70	0.01	<0.01	NA	NA	NA	103	NA
N-MeFOSA (31506-32-8)	NR70	0.02	<0.02	NA	NA	NA	96	NA
N-EtFOSA (4151-50-2)	NR70	0.02	<0.02	NA	NA	NA	102	NA
N-MeFOSAA (2355-31-9)	NR70	0.01	<0.01	NA	NA	NA	107	NA
N-EtFOSAA(2991-50-6)	NR70	0.01	<0.01	NA	NA	NA	102	NA
N-MeFOSE (24448-09-7)	NR70	0.05	<0.05	NA	NA	NA	86	NA
N-EtFOSE (1691-99-2)	NR70	0.05	<0.05	NA	NA	NA	104	NA
4:2 FTS (757124-72-4)	NR70	0.01	<0.01	NA	NA	NA	104	NA
6:2 FTS (27619-97-2)	NR70	0.01	<0.01	NA	NA	NA	119	NA
8:2 FTS (39108-34-4)	NR70	0.01	<0.01	NA	NA	NA	104	NA
10:2 FTS (120226-60-0)	NR70	0.01	<0.01	NA	NA	NA	91	NA
8:2 diPAP (678-41-1)	NR70	0.02	<0.02	NA	NA	NA	108	NA

Results expressed in percentage (%) or ug/L wherever appropriate.
Acceptable Spike recovery is 50-150%.
Maximum acceptable RPDs on spikes and duplicates is 40%.
'NA ' = Not Applicable.
RPD= Relative Percentage Difference.

Signed: [redacted]

Organics Manager, NMI-North Ryde

Date: **2/06/2021**

Australian Government

National Measurement Institute

QUALITY ASSURANCE REPORT

Client: AECOM AUSTRALIA PTY LTD

NMI QA Report No: AECO06/210527 **Sample Matrix:** Solid

Analyte	Method	LOR	Blank	Sample Duplicates			Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		mg/kg	mg/kg	mg/kg	mg/kg	%	%	%
				N21/013602				N21/013602
PFBA (375-22-4)	NR70	0.002	<0.002	<0.002	<0.002	-	105	92
PFPeA (2706-90-3)	NR70	0.002	<0.002	<0.002	<0.002	-	98	88
PFHxA (307-24-4)	NR70	0.001	<0.001	<0.001	<0.001	-	96	104
PFHpA (375-85-9)	NR70	0.001	<0.001	<0.001	<0.001	-	95	88
PFOA (335-67-1)	NR70	0.001	<0.001	<0.001	<0.001	-	100	93
PFNA (375-95-1)	NR70	0.001	<0.001	<0.001	<0.001	-	91	91
PFDA (335-76-2)	NR70	0.001	<0.001	<0.001	<0.001	-	88	93
PFUdA (2058-94-8)	NR70	0.002	<0.002	<0.002	<0.002	-	94	98
PFDoA (307-55-1)	NR70	0.002	<0.002	<0.002	<0.002	-	96	95
PFTrDA (72629-94-8)	NR70	0.002	<0.002	<0.002	<0.002	-	91	75
PFTeDA (376-06-7)	NR70	0.002	<0.002	<0.002	<0.002	-	97	92
PFHxDA (67905-19-5)	NR70	0.002	<0.002	<0.002	<0.002	-	104	106
PFODA (16517-11-6)	NR70	0.005	<0.005	<0.005	<0.005	-	102	103
FOUEA (70887-84-2)	NR70	0.001	<0.001	<0.001	<0.001	-	92	92
PFBS (375-73-5)	NR70	0.001	<0.001	<0.001	<0.001	-	102	103
PFPeS (2706-91-4)	NR70	0.001	<0.001	<0.001	<0.001	-	102	104
PFHxS (355-46-4)	NR70	0.001	<0.001	<0.001	<0.001	-	98	90
PFHpS (375-92-8)	NR70	0.001	<0.001	<0.001	<0.001	-	96	94
PFOS (1763-23-1)	NR70	0.002	<0.002	<0.002	<0.002	-	105	90
PFNS (68259-12-1)	NR70	0.001	<0.001	<0.001	<0.001	-	97	91
PFDS (335-77-3)	NR70	0.001	<0.001	<0.001	<0.001	-	94	103
PFOSA (754-91-6)	NR70	0.001	<0.001	<0.001	<0.001	-	91	84
N-MeFOSA (31506-32-8)	NR70	0.002	<0.002	<0.002	<0.002	-	88	109
N-EtFOSA (4151-50-2)	NR70	0.002	<0.002	<0.002	<0.002	-	73	109
N-MeFOSAA (2355-31-9)	NR70	0.002	<0.002	<0.002	<0.002	-	97	98
N-EtFOSAA(2991-50-6)	NR70	0.002	<0.002	<0.002	<0.002	-	92	99
N-MeFOSE (24448-09-7)	NR70	0.005	<0.005	<0.005	<0.005	-	136	103
N-EtFOSE (1691-99-2)	NR70	0.005	<0.005	<0.005	<0.005	-	104	78
4:2 FTS (757124-72-4)	NR70	0.001	<0.001	<0.001	<0.001	-	93	105
6:2 FTS (27619-97-2)	NR70	0.001	<0.001	<0.001	<0.001	-	100	101
8:2 FTS (39108-34-4)	NR70	0.001	<0.001	<0.001	<0.001	-	93	81
10:2 FTS (120226-60-0)	NR70	0.002	<0.002	<0.002	<0.002	-	110	144
8:2 diPAP (678-41-1)	NR70	0.002	<0.002	<0.002	<0.002	-	109	94

Results expressed in percentage (%) or mg/kg wherever appropriate.
Acceptable Spike recovery is 50-150%.
Maximum acceptable RPDs on spikes and duplicates is 40%.
'NA ' = Not Applicable.
RPD= Relative Percentage Difference.

Signed: [redacted]

[redacted]
Organics Manager, NMI-North Ryde

Date: **2/06/2021**

Appendix F

Equipment Calibration Certificates

D R A F T

Appendix F Equipment Calibration Certificates

EQUIPMENT CERTIFICATION REPORT

KENNARDS HIRE

PGN9003871 WATER QUALITY METER – MULTIFUNCTION (YSI)

Plant Number: 10722254

SENSOR	CONCENTRATION	SPAN 1	SPAN 2	TRACEABILITY	PASS
pH	pH 7	pH 7		358580	☑
pH	pH 4	pH 4		357330	☑
Conductivity	2.76 mS/cm	2.76 mS/cm		345199	☑
Dissolvent Oxygen	Sodium Sulphite / Air	0.0ppm in Sodium Sulphite	ppm Saturation in Air	10640	☑
ORP	240mV	240mV		5766	☑

Battery Status 90 (%)	Temperature 19.6 °C
Electrical Test & Tag (AS/NZS 3760)	Electrodes Cleaned and Checked

Note: Calibration solution traceability information is available upon request.

Please clean/decontaminate instrument and accessories before returning. A minimum 'Cleaning Fee' $55.00 (Inc GST) may apply if instrument is returned contaminated.

Checked By: [redacted] Date: 17/5/21 Signed: [redacted]

Accessories List:

User's Manual	pH and ORP Storage Solution	Transit Case

EQUIPMENT CERTIFICATION REPORT

KENNARDS HIRE

PGN9003842-9003846 - INTERFACE METER

Plant Number: 235224

Probe Length: 30m

ITEM	TEST	PASS	COMMENTS
Battery	Compartment / Capacity	☑	9v
Probe	Clean / Operation	☑	
Earth Lead	Check if equipped	☑	
Tape Check	Cleaned / Checked for cuts	☑	
Function test	At surface level	☑	

Note: Calibration traceability information is available upon request.

Please clean/decontaminate instrument and accessories before returning. A minimum 'Cleaning Fee' $55.00 (Inc GST) may apply if instrument is returned contaminated.

Checked By: [redacted] Date: 17/5/21 Signed: [redacted]

Accessories List:

Interface Meter	Tape Guide	Decon 90 Solution
Brush	Spare 9v Battery	Instruction Manual
Transport Box		

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	OMP WBTA	**Project Number:**	60612563 4.1
Project Location:	WBTA	**Client:**	DoD
PM Name:	[redacted]	**Fieldwork Staff Name:**	J[redacted]

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	~~YSI~~ Kennards
Make and Model:	YSI
Serial Number:	16722544

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:	19/5/21				
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:	7.0	4.0	2760	0	
Calibration Reading:	6.83	5.98	2658		
Calibration Temperature:	17.6	17.6	17.6		

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

☐ Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.

[redacted] — **Fieldwork Staff Signature**

[redacted] — **Date**

Distribution: Project Central File

AECOM

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	OMP WBTA	**Project Number:**	60612563 4.1
Project Location:	WBTA	**Client:**	DoD
PM Name:	[redacted]	**Fieldwork Staff Name:**	[redacted]

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	Kennards
Make and Model:	YSI
Serial Number:	1072254

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:	20/5/21				
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:	7.00	4.00	2760	0	
Calibration Reading:	6.97	3.91	2714	0	
Calibration Temperature:	18.3	18.3	18.4	18.5	

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

☐ Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.

[redacted] _____ [redacted]

Fieldwork Staff Signature **Date**

Distribution: Project Central File

AECOM

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	OMP WBTA	**Project Number:**	60612563 4.1
Project Location:	WBTA	**Client:**	DoD
PM Name:	[redacted]	**Fieldwork Staff Name:**	[redacted]

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	Kennards
Make and Model:	YSI
Serial Number:	10722554

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:	21/5/21				
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:	7.03	4.00	2760	0	
Calibration Reading:	6.92	4.02	2719	0.5	
Calibration Temperature:	17.9	17.8	18.6	18.5	

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

☐ Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.

[redacted] — **Fieldwork Staff Signature**

[redacted] — **Date**

Distribution: Project Central File

Appendix F

Equipment Calibration Certificates

Appendix F Equipment Calibration Certificates

Multi Parameter Water Meter

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument YSI Quatro Pro Plus
Serial No. 19C104402

Post Callibration Reading

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00	**NIST**	335072	pH 6.99
2. pH 4.00		pH 4.00	**NIST**	351412	pH 4.00
3. mV		245.5mV	**NIST**	345754/342074	245.5mV
4. EC		2.44mS	**NIST**	343511	2.44mS
6. D.O		0%	**NIST**	10690	-0.10%
7. Temp		18.8.oC	**NIST**	MultiTherm 09000528	19.1.oC

Calibrated by: **Siobhan Watts**

Calibration date: **23-Oct-20**

Next calibration due: **21-Apr-21**

Prepared for
Department of Defence
ABN: 68706814312

Sampling Event Factual Report, November 2021

PFAS OMP - Wide Bay Training Area

20-Jan-2022
Doc No. 60612563_RP_045_0_220120

aecom.com

Delivering a better world

Sampling Event Factual Report, November 2021

PFAS OMP - Wide Bay Training Area

Client: Department of Defence

ABN: 68706814312

Prepared by

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3056 4800 www.aecom.com
ABN 20 093 846 925

20-Jan-2022

Job No.: 60612563

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 and ISO45001.

Quality Information

Document	Sampling Event Factual Report, November 2021
Ref	60612563
Date	20-Jan-2022
Prepared by	Camden McCosker
Reviewed by	James Peachey

Revision History

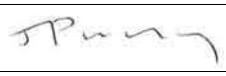
Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	15-Dec-2021	Draft	James Peachey Associate Director	
B	13-Jan-2022	Draft	James Peachey Associate Director	
0	20-Jan-2022	Final	James Peachey Associate Director	

Table of Contents

List of Tables (in Text)

List of Figures (in Appendix A)

List of Tables (in Appendix B)

Abbreviation	
ALS	Australian Laboratory Services
ASC NEPM	Assessment of Site Contamination National Environment Protection Measure 1999 (as amended 2013)
COC	Chain of Custody
DCMM	Defence Contamination Management Manual
Defence	Department of Defence
DO	Dissolved oxygen
EC	Electrical conductivity
HEPA	Heads of Environmental Protection Agencies
IP	Interface probe
LOR	Limit of reporting
mAHD	metres Australian height datum
mbtoc	Metres below top of casing
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan
NHMRC	National Health and Medical Research Council
NMI	National Measurement Institute
OMP	Ongoing management plan
ORP	Oxidation reduction potential
PFAS	Per- and poly-fluorinated alkyl substances
PFHxS	Perfluorohexane sulfonate
PFOA	Perflurooctanoic acid
PFOS	Perflurooctanesulfonic acid
PMAP	PFAS management area plan
POL	Paints, oil and lubricants
QA/QC	Quality assurance / quality control
QLD	Queensland
RPD	Relative percent difference
SAQP	Sampling analysis and quality plan
SWL	Standing water level
WBTA	Wide Bay Training Area
WWTP	Wastewater treatment plant

Units of Measurement			
L	Litres	m	Metres
mg	Milligram	ha	Hectares
kg	Kilogram	µg	Microgram
mV	Millivolts		

1.0 Introduction

1.1 General

AECOM Australia Pty Ltd (AECOM) has been engaged by the Department of Defence (Defence) to implement the per- and poly-fluoroalkyl substances (PFAS) Ongoing Monitoring Program (OMP) (Defence, 2020) at the Wide Bay Training Area (WBTA) (the 'Site') and the WBTA Management Area in the South Queensland Region. The locations of the Site and the Management Area are shown in **Figure 1** in **Appendix A**. The OMP for WBTA (Defence, 2020) includes the following sampling events:

- Biannual sampling events in October 2020, April 2021, October 2021, April 2022, October 2022 and April 2023 including:
  - groundwater sampling of 17 on-Site groundwater monitoring wells and five off-Site groundwater monitoring wells
  - surface water sampling of creeks and dams at 13 on-Site and seven off-Site sampling locations
  - tap sampling of the two on-Site groundwater extraction bores
  - tap sampling of the treated wastewater from the outlet tap of the Camp Kerr wastewater treatment plant (WWTP).
- Sediment samples (co-located with the surface water samples) at creeks and dams to be collected once per year in April 2021, April 2022 and April 2023.
- Up to two event-based sampling of the WWTP during times of high site usage.

Following each sampling event, a sampling event factual report will be prepared. Annual interpretative reports will be prepared following the completion of each 12-month sampling period.

This sampling event factual report has been prepared to report the results of the biannual sampling event completed in November 2021, specifically highlighting any first-time detections and/or first-time exceedances of human health or ecological (freshwater species) screening criteria for PFHxS+PFOS and / or PFOA.

The sampling event presented in this report was planned for October 2021, however it was delayed until November 2021 due to training activities within the WBTA Management Area preventing safe access to the base.

This report has been prepared in accordance with the *PFAS OMP Factual Report Guidance,* v0.2, May 2021 (Defence, 2021).

1.2 Objectives

The objectives of the OMP program are to:

- Implement the OMP prepared as part of the PFAS Management Area Plan (PMAP); and
- Collect data that will enable Defence to maintain an up-to-date understanding of the distribution, concentration and transport of PFAS at the Site and WBTA Management Area.

The data will assist in the timely identification of risks and inform Defence's approach to the management of PFAS, including updates and revisions to the PMAP.

The objective of this phase of works is to implement the scope of works for the biannual November 2021 sampling event (identified in **Section 2.0**) in accordance with the Sampling and Analysis Quality Plan (SAQP) (AECOM, 2021a).

2.0 Scope of Work

The biannual sampling event at WBTA was completed in accordance with the SAQP (AECOM, 2021a). In summary, the scope of work for this sampling event included:

- Obtaining access to private properties where some surface water sampling locations are situated.
- Review of the SAQP prior to the monitoring event to ensure compliance with the following:
  - PFAS National Environmental Management Plan (NEMP) (Heads of Environmental Protection Authorities [HEPA], 2020)
  - National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B1, as amended in 2013 (ASC NEPM, 2013)
  - Defence Routine Environment Water Quality Monitoring Manual
  - AS/NZ 5667:1998 Water quality – Sampling
  - Australian and New Zealand Guidelines for Fresh and Marine Water Quality; and
  - Relevant State regulatory guidelines.
- Gauging of groundwater level at 22 locations including 17 on-Site and five off-Site monitoring wells (located on Council / State land) prior to collection of samples[1] (refer to **Table 1** below, and **Figure 2** and **Figure 3** in **Appendix A** for specific locations).
- Tap sampling of the two on-Site groundwater extraction bores (refer to **Table 1** below and **Figure 3** in **Appendix A** for specific locations).
- Tap sampling of the treated wastewater from the outlet tap of the Camp Kerr WWTP (refer to **Table 2** below and **Figure 3** in **Appendix A** for specific location).
- Collection of surface water samples at 20 locations including 13 on-Site and seven off-Site locations (refer to **Table 3** below, and **Figure 2** and **Figure 3** in **Appendix A**). One off-Site location was not accessible as the stakeholder did not respond to the access request, refer to **Table 8**.
- Collecting field quality control samples including field duplicate and triplicate samples at a rate of 1 in 10 primary samples and collecting one rinsate sample per fieldwork day as per the SAQP.
- Analysis of all groundwater samples for the PFAS suite at the standard limit of reporting (LOR).
- Analysis of all surface water samples for the PFAS suite at trace levels of detection.
- Analysis of WWTP outlet sample for the PFAS suite at the standard LOR.
- Data management of all OMP field and laboratory data in the Defence ESdat database.
- Preparation of results letters for off-site stakeholders.
- Preparation of this Sampling Event Factual Report.

[1] Two groundwater sampling locations, POT001 and POT005, have pumps installed and consequently groundwater levels cannot be gauged.

Table 1 Groundwater Sampling Locations

Location	Monitoring Well
Paints, oils and lubricants (POL) Refuelling point	MW101, MW102, MW115
Airfield	MW103, MW104, MW105
Southern site boundary	MW106
Electronic Classification Range	MW107
Landfill 1	MW108
Eastern site boundary	MW109
Multiuser Firing Point Range	MW110
Possible demonstration area	MW111
WWTP discharge areas	MW112, MW113*, MW114*, MW120, MW121, MW122
Central portion of Camp Kerr	MW119
Down-gradient / cross-gradient of Camp Kerr	MW116*, MW117*, MW118*
Water treatment plant	POT001, POT005
Note: * denotes off-site sampling location	

Table 2 Wastewater Sampling Locations

Description	Tapwater Sampling Locations
Wastewater treatment plant outlet	OTH001

Table 3 Surface Water Sampling Locations

Area	Description	Surface Water Sampling Locations
Creek	Kauri Creek	SW004, SW008, SW012
	Mosquito Creek	SW005
	Kangaroo Creek	SW006, SW07, SW009
	Snapper Creek	SW013, SW014, SW016
Drainage Channel	Site entrance (receives runoff from WWTP discharge areas)	SW017
	Vehicle wash point drainage channel	SW018
	Ponded water from surface water flows flowing overland from Camp Kerr	SW019
	Drainage pipe at Clyde Road discharging runoff from Camp Kerr to residential dam	SW027*
	Ephemeral waterway draining residential dams in Wallu	SW025*
Dams	Residential dams in Wallu	SW020*, SW021*, SW022*, SW023*, SW024*
Note: * denotes off-site sampling location		

3.0 Methodology

The methodology used for the November 2021 sampling event was in accordance with the SAQP (AECOM, 2021a) and is summarised below.

3.1 Groundwater Sampling Methodology

Table 4 Groundwater Sampling Methodology

Item	Details
Groundwater gauging	The depth to groundwater was measured in each monitoring well immediately prior to collection of groundwater samples using an interface probe. Due to ongoing training activities in different areas of the Base at the time of the fieldworks, areas of the Base were only accessible at specific times/days. Consequently, groundwater gauging data were collected over several days, between 08 and 10 November 2021.
Groundwater quality parameter field measurements	Temperature, electrical conductivity (EC), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH and observations of water quality were recorded for all groundwater samples. Equipment calibration certificates are provided in **Appendix F**.
Sampling methodology	Groundwater samples were collected from all monitoring wells using no-purge methodology HydraSleeves™, which were installed within the screened interval of each well, approximately 1 m above the base of the well (the target depth is shown in **Table T1** in **Appendix A**), for a minimum of 24 hours prior to the sampling round. Once sampling was completed, new HydraSleeves™ were deployed at the screened interval depth in preparation for the next sampling round. Tap samples from extraction bores were collected by opening the tap / valve and allowing the water to run for approximately three minutes prior to sample collection. Water samples were collected by placing the laboratory provided sample bottle beneath the tap outlet.
Sample analysis	All primary samples were submitted for PFAS suite using the standard levels of detection. ALS Environmental (ALS) Brisbane, Queensland was used as the primary laboratory. The National Measurement Institute (NMI) of Sydney, NSW was used as the secondary laboratory. ALS and NMI methods for groundwater analyses were certified by the National Association of Testing Authorities (NATA). Chain of custody (COC) forms and laboratory certificates are presented in **Appendix D** and **Appendix E** respectively.
QA/QC Samples	Field quality assurance (QA) / quality control (QC) samples collected included intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and rinsate samples. Refer to **Appendix C** for assessment of QA/QC sample data.

3.2 Surface Water Sampling Methodology

Table 5 Surface Water Sampling Methodology

Item	Details
Surface water parameter field measurements	Temperature, electrical conductivity, dissolved oxygen, oxidation-reduction potential, pH and observations of water quality were recorded for all surface water samples. Equipment calibration certificates are provided in **Appendix F**.
Sampling methodology	Samples were collected from immediately below the water surface to minimise collection of sediment or floating materials in the samples. At each location, a new, laboratory-supplied container was lowered into the water with the cap immediately applied once the container was full.
Sample analysis	All primary samples were submitted for PFAS suite using the trace levels of detection. ALS Brisbane, Queensland was used as the primary laboratory. NMI of Sydney, NSW was used as the secondary laboratory. ALS and NMI methods for groundwater analyses were certified by the NATA. COC forms and laboratory certificates are presented in **Appendix D** and **Appendix E** respectively.
QA/QC Samples	Field QA/QC samples collected included intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and rinsate samples. Refer to **Appendix C** for assessment of QA/QC sample data.

3.3 Wastewater Sampling Methodology

Table 6 Wastewater Sampling Methodology

Item	Details
Locations sampled	OTH001 was collected from an outlet at the WWTP.
Sampling methodology	The tap/valve was opened and water allowed to run for approximately one minute prior to a sample being collected. A laboratory provided sample bottle was placed beneath the tap outlet. The sample bottle was filled to the top to ensure no headspace and the cap was immediately applied. The sample bottle was immediately placed in a cooler with cooling media.
Sample analysis	The sample was submitted for PFAS suite using the standard levels of detection.

3.4 Adopted Screening Criteria

Adopted screening criteria references national guidance in the form of the PFAS National Environmental Management Plan (NEMP), Defence estate and environmental strategies, and Defence PFAS-specific strategies and guidance. Guidance documents used to assess the dataset includes the following:

- PFAS NEMP v2.0 (HEPA, 2020)
- Department of Health, 2019. Health Based Guidance Values for PFAS for use in site investigations in Australia. April 2017 [updated September, 2019]
- National Health and Medical Research Council (NHMRC), 2019. Guidance on PFAS in Recreational Water. August 2019 (NHMRC, 2019)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B1, as amended in 2013.

The adopted PFAS screening criteria to assess the data generated as part of the OMP are presented in **Table 7** below.

Table 7 Summary of Adopted Screening Criteria

Pathway	Compound	Criteria	Comment / Reference
Human Health Receptors			
Drinking water - groundwater	PFOS + PFHxS	0.07 µg/L	The values are from HEPA (2020). *All groundwater results will be compared to these criteria.*
	PFOA	0.56 µg/L	
Recreational use – surface water	PFOS + PFHxS	2 µg/L	The values are from NHMRC (2019). *All surface water results will be compared to these criteria.*
	PFOA	10 µg/L	
Ecological Receptors			
Freshwater (99% species protection values)	PFOS	0.00023 µg/L	The values are from the HEPA (2020). The 99% level of protection has been applied for slightly to moderately disturbed ecosystems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. For the purposes of preliminary screening of analytical water results, the laboratory LOR will be adopted rather than sole use of the criteria value. *All surface water (except SW025) and groundwater results will be compared to these criteria.*
	PFOA	19 µg/L	
Freshwater (95% species protection values)	PFOS	0.13 µg/L	Surface water in the ephemeral waterway south of Clyde Road (SW025) should be screened against freshwater ecological guidelines for slight to moderately disturbed ecosystems (95% species protection).
	PFOA	220 µg/L	

3.5 Data Quality Objectives and Data Validation

The data quality objectives and data quality indicators adopted for these works are presented in the SAQP (AECOM, 2021a).

Data validation assessment is provided in **Appendix C**.

The data validation procedure employed in the assessment of the field and laboratory QA/QC data indicated that the reported analytical results are representative of the sample locations and that the overall quality of the analytical data produced is acceptably reliable for the purpose of this report.

All data collected during this event has been reviewed and uploaded to the Defence ESdat database in accordance with Defence Contamination Management Manual (Defence 2018, amended August 2019) requirements.

3.6 Deviations from the SAQP

Table 8 lists the deviations from the SAQP (AECOM, 2021a) during this sampling event.

Table 8 Deviations from the SAQP during the November 2021 Sampling Event

SAQP	Sampling Event
The biannual event was scheduled for October 2021	The sampling event was delayed until November 2021 due to ongoing training activities at WBTA.
Surface water sampling at SW020	SW020 is located on private property The property ownership changed in early 2021. Access permission was not provided by the new owners and consequently surface water sampling could not be conducted.

4.0 Field Observations and Results

The November 2021 biannual sampling event was completed between 08 and 11 November 2021. The results are summarised in following sections.

4.1 Groundwater

4.1.1 Groundwater Observations and Quality Parameter Field Measurements

Table 9 Groundwater Observations and Quality Parameter Field Measurements

Compound	Criteria
Access	All monitoring wells and bores were accessible.
Monitoring Well Network	Covers to the groundwater monitoring wells were noted to be in good condition at the time of sampling.
Field Observations	No visible or olfactory indications of contamination were observed during the sampling of the groundwater monitoring wells. Field observations are presented **Table T1** in **Appendix B**.
Depth to Groundwater	Depth to groundwater in the monitoring wells was between 1.29 (MW110) metres below top of casing (mbtoc) and 15.66 mbtoc (MW101). Groundwater elevations in these wells were between 6.12 metres above Australian Height Datum (mAHD) (MW109) and 70.30 mAHD (MW119). Groundwater gauging data are presented in **Table T1** in **Appendix B**.
Groundwater Flow Direction	Inferred groundwater contours and groundwater flow directions in the greater WBTA area in November 2021 are shown on **Figure 4** in **Appendix A**. The inferred local groundwater flow direction is generally from the southwest to the northeast, towards Tin Can Bay Inlet. Inferred groundwater contours and groundwater flow directions within and immediately adjacent to Camp Kerr between 08 and 10 November 2021 are shown on **Figure 5** in **Appendix A**. A groundwater divide appears to be present in the central portion of Camp Kerr with groundwater to the east of the groundwater divide flowing towards the east. Groundwater to the west of the groundwater divide appears to be flowing to the west and southwest towards Wallu, and towards the south. The observed groundwater divide is consistent with that observed in previous investigations (AECOM, 2020) and previous OMP sampling events in October 2020 and May 2021 (AECOM, 2021b and c).
Groundwater Quality Parameter Field Measurements	Groundwater quality parameters were measured prior to collecting groundwater samples. The readings are presented in **Table T1** in **Appendix B** and are summarised below: • Electrical conductivity ranged from 53.9 µS/cm (MW114) to 659 µS/cm (MW105) indicating fresh conditions. • pH ranged from 3.64 (MW110) to 14.3 (MW108) with a mean pH of 8.3 generally indicating slightly alkaline conditions. • Corrected redox ranged from 189.4 mV (MW108) to 377.2 mV (MW110) indicating mildly to moderately reducing conditions. • Temperature ranged from 22.1°C (MW117) to 27.0°C (POT005). • The dissolved oxygen results ranged between 0.14 mg/L (MW105) and 3.93 mg/L (MW103) indicating poorly to moderately oxygenated conditions.
Weather Conditions	Weather conditions during groundwater sampling were overcast with rainfall on all four days (08 to 11 November 2021). There was a total of 113.0 mm of rainfall during this period.

Compound	Criteria
Estate Management Works or Training Activities	During the sampling event no notable estate works or training activities were observed in the vicinity of sampling locations.

4.1.2 PFAS Groundwater Analytical Results

The PFAS groundwater analytical results from this sampling event are presented in **Table T2** in **Appendix B**. There were no first-time detections or first-time exceedances of the human health guideline values in the November 2021 sampling event for PFOA and sum of PFHxS+PFOS. Two groundwater samples exceeded the HEPA (2020) drinking water guideline value for sum of PFHxS and PFOS (MW121 and MW122). These two groundwater samples also reported PFOS above the limit of reporting at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of freshwater species. There were no exceedances of the human health or ecological guidelines values for PFOA.

With the exception of PFHxS, no PFAS compounds were detected at concentrations that exceeded the limit of reporting in groundwater samples from the two extraction bores, Bore 1 (POT001) and Bore 2 (POT005). PFHxS was detected equal to the limit of reporting in the sample from POT001. Sum of PFHxS+PFOS, PFOS and PFOA concentrations did not exceed the human health or ecological guideline values in these potable water samples.

4.2 Surface Water

4.2.1 Surface Water Observations and Quality Parameter Field Measurements

Table 10 Surface Water Observations and Quality Parameter Field Measurements

Compound	Criteria
Access	Nineteen of the 20 surface water sampling locations were accessible during the November 2021 sampling event. Prior to conducting sampling on private properties, access permissions were obtained from stakeholders. SW020 was not sampled as the stakeholder did not respond to the access permission request.
Field Observations	No visual or olfactory indications of contamination were observed during the sampling of the surface water sampling locations. Field observations are presented in **Table T3** in **Appendix B**.
Surface Water Quality Parameter Field Measurements	Surface water quality parameters were measured prior to collecting surface water samples. The readings are presented in **Table T3** in **Appendix B** and are summarised below: • Dissolved oxygen ranged from 1.25 mg/L (SW021) to 6.84 mg/L (SW016). The measurements generally indicated moderately to well oxygenated conditions. • With the exception of SW008, SW012 and SW013, electrical conductivity ranged from 15.1 µS/cm (SW018) to 463.6 µS/cm (SW014) indicating fresh conditions in inland creeks and dams. The three surface water samples from estuarine environments had between 401.0 µS/cm (SW008) and 51,448 µS/cm (SW012) indicating brackish to saline conditions. • pH ranged from 3.75 (SW021) to 9.63 (SW027). pH results generally indicated slightly acidic to basic conditions. • Corrected redox ranged from 228.8 mV (SW021) to 385.8 mV (SW019) indicating mildly reducing conditions. • Temperature ranged from 22.4°C (SW009) and 27.7°C (SW023).

Compound	Criteria
Weather Conditions	Weather conditions during surface water sampling were overcast with rainfall on all four days (08 to 11 November 2021). There was a total of 113.0 mm of rainfall during this period.
Estate Management Works or Training Activities	During the sampling event no notable estate works or training activities were observed in the vicinity of sampling locations.

4.2.2 PFAS Surface Water Analytical Results

The PFAS surface water analytical results from this sampling event are presented in **Table T4** in **Appendix B**. There were no first-time detections or first-time exceedances of the human health guideline values in the November 2021 sampling event for PFOA and sum of PFHxS+PFOS. Three surface water samples reported PFOS above the limit of reporting at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of fresh / marine water species. No surface water samples reported PFOA at concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection of fresh / marine water species.

Concentrations of PFOS and PFOA at SW025 did not exceed the HEPA (2020) ecological guideline value for 95% species protection of freshwater species.

4.3 Wastewater Observations, Quality Parameter Field Measurements and Analytical Results

Wastewater observations and quality parameter field measurements are presented in **Table T5**, **Appendix B**. The water was clear with no sheen or odour. The field parameters indicated the water was neutral, fresh, well oxygenated and oxidising.

The PFAS analytical results for the wastewater sample is presented in **Table T6** in **Appendix B**. None of the concentrations exceeded the limit of reporting. There were no first-time detections of PFAS or exceedances of the human health guideline values in the November 2021 sampling event.

5.0 Summary and Next Sampling Event

5.1 Summary of Monitoring Event

A biannual groundwater, surface water and wastewater monitoring event was completed at the WBTA Management Area between 08 and 11 November 2021. The event included sampling of groundwater from 22 monitoring wells, two extraction bores, one wastewater sample from the WWTP and 19 surface water sampling locations. **Table 11** summarises the findings of the biannual November 2021 sampling event and the recommended actions.

Table 11 Summary of Sampling Event

Item	Comment	Recommended Actions
Access to sampling locations	All 24 monitoring well/bore locations were accessible and able to be sampled. The WWTP outlet was able to be sampled. Nineteen out of twenty surface water sampling location were accessible and able to be sampled. One sample location (SW020) could not be sampled as the stakeholder did not provide access permission.	As access permission has not been provided for sampling location SW020 for two consecutive events, the location will be reviewed in the interpretative report. The sampling location could be removed or replaced with a suitable alternative.
Monitoring well network condition	No issues were identified in the 22 monitoring wells sampled.	None.
Analytical results	PFAS concentrations in all groundwater, surface and wastewater samples were consistent with historical results. Sum of PFHxS and PFOS concentrations exceeded the HEPA (2020) drinking water guidelines value in two groundwater samples. PFOS concentrations in three surface water samples exceeded the HEPA (2020) ecological guideline value (99% species protection).	Ongoing monitoring in accordance with the OMP.
First-time detections of sum of PFHxS+PFOS or PFOA	There were no first-time detections of sum of PFHxS+PFOS or PFOA in the 24 groundwater samples, the 19 surface water samples or the wastewater sample.	Ongoing monitoring in accordance with the OMP.
First time exceedance of HEPA (2020) drinking water or recreational use guidelines	There were no first-time exceedances of the HEPA (2020) drinking water guidelines or NHMRC (2019) recreational use guidelines.	Ongoing monitoring in accordance with the OMP.

5.2 Upcoming Sampling Events

The next biannual sampling event is scheduled for April 2022.

5.3 Upcoming Annual Interpretive Report

The next annual interpretative report is scheduled for January 2022.

6.0 References

AECOM, 2020, *PFAS Detailed Site Investigation*, WBTA, Rev 0, September 2020.

AECOM, 2021a, *PFAS OMP - WBTA Sampling and Analysis Quality Plan*, Revision 4, 23 April 2021.

AECOM, 2021b, *Sampling Event Factual Report, October 2020, PFAS OMP – Wide Bay Training Area,* 23 April 2021.

AECOM, 2021c, *Sampling Event Factual Report, May 2021, PFAS OMP – Wide Bay Training Area,* 5 August 2021.

ASC NEPM, 2013. *Schedule B2. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B2 Guideline on Site Characterisation*.

ASC NEPM, 2013. *Schedule B4. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B4 Guideline on Site-Specific Health Risk Assessment Methodology*.

ASC NEPM, 2013. *Schedule B7. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B7 Guideline on Derivation of Health-Based Investigation Levels*.

Australian and New Zealand Governments and Australian state and territory governments [ANZG]. , 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

Department of Defence, July 2018, Amended August 2019, *Defence Contamination Management Manual.*

Department of Defence, 2020. *Wide Bay Training Area – PFAS Management Area Plan*, Version 7, September 2020.

Department of Defence, 2021. *PFAS OMP Factual Report Guidance*, Version 0.2, May 2021.

Department of Health, 2019. *Health Based Guidance Values for PFAS for use in site investigations in Australia*. 2017, as updated in 2019.

Heads of EPAs Australia and New Zealand, 2020. *PFAS National Environmental Management Plan*. January 2020.

National Health and Medical Research Council, 2019. *Guidance on PFAS in Recreational Water. August 2019*. August 2019.

Appendix A

Figures

Appendix A Figures

G:\ENV\GIS\Projects\60\60580555 Wide Bay Training Area\FIGURES\60580555 F2 Investigation Area 08 01 2020 TO Rev B

AECOM Imagine it. Delivered.

LOCATION OF WBTA AND MANAGEMENT AREA

November 2021 Sampling Event

Wide Bay Training Area, Queensland

FIGURE 1

Pioneer Point Boat Ramp
Tin Can Bay
Inskip
Pannikin Island
UOTF/EHTA
Demolition Range
SW012
Old Boat Ramp/Sentry Post
Little Sandy Creek
Airstrip UAV
24m Tower
Wide Bay Training Area
SW005
SW008
Mosquito Creek
Tookar Creek
Griffin Creek
Forward Operating Base
SW009
Carlo Island
AGR/SGR/DFSW
SW004
Kauri Creek
Kingfisher Creek
Easy Feature/MUFP/MCR/BIF
Quarry
Tin Can Bay
Tin Can Bay Waste Transfer Station and Sewage Treatment Works
Ammunition Storage
MW110
MW109
SW013
SW014
Maryborough - Cooloola Road
SW07
Range/ECR
MW104
MW105
MW107
MW108
SW06
Landfill 1
MW103
SW016
Tin Can Bay Road
Area shown in Figure 3
MW111
MW106
Wallu Heights
Rainbow Beach Road
Snapper Creek
Wallu
Tuan Creek
Cooloola Cove
Toolara
Teewah Point
North Cooloola Point
South Cooloola Point
Poverty Point
Snapper Point
Smooger Point
Tin Can Inlet

KEY
- Wide Bay Training Area
- Management Area
- Great Sandy Strait Ramsar
- Parks and recreation reserves
- Major road
- Road
- Watercourse
- Surface water sample location
- Groundwater monitoring well location

0 2km

G:\ENV\GIS\Projects\60\60580555 Wide Bay Training Area\FIGURES\60580555 F5 Sample Locations (Greater WBTA) 08 01 2020 TO Rev B

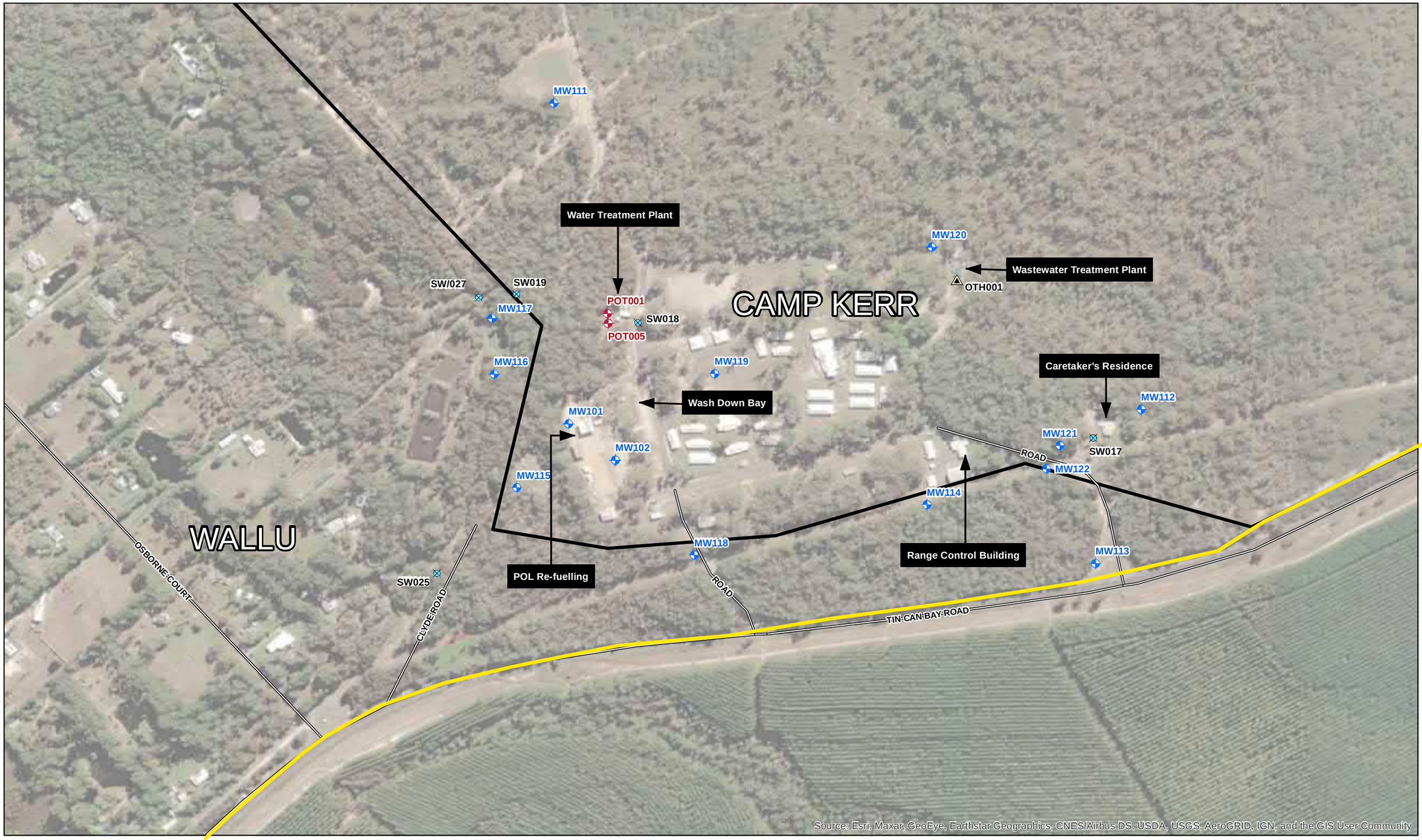
AECOM Imagine it. Delivered.

UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SAMPLING LOCATIONS (GREATER WIDE BAY TRAINING AREA)

November 2021 Sampling Event
Wide Bay Training Area, Queensland

FIGURE 2



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE

0 50 100 200

metres

1:4,500 (when printed at A3)

LEGEND

- Waste Water Treatment Plant Sampling Location
- Abstraction Bore
- Groundwater sampling location
- Surface water sampling location
- Road
- WBTA Property Boundary
- WBTA Management Area

Note that not all sampling locations are shown for privacy reasons.

Wide Bay Training Area, Queensland

SAMPLING LOCATIONS (CAMP KERR)

November 2021 Sampling Event

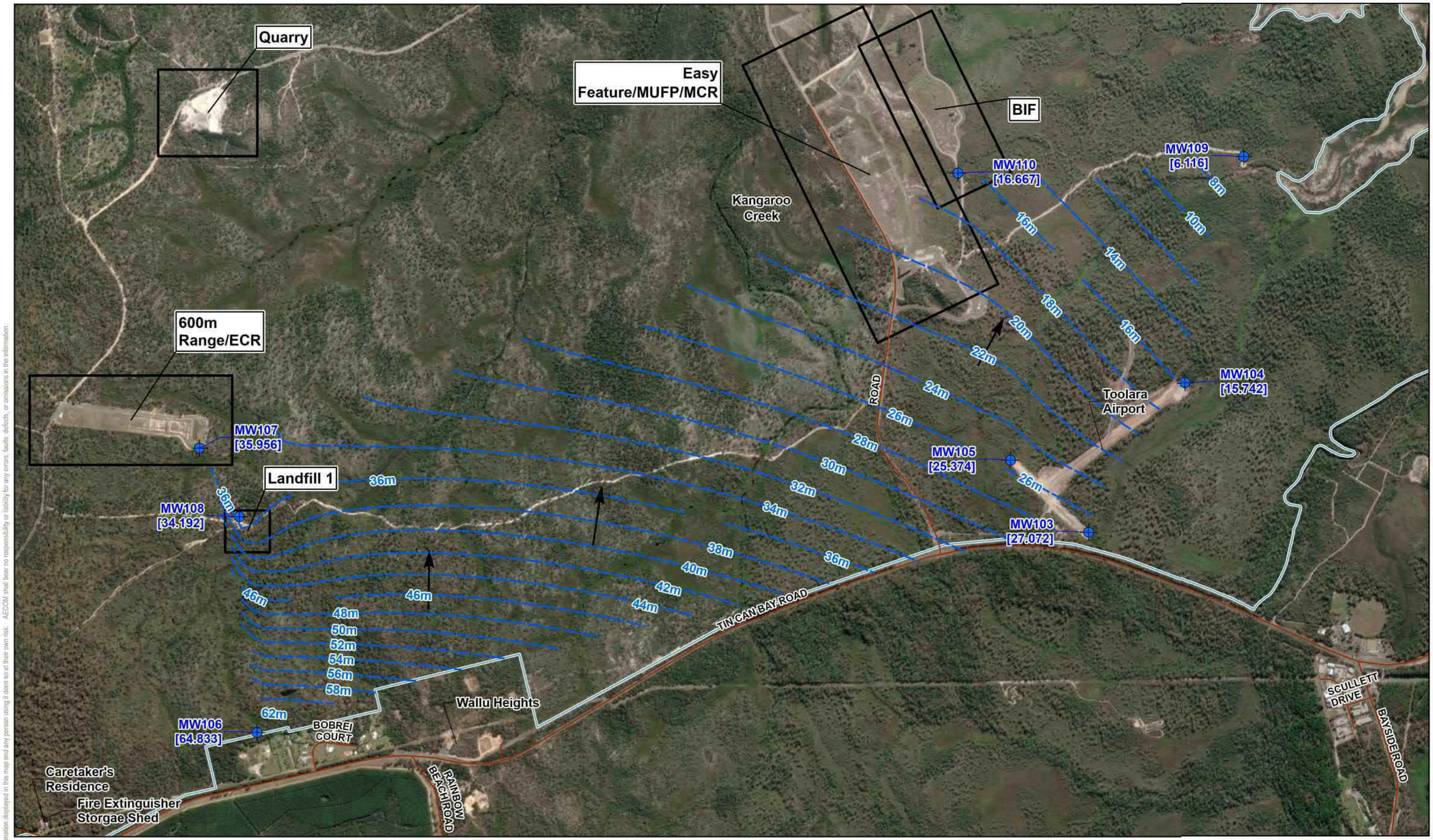
PROJECT ID	60612563
CREATED BY	PeacheyJ
LAST MODIFIED	SCS- 25/06/21
VERSION:	1

Figure

3

A3 size

Filename:\\na.aecomnet.com\lfs\APAC\Brisbane-AUBNE1\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\20200817_JP_OMP_AnnualInterpretativeReport2020_PFAS_AACO\WBTA_P60612563_F3_OMP_Sampling_Locations_CampKerr_20210624 v3.mxd



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX.

0 200 400 800

metres

1:16,918 (when printed at A3)

LEGEND

- Groundwater Well Location
- Groundwater Contours (mAHD)
- Inferred Groundwaler Flow Direction

Note that not all sampling locations are shown for privacy reasons.

Wide Bay Training Area, Queensland

INFERRED GROUNDWATER CONTOURS, GREATER WBTA

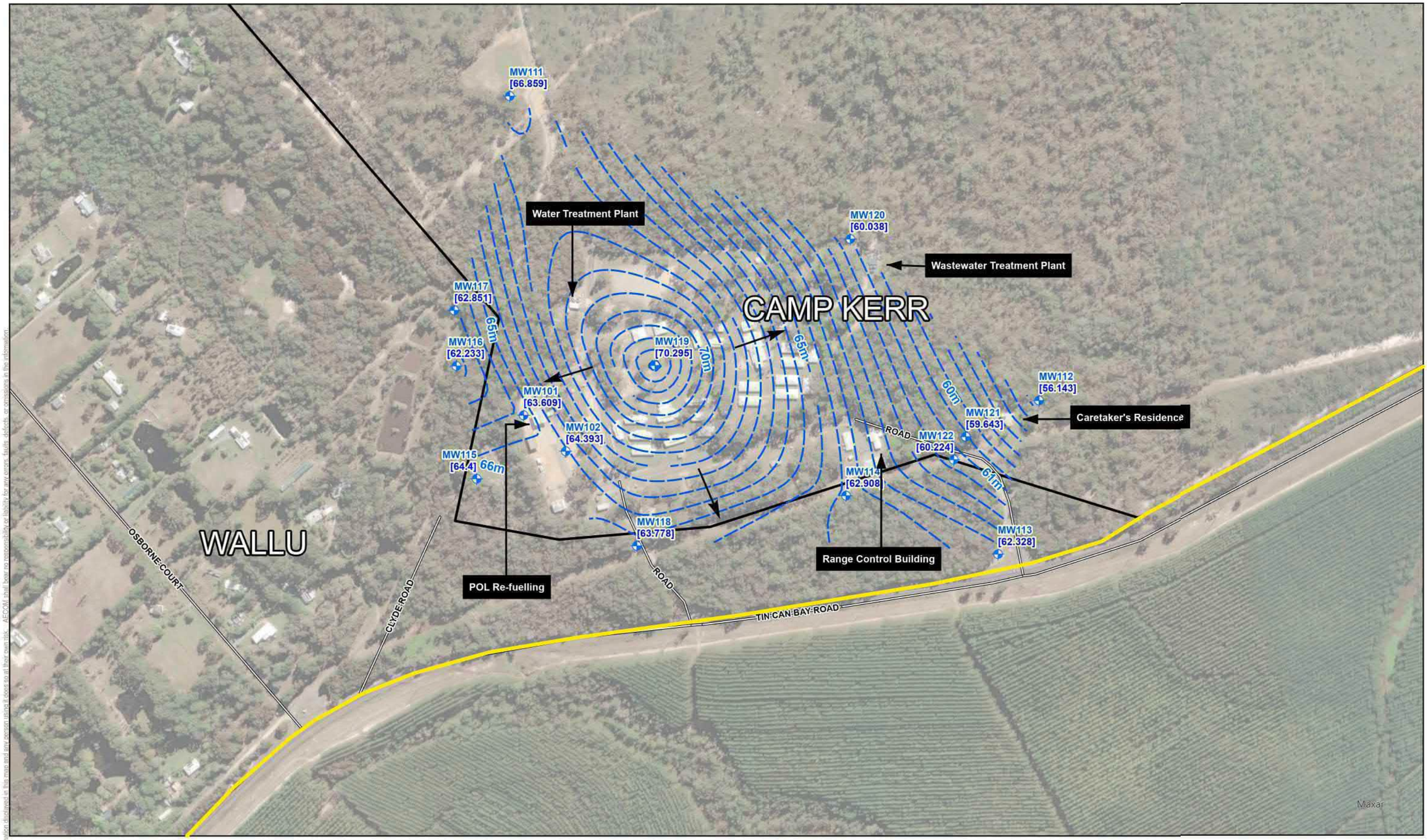
8-10 November 2021

PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	ScottA3- 01/12/21
VERSION:	2

Figure **4**

A3 size

Filename:L:\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_Factual Report October 2021\WBTA_FactualReport_Oct2021.aprx



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX

0 55 110 220

metres

1:4,500 (when printed at A3)

LEGEND

- Groundwater sampling location
- Road
- WBTA Property Boundary
- WBTA Management Area
- Inferred Groundwater Contours (mAHD)
- Inferred Groundwater Flow Direction

Note that not all sampling locations are shown for privacy reasons.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

Wide Bay Training Area, Queensland

INFERRED GROUNDWATER CONTOURS (CAMP KERR)

8-10 November 2021

PROJECT ID	60612563
CREATED BY	SkipworthS
LAST MODIFIED	ScottA3- 02/12/21
VERSION:	2

Figure 5

A3 size

Filename:\\Secure\Projects\606X\60612563\900_CAD_GIS\920_GIS\02_MXDs\PFAS_OMP_WBTA_Factual Report October 2021\WBTA_FactualReport_Oct2021.aprx

Appendix B

Tables

Appendix B Tables

Table T1 Groundwater Gauging and Quality Parameter Field Measurement Results

Property ID	Well ID	Sample Date	Screened Interval depth (mbgs)	Depth to Water (mbtoc)	TOC Elevation (mAHD)	Groundwater Elevation (mAHD)	Well Depth (mbtoc)	Condition of Stand up cover / Gatic	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Water Colour	Odour	Sheen	Sample Method / Comments	Hydrasleeve target depth (mbtoc)	Hydrasleeve install date	Hydrasleeve install time	Hydrasleeve removal date	Hydrasleeve removal time
0224	MW101	10/11/2021	11 - 15	15.655	79.264	63.609	16.08	Good	2.38	140	6.74	102.5	307.5	23.7	Turbid	Red	No odour	No sheen	Hydrasleeve	15.0	10/11/2021	3:18:12 PM	11/11/2021	2:40:20 PM
0224	MW102	09/11/2021	14-20	14.171	78.564	64.393	19.91	Good	1.86	114.7	7.19	95.1	300.1	24.3	Clear	Clear	No odour	No sheen	Hydrasleeve	19.5	09/11/2021	3:02:04 PM	11/11/2021	2:25:07 PM
0224	MW103	09/11/2021	7.5 - 10.5	6.167	33.239	27.072	11.6	Good	3.93	119.3	8.01	105.1	310.1	23.8	Low	Clear	No odour	No sheen	Hydrasleeve	10.5	19/05/2021	3:00:00 PM	09/11/2021	7:53:15 AM
0224	MW104	09/11/2021	8 - 11	5.073	20.815	15.742	12.035	Good	2.35	127.8	4.33	107.4	312.4	24.7	Low	Clear	No odour	No sheen	Hydrasleeve	11.0	19/05/2021	3:30:00 PM	09/11/2021	8:39:15 AM
0224	MW105	09/11/2021	4.2 - 7.2	2.229	27.603	25.374	8.35	Good	0.14	659	9.44	85	290	23.4	Low	Clear	No odour	No sheen	Hydrasleeve	7.0	19/05/2021	4:00:00 PM	09/11/2021	8:19:46 AM
0224	MW106	09/11/2021	4 - 10	4.635	69.468	64.833	11.05	Good	2.94	90.7	7.95	146.7	351.7	22.4	Medium	Light brown	No odour	No sheen	Hydrasleeve	10.0	20/05/2021	2:16:41 PM	09/11/2021	2:24:21 PM
0224	MW107	09/11/2021	2.8 - 5.8	1.833	37.789	35.956	6.31	Good	0.83	214.8	4.87	68.9	273.9	26.8	Low	Clear	No odour	No sheen	Hydrasleeve	5.8	20/05/2021	11:37:26 AM	09/11/2021	10:40:37 AM
0224	MW108	09/11/2021	14.5 - 17.5	5.798	39.99	34.192	18.475	Good	0.62	543	14.3	-15.6	189.4	23.7	Low	Light grey	No odour	No sheen	Hydrasleeve	17.5	20/05/2021	10:54:24 AM	09/11/2021	11:14:04 AM
0224	MW109	08/11/2021	7 - 10	3.091	9.207	6.116	11.06	Good	0.89	180.6	6.73	75.9	280.9	23.6	Low	Clear	No odour	No sheen	Hydrasleeve	10.0	19/05/2021	12:21:17 PM	09/11/2021	2:38:00 PM
0224	MW110	08/11/2021	0.5 - 4	1.29	17.967	16.677	4.535	Good	1.85	146.7	3.64	172.2	377.2	24.2	Low	Clear	No odour	No sheen	Hydrasleeve	3.5	19/05/2021	12:42:04 PM	08/11/2021	2:56:51 PM
0224	MW111	09/11/2021	16.5 - 20.5	12.093	78.952	66.859	21.535	Good	0.79	235.3	8.08	118.2	323.2	22.5	Low	Clear	No odour	No sheen	Hydrasleeve	20.5	20/05/2021	10:15:49 AM	08/11/2021	1:04:34 PM
0224	MW112	10/11/2021	6 - 9	9.04	65.183	56.143	9.87	Good	0.53	146.2	12.2	142	347	22.7	Turbid	Yellow / brown	No odour	No sheen	Hydrasleeve. Water level below hydrasleeve intake.	9.0	20/05/2021	3:40:55 PM	09/11/2021	1:42:35 PM
0224	MW113	10/11/2021	6 - 9	5.389	67.717	62.328	9.015	Good	1.14	131.8	9.33	66	271	23.6	Low	Clear	No odour	No sheen	Hydrasleeve	8.0	21/05/2021	11:32:38 AM	10/11/2021	11:37:42 AM
0224	MW114	10/11/2021	8.5 - 11.5	10.108	73.016	62.908	12.52	Good	1.91	53.9	8.29	76.8	281.8	24	Low	Clear	No odour	No sheen	Hydrasleeve	11.5	21/05/2021	12:03:25 PM	10/11/2021	11:07:51 AM
0224	MW115	10/11/2021	13 - 16	12.259	76.659	64.400	17.065	Good	0.89	146.8	9.76	126.6	331.6	23.8	Medium	Yellow / brown	No odour	No sheen	Hydrasleeve	16.0	20/05/2021	1:11:36 PM	10/11/2021	2:49:55 PM
0224	MW116	10/11/2021	8 - 11	7.582	69.815	62.233	11.795	Good	0.63	468	9.53	11.6	216.6	23.1	Medium	Light yellow	No odour	No sheen	Hydrasleeve	11.0	19/05/2021	-	10/11/2021	9:47:54 AM
0224	MW117	10/11/2021	7 - 10	6.063	68.914	62.851	11.01	Good	0.83	454.8	9.72	12.7	217.7	22.1	Medium	Yellow / brown	No odour	No sheen	Hydrasleeve	10.0	18/05/2021	3:25:00 PM	10/11/2021	9:17:33 AM
0224	MW118	10/11/2021	10 - 13	12.376	76.154	63.778	13.59	Good	2.56	114.1	8.25	74.4	279.4	23.7	Medium	Pale red	No odour	No sheen	Hydrasleeve. Water level below hydrasleeve intake.	12.7	21/05/2021	12:34:43 PM	10/11/2021	10:26:05 AM
0224	MW119	10/11/2021	13 - 16	9.251	79.546	70.295	15.76	Good	2.74	227	9.28	125.1	330.1	24.2	Medium	Other	No odour	No sheen	Hydrasleeve	14.7	20/05/2021	1:36:19 PM	10/11/2021	3:40:43 PM
0224	MW120	09/11/2021	Unknown	11.294	71.332	60.038	14.5	Good	0.82	216.6	6.78	63.2	268.2	22.9	Clear	Clear	No odour	No sheen	Hydrasleeve	12.7	09/11/2021	3:35:33 PM	10/11/2021	1:18:19 PM
0224	MW121	09/11/2021	Unknown	10.762	70.405	59.643	14.4	Good	1.23	111.9	10.8	106.2	311.2	23.3	Clear	Clear	No odour	No sheen	Hydrasleeve	14.0	09/11/2021	3:44:00 PM	11/11/2021	1:49:58 PM
0224	MW122	09/11/2021	Unknown	10.351	70.575	60.224	19.4	Good	0.96	74.9	8.17	73.9	278.9	24.2	Clear	Clear	No odour	No sheen	Hydrasleeve	19.0	09/11/2021	3:52:57 PM	11/11/2021	2:03:03 PM
0224	POT001	10/11/2021	18 - 78.4	-	-	-	-	-	3.77	576	8.76	71.6	276.6	26.1	Clear	Clear	No odour	No sheen	Tap	-	-	-	-	-
0224	POT005	10/11/2021	30 - 51.5	-	-	-	-	-	0.53	545	6.22	-3.4	201.6	27	Clear	Clear	No odour	No sheen	Tap	-	-	-	-	-

Notes
mbgs is metres below ground surface
mbtoc is metres below top of casing
mAHD is metres above Australian height datum
DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential
Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)
Temp is Temperature
µS/cm is microsiemens per centrimetre
ºC is degrees Celcius
mV is millivolts
` - No data

Table T2 Groundwater PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFDoDA	PFTeDA	PFTrDA	PFUnDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.05	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.05	0.01
NEMP (HEPA, 2020) Human Health Drinking Water		**0.07**											**0.56**																		
NEMP (HEPA, 2020) Ecological Freshwater 99% Species Protection							*0.00023*						*19*																		
Location ID	**Sample ID**	**Sample Date**	**Lab Report No.**																												
MW101	0244_MW101_211111	11/11/2021	EB2132641	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.4	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.22	<0.09	<0.09	<0.09	<0.22	<0.22	<0.09	<0.09	<0.22	<0.22	<0.09	<0.09	<0.09	<0.09	<0.09
MW102	0244_MW102_211111	11/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW103	0244_MW103_211109	9/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW104	0244_MW104_211109	9/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW105	0244_MW105_211110	10/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW106	0244_MW106_211109	9/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW107	0244_MW107_211109	9/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW108	0244_MW108_211109	9/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW109	0244_MW109_211108	8/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW110	0244_MW110_211108	8/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW111	0244_MW111_211109	9/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW112	0244_MW112_211110	10/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW113	0244_MW113_211110	10/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW114	0244_MW114_211110	10/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW115	0244_MW115_211110	10/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW116	0244_MW116_211110	10/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW117	0244_MW117_211110	10/11/2021	EB2132641	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	<0.02	<0.02	<0.02	<0.06	<0.06	<0.02	<0.02	<0.06	<0.06	<0.05	<0.05	<0.05	<0.05	<0.02
MW118	0244_MW118_211110	10/11/2021	EB2132641	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	<0.02	<0.02	<0.02	<0.06	<0.06	<0.02	<0.02	<0.06	<0.06	<0.05	<0.05	<0.05	<0.05	<0.02
MW119	0244_MW119_211110	10/11/2021	EB2132641	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.06	<0.02	<0.02	<0.02	<0.06	<0.06	<0.02	<0.02	<0.06	<0.06	<0.05	<0.05	<0.05	<0.05	<0.02
MW120	0244_MW120_211111	11/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
MW121	0244_MW121_211111	11/11/2021	EB2132641	**0.11**	<0.02	<0.02	0.07	<0.02	*0.04*	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11
MW122	0244_MW122_211111	11/11/2021	EB2132641	**0.12**	<0.02	<0.02	0.1	<0.02	*0.02*	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.12
POT001	0244_POT001_211110	10/11/2021	EB2132641	0.02	<0.02	<0.02	0.02	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.02
POT005	0244_POT005_211110	10/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01

LOR is limit of reporting
µg/L is micrograms per litre
-' denotes no analysis undertaken
<' denotes concentration is less than
NEMP is National Environmental Mangement Plan
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values

Table T3 Surface Water Quality Parameter Field Measurement Results

Property ID	Location ID	Sample Date	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Odour	Sheen
0224	SW004	10/11/2021	6.13	103.4	4.73	70.9	275.9	23.8	Medium	No odour	No sheen
0224	SW005	11/11/2021	5.65	134	4.67	92.3	297.3	23.5	Low	No odour	No sheen
0224	SW006	9/11/2021	2.83	184.8	8.79	111.2	316.2	23.7	Low	No odour	No sheen
0224	SW007	8/11/2021	3.23	160.1	4.62	104.5	309.5	25.9	Low	No odour	No sheen
0224	SW008	9/11/2021	5.23	401.8	5.34	74.2	279.2	23.5	Medium	No odour	No sheen
0224	SW009	8/11/2021	1.47	213.9	5.03	100.4	305.4	22.4	Low	No odour	No sheen
0224	SW012	8/11/2021	6.31	51448	7.63	119.4	324.4	25.3	Clear	No odour	No sheen
0224	SW013	8/11/2021	4.25	47739	6.88	141.3	346.3	24.8	Clear	No odour	No sheen
0224	SW014	8/11/2021	2.58	463.6	8.88	49.7	254.7	24.7	Clear	No odour	No sheen
0224	SW016	9/11/2021	6.84	140.8	4.9	109.3	314.3	22.5	Low	No odour	No sheen
0224	SW017	9/11/2021	4.89	53.9	8.64	133.7	338.7	23.2	Medium	No odour	No sheen
0224	SW018	9/11/2021	5.52	15.1	7.42	157.8	362.8	22.7	Turbid	No odour	No sheen
0224	SW019	9/11/2021	5.73	25.9	7.58	180.8	385.8	22.7	Medium	No odour	No sheen
0224	SW020	-	Not sampled- stakeholder did not respond to access permission request.								
0224	SW021	11/11/2021	1.25	157.4	3.75	23.8	228.8	25.3	Low	No odour	No sheen
0224	SW022	11/11/2021	2.18	68.5	4.41	105.3	310.3	25.8	Medium	No odour	No sheen
0224	SW023	11/11/2021	5.33	81.5	5.45	64.1	269.1	27.7	Medium	No odour	No sheen
0224	SW024	11/11/2021	5.48	170.2	5.12	52.9	257.9	26.8	Turbid	No odour	No sheen
0224	SW025	9/11/2021	4.42	128.9	5.83	150.1	355.1	23.5	Medium	No odour	No sheen
0224	SW027	9/11/2021	3.53	93.7	9.63	110.7	315.7	22.8	Turbid	No odour	No sheen

Notes

DO is dissolved oxygen

EC is electrical conductivity

E_h is oxidation reduction potential

Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)

Temp is Temperature

µS/cm is microsiemens per centrimetre

ºC is degrees Celcius

mV is millivolts

` - No data

Table T4 Surface Water PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFDA	PFDoDA	PFNA	PFTeDA	PFTrDA	PFUnDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.0016	0.0005	0.0005	0.0005	0.0005	0.0003	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0016
NHMRC (2019) PFAS Recreational Water		2											10																		
HEPA (2020) Ecological Freshwater 99% Species Protection							**0.00023**						**19**																		
HEPA (2020)Ecological Freshwater 95% Species Protection (SW025 only)							*0.13*						*220*																		

Location ID	Sample ID	Sample Date	Lab Report No.																													
SW004	0244_SW004_211111	11/11/2021	EB2132641	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.202	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0019	<0.0008	<0.0008	<0.0008	<0.002	<0.002	<0.0008	<0.0008	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.0008
SW005	0244_SW005_211111	11/11/2021	EB2132641	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.012	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.002	<0.0008	<0.0008	<0.0008	<0.002	<0.002	<0.0008	<0.0008	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.0008
SW006	0244_SW006_211109	9/11/2021	EB2132641	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.0016	<0.0016	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.0016
SW007	0244_SW007_211109	9/11/2021	EB2132641	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.0016	<0.0016	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.0016
SW008	0244_SW008_211110	10/11/2021	EB2132641	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.002	<0.0008	<0.0008	<0.0008	<0.002	<0.002	<0.0008	<0.0008	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.0008
SW009	0244_SW009_211108	8/11/2021	EB2132641	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.0016	<0.0016	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.0016
SW012	0244_SW012_211108	8/11/2021	EB2132641	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0032	<0.008	<0.0032	<0.0032	<0.0032	<0.008	<0.008	<0.0032	<0.0032	<0.008	<0.008	<0.001	<0.001	<0.001	<0.001	<0.0003
SW013	0244_SW013_211108	8/11/2021	EB2132641	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0003	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0032	<0.008	<0.0032	<0.0032	<0.0032	<0.008	<0.008	<0.0032	<0.0032	<0.008	<0.008	<0.001	<0.001	<0.001	<0.001	<0.0003
SW014	0244_SW014_211108	8/11/2021	EB2132641	0.0027	<0.0016	<0.0016	0.0027	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.0016	<0.0016	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	0.0027
SW016	0244_SW016_211109	9/11/2021	EB2132641	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.0016	<0.0016	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	<0.0016
SW017	0244_SW017_211109	9/11/2021	EB2132641	0.0038	<0.0008	<0.0008	<0.0008	<0.0008	**0.0038**	<0.0008	<0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.002	<0.0008	<0.0008	<0.0008	<0.002	<0.002	<0.0008	<0.0008	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.0008
SW018	0244_SW018_211109	9/11/2021	EB2132641	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.002	<0.0008	<0.0008	<0.0008	<0.002	<0.002	<0.0008	<0.0008	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.0008
SW019	0244_SW019_211109	9/11/2021	EB2132641	0.0026	<0.0008	<0.0008	0.0008	<0.0008	**0.0018**	<0.0008	<0.004	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.002	<0.0008	<0.0008	<0.0008	<0.002	<0.002	<0.0008	<0.0008	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	0.0026
SW021	0224_SW021_211111	11/11/2021	EB2132640	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.016	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.0032	<0.0032	<0.008	<0.008	<0.0032	<0.0032	<0.008	<0.008	<0.003	<0.003	<0.003	<0.003	<0.0032
SW022	0224_SW022_211111	11/11/2021	EB2132652	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0054	<0.0032	<0.016	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.0032	<0.0032	<0.008	<0.008	<0.0032	<0.0032	<0.008	<0.008	<0.003	<0.003	<0.003	<0.003	<0.0032
SW023	0224_SW023_211111	11/11/2021	EB2132652	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0069	<0.0032	<0.016	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.0032	<0.0032	<0.008	<0.008	<0.0032	<0.0032	<0.008	<0.008	<0.003	<0.003	<0.003	<0.003	<0.0032
SW024	0224_SW024_211111	11/11/2021	EB2132649	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.016	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.0032	<0.0032	<0.008	<0.008	<0.0032	<0.0032	<0.008	<0.008	<0.003	<0.003	<0.003	<0.003	<0.0032
SW025	0244_SW025_211109	9/11/2021	EB2132641	0.0024	<0.0016	<0.0016	<0.0016	<0.0016	**0.0024**	<0.0016	<0.008	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.004	<0.0016	<0.0016	<0.0016	<0.004	<0.004	<0.0016	<0.0016	<0.004	<0.004	<0.002	<0.002	<0.002	<0.002	0.0024
SW027	0244_SW027_211109	9/11/2021	EB2132641	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.016	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.0032	<0.008	<0.0032	<0.0032	<0.0032	<0.008	<0.008	<0.0032	<0.0032	<0.008	<0.008	<0.003	<0.003	<0.003	<0.003	<0.0032

LOR is limit of reporting
µg/L is micrograms per litre
-' denotes no analysis undertaken
<' denotes concentration is less than
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values
In accordance with the SAQP, SW025 has been assessed with HEPA (2020) ecological guideline for the protection of freshwater species at 95%.

Table T5 Wastewater Quality Parameter Field Measurement Results

Property ID	Well ID	Sample Date	DO (mg/L)	EC (µS/cm)	pH	E_r (mV)	E_h (mV)	Temp (°C)	Turbidity	Water Colour	Odour	Sheen	Sample Method / Comments
0224	OTH001	10/11/2021	5.4	879	6.93	420.1	625.1	25.5	Clear	Clear	No odour	No sheen	Tap

DO is dissolved oxygen
EC is electrical conductivity
E_h is oxidation reduction potential
Oxidation reducation potential (E_r) measured with a platinum electrode and a silver/silver chloride reference electrode (E_r) and converted to E_h by $E_h = E_r + 205$ mV (based on a groundwater temperature of 21°C)
Temp is Temperature
µS/cm is microsiemens per centrimetre
ºC is degrees Celcius
mV is millivolts

Table T6 Wastewater PFAS Analytical Results

		PFHxS and PFOS	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHpA	PFHxA	PFOA	PFNA	PFDA	PFTeDA	PFTrDA	PFUnDA	PFDoDA	FOSA	MeFOSE	EtFOSE	MeFOSA	EtFOSA	MeFOSAA	EtFOSAA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Sum of PFAS
	Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	LOR	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.05	0.02	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.05	0.01
HEPA (2020) Ecological Freshwater 99% Species Protection							*0.00023*						*19*																		
Location ID	**Sample ID**	**Sample Date**	**Lab Report No.**																												
OTH001	0244_OTH001_211110	10/11/2021	EB2132641	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01

LOR is limit of reporting
µg/L is micrograms per litre
-' denotes no analysis undertaken
<' denotes concentration is less than
Denotes first time detection above LOR
Denotes new exceedance of human health guideline values

Appendix C

Analytical Data Validation

Appendix C Analytical Data Validation

DATA VALIDATION REPORT

Project No.:	60612563	**Validation by:** CM	**Date:** 09/12/2021
Client:	Department of Defence		
Site:	Wide Bay Training Area		
Matrix type:	Groundwater, surface water, waste water	**Data verified by:** JP	**Date:** 09/12/2021
No. of primary samples:	44 water		
Laboratory:	ALS (Brisbane), NMI (Sydney)	**Project Manager:** JP	
Lab reference:	EB2132640; EB2132641; EB2132649; EB2132652; AECO06_211116 (RN1335135)		

Key Issues:	No QA/QC issues were identified in the field or laboratory datasets that could have a material implication on data interpretation and therefore decision-making on the project. The data are therefore considered appropriate for use to meet the project objectives.

Field QA/QC

Sampling personnel	Sampling was conducted by an AECOM environmental scientist between 08 and 11 November 2021.
Sampling Methodology	Samples were collected using appropriate methods as identified within the main body of the report.
Hydrasleeve sampling	All Hydrasleeves were left in the monitoring wells for a minimum of 24 hours prior to being sampled. Installation and retrieval times and dates are shown in **Table T1** in **Appendix B**.
Daily Equipment Calibration	Daily equipment calibration was completed during the sampling event and are attached within **Appendix F**.
Chain of Custody (COC)	COC documents were completed as per AECOM procedures and are attached within **Appendix D**.
Rinsate Blank (refer to **Table C4**)	Rinsate blank samples were collected at a frequency of approximately one per day of sampling (three in total) where non-dedicated sampling equipment was used. All rinsates were collected from the decontaminated interface probe. Concentrations reported below the LOR for all analytes tested.
Frequency of field QC	Field duplicate (intra-laboratory duplicates) and triplicates (inter-laboratory duplicates) were collected for samples analysed for PFAS at a frequency of one in ten primary samples (six sets for 44 water samples [14%]). The frequency of field QC achieves the expected frequency for each media type. The target frequency of one in ten primary samples was achieved for all matrices.
Handling and preservation	Primary, duplicate and triplicate samples were received preserved and chilled at the laboratory. All samples were received at the laboratory in appropriate sample containers with no sample container / preservation non-compliances noted.

Laboratory QA/QC	
Tests requested/reported	Samples were analysed and reported as requested on the COC.
Holding time compliance	Samples were extracted and analysed within recommended holding times.
Laboratory Accreditation	The laboratory analysis was conducted by ALS Environmental Pty Ltd (Brisbane) a National Association of Testing Authorities (NATA) accredited laboratory. The triplicate samples were analysed at the National Measurement Institute (Sydney), also a NATA accredited laboratory.
Frequency of laboratory QC	The laboratory reported a sufficient frequency of quality control samples to assess whether the results have been reported to an acceptable accuracy and precision, except: • Laboratory duplicates for PFAS (0.00%) below the expected rate of 10.00% in - EB2132640 (4 samples in batch) - EB2132649 (4 samples in batch). - EB2132652 (4 samples in batch) - EB2132641 (18 samples in batch) • Matrix spikes for PFAS (0.00%) below the expected rate of 5.00% in - EB2132640 (4 samples in batch) - EB2132649 (4 samples in batch) - EB2132652 (4 samples in batch) - EB2132641 (18 samples in batch) • Laboratory duplicates for PFAS (5.56%) below the expected rate of 10.00% in - EB2132641 (36 samples in batch) • Matrix spikes for PFAS (2.78%) below the expected rate of 5.00% in - EB2132641 (36 samples in batch) The reason for insufficient matrix spikes and laboratory duplicates for these batches is unknown however as all other QC results including primary and duplicate field QC samples met control limits this is not expected to impact data quality.
Method Blank	No method blank non-conformances were reported in the batches.
Laboratory duplicate RPDs	Laboratory duplicate relative percentage differences (RPD) were within control limits for all samples.
Laboratory control spike recovery	No non-compliances were reported for Laboratory Control Spikes (LCS).
Matrix spike recovery	All matrix spike recoveries were within control limits.
Surrogate spike recovery	Surrogate spike recoveries were within control limits.
QA/QC Data Evaluation	
Comparison of Field Observations and Laboratory Results	No anomalous results between field observations and analysis results were noted.
Data transcription	A random 10% check of the laboratory results identified no anomalies within the electronic data, the laboratory reports, and tables generated by AECOM.
Limits of reporting	LORs were sufficiently low to enable assessment against adopted screening levels except for PFOS for HEPA (2020) ecological guideline values for the 99% protection of freshwater species. The potential exists for concentrations of PFOS to be above the adopted guideline, but below the laboratory LOR. This should be taken into consideration when interpreting and using this data quantitatively where results are reported below LOR.

Field duplicate RPDs (refer to **Tables C1** and **C2**)	Field duplicate RPDs were reported within control limits for all primary and duplicate samples except for the following. The highest concentration is indicated in bold: • 0244_SW017_211109 and **0244_QC117_211110** for PFOS The reason(s) for the discrepancies is unknown however it may be due to the presence of sediment in the unfiltered shallow drain sample. Although the duplicate samples highlighted above reported a higher concentration than the primary sample, the higher duplicate sample concentrations do not constitute a first-time detection of PFOA or PFHxS+PFOS or a new maximum of the same concentrations and therefore the elevated RPDs are not considered to affect data interpretation for use in this report. The higher concentration has however conservatively been adopted in the report tables.
Field triplicate RPDs (refer to **Tables C1** and **C2**)	Field triplicate RPDs were reported within control limits for all primary and triplicate samples.
Other	
Other observations	Due to access constraints, the groundwater gauging event was undertaken over three days (08 – 10 November 2021). During this period several rainfall events occurred with a total of approximately 113.0 mm rainfall recorded at the nearest Bureau of Metrology (BoM) station (040856 Rainbow Beach) between 08 – 11 November 2021. Due to the depth to groundwater across the majority of the Base (which ranges between 1.29 and 15.655 mbgl), it not considered likely that groundwater elevations would respond to short-term events as infiltrating groundwater would not reach the groundwater table in such a short period. This is supported by the consistency of the groundwater contour maps for November2021 with previous results. Monitoring well MW109 is located within 50m of a tributary of Snapper Creek that is likely to be tidally influenced. Due to this proximity, MW109 has the potential to have some tidal variations in groundwater levels. However, due to the large distance covered by the monitoring network (>8 km) between Wallu and the Base eastern boundary, the presence of minor fluctuations in groundwater level in MW109 due to tidal influence (if present) would have a minimal impact on the groundwater contour interpretation due to the large change in piezometric surface, which falls from 70.295 mAHD in Camp Kerr to 6.116 mAHD at MW109.

Table C1 Groundwater Duplicate and Triplicate Analytical Results

AECOM Imagine it Delivered

	Lab Report No.	EB2132641	EB2132641	RPD	RN1335135	RPD	RN1335135	RN1335135	RPD	RN1335135	RPD	EB2132641	EB2132641	RPD	RN1335135	RPD
	Sample ID	0244_MW118_211110	0244_QC118_211110		0224_QC218_211110		0224_QC219_211111	0224_QC219_211111		0224_QC219_211111		0244_MW122_211111	0244_QC120_211111		0224_QC220_211111	
	Sample Date	10/11/2021 10:35	10/11/2021 10:35		10/11/2021 10:35		11/11/2021 14:00	11/11/2021 14:00		11/11/2021 14:00		11/11/2021 14:15	11/11/2021 14:15		11/11/2021 14:15	
	Sample Type	Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate	
Chemical	**Units**	**LOR**														
10:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC
4:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC
6:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC
8:2 FTS	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC	<0.05	<0.05	NC	<0.01	NC
EtFOSA	µg/L	0.05 : 0.02 (Interlab)	<0.06	<0.06	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC
EtFOSAA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
EtFOSE	µg/L	0.05 : 0.005 (Interlab)	<0.06	<0.06	NC	<0.05	NC	<0.05	<0.05	NC	<0.05	NC	<0.05	<0.05	NC	<0.05	NC
MeFOSA	µg/L	0.05 : 0.02 (Interlab)	<0.06	<0.06	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC
MFOSAA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
MeFOSE	µg/L	0.05 : 0.005 (Interlab)	<0.06	<0.06	NC	<0.05	NC	<0.05	<0.05	NC	<0.05	NC	<0.05	<0.05	NC	<0.05	NC
PFBS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	0.011	0
PFBA	µg/L	0.1 : 0.05 (Interlab)	<0.1	<0.1	NC	<0.05	NC	<0.1	<0.1	NC	<0.05	NC	<0.1	<0.1	NC	<0.05	NC
PFDS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFDoDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFHpS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFHpA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFHxA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFNA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
FOSA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFPeS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	0.011	NC
PFPeA	µg/L	0.02 : 0.002 (Interlab)	<0.02	<0.02	NC	<0.02	NC	<0.02	<0.02	NC	<0.02	NC	<0.02	<0.02	NC	<0.02	NC
PFTeDA	µg/L	0.05 : 0.02 (Interlab)	<0.06	<0.06	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC	<0.05	<0.05	NC	<0.02	NC
PFTrDA	µg/L	0.02 : 0.002 (Interlab)	<0.02	<0.02	NC	<0.02	NC	<0.02	<0.02	NC	<0.02	NC	<0.02	<0.02	NC	<0.02	NC
PFUnDA	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC	<0.02	<0.02	NC	<0.01	NC
PFOS	µg/L	0.01 : 0.02 (Interlab)	<0.02	<0.02	NC	<0.02	NC	0.04	0.03	29	0.031	25	0.02	0.02	0	<0.02	NC
PFOA	µg/L	0.01 : 0.001 (Interlab)	<0.02	<0.02	NC	<0.01	NC	<0.01	<0.01	NC	<0.01	NC	<0.01	<0.01	NC	<0.01	NC
PFHxS	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	NC	0.019	NC	0.07	0.07	0	0.081	15	0.1	0.12	18	0.11	10

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

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: no limit (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 C2 Surface Water Duplicate and Triplicate Analytical Results

Lab Report Number	EB2132641	EB2132641	RPD	RN1335135	RPD	EB2132641	EB2132641	RPD	RN1335135	RPD	EB2132641	EB2132641	RPD	RN1335135	RPD
Sample ID	0244_SW014_211108	0244_QC115_211108		0224_QC215_211108		0244_SW006_211109	0244_QC116_211109		0224_QC216_211109		0244_SW017_211109	0244_QC117_211110		0224_QC217_211110	
Sample Date	8/11/2021 15:45	8/11/2021 15:45		8/11/2021 15:45		9/11/2021 11:45	9/11/2021 11:45		9/11/2021 11:45		9/11/2021 14:05	9/11/2021 14:05		9/11/2021 14:05	
Sample Type	Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate		Primary	Duplicate		Triplicate	

Chemical	Units	LOR														
10:2 FTS	µg/L	0.001	<0.002	<0.002	NC	<0.001	NC	<0.002	<0.001	NC	<0.001	NC	<0.001	<0.003	NC	<0.001	NC
4:2 FTS	µg/L	0.001	<0.002	<0.002	NC	<0.001	NC	<0.002	<0.001	NC	<0.001	NC	<0.001	<0.003	NC	<0.001	NC
6:2 FTS	µg/L	0.001	<0.002	<0.002	NC	<0.001	NC	<0.002	<0.001	NC	<0.001	NC	<0.001	<0.003	NC	<0.001	NC
8:2 FTS	µg/L	0.001	<0.002	<0.002	NC	<0.001	NC	<0.002	<0.001	NC	<0.001	NC	<0.001	<0.003	NC	<0.001	NC
EtFOSA	µg/L	0.001 : 0.002 (Interlab)	<0.004	<0.004	NC	<0.002	NC	<0.004	<0.002	NC	<0.002	NC	<0.002	<0.008	NC	<0.002	NC
EtFOSAA	µg/L	0.0005 : 0.002 (Interlab)	<0.0016	<0.0016	NC	<0.002	NC	<0.0016	<0.0008	NC	<0.002	NC	<0.0008	<0.0032	NC	<0.002	NC
EtFOSE	µg/L	0.001 : 0.005 (Interlab)	<0.004	<0.004	NC	<0.005	NC	<0.004	<0.002	NC	<0.005	NC	<0.002	<0.008	NC	<0.005	NC
MeFOSA	µg/L	0.001 : 0.002 (Interlab)	<0.004	<0.004	NC	<0.002	NC	<0.004	<0.002	NC	<0.002	NC	<0.002	<0.008	NC	<0.002	NC
MFOSAA	µg/L	0.0005 : 0.002 (Interlab)	<0.0016	<0.0016	NC	<0.002	NC	<0.0016	<0.0008	NC	<0.002	NC	<0.0008	<0.0032	NC	<0.002	NC
MeFOSE	µg/L	0.001 : 0.005 (Interlab)	<0.004	<0.004	NC	<0.005	NC	<0.004	<0.002	NC	<0.005	NC	<0.002	<0.008	NC	<0.005	NC
PFBS	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFBA	µg/L	0.002 : 0.005 (Interlab)	<0.008	<0.008	NC	0.0079	NC	<0.008	<0.004	NC	0.0071	NC	<0.004	<0.016	NC	0.0082	NC
PFDS	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFDA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFDoDA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFHpS	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFHpA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFHxA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	0.001	NC
PFNA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
FOSA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFPeS	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFPeA	µg/L	0.0005 : 0.002 (Interlab)	<0.0016	<0.0016	NC	0.013	NC	<0.0016	<0.0008	NC	<0.002	NC	<0.0008	<0.0032	NC	0.0023	NC
PFTeDA	µg/L	0.0005 : 0.002 (Interlab)	<0.004	<0.004	NC	<0.002	NC	<0.004	<0.002	NC	<0.002	NC	<0.002	<0.008	NC	<0.002	NC
PFTrDA	µg/L	0.0005 : 0.002 (Interlab)	<0.0016	<0.0016	NC	<0.002	NC	<0.0016	<0.0008	NC	<0.002	NC	<0.0008	<0.0032	NC	<0.002	NC
PFUnDA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFOS	µg/L	0.0003 : 0.002 (Interlab)	<0.0016	<0.0016	NC	<0.002	NC	<0.0016	<0.0008	NC	<0.002	NC	<0.0008	**0.0038**	**130**	0.0028	111
PFOA	µg/L	0.0005 : 0.001 (Interlab)	<0.0016	<0.0016	NC	<0.001	NC	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	<0.001	NC
PFHxS	µg/L	0.0005 : 0.001 (Interlab)	0.0027	0.0032	17	0.0035	26	<0.0016	<0.0008	NC	<0.001	NC	<0.0008	<0.0032	NC	0.0024	100

is not calculable

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

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: no limit (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 C3
Rinsate Analytical Results

Lab Report Number		EB2132641	EB2132641	EB2132641
Sample ID		0244_QC310_211108	0244_QC311_211109	0244_QC312_211110
Sample Date		8/11/2021	9/11/2021	10/11/2021
Sample Type		Rinsate	Rinsate	Rinsate
Analyte	**Units**	**LOR**		
10:2 FTS	µg/L	0.001	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.05	<0.05	<0.05
6:2 FTS	µg/L	0.001	<0.05	<0.05	<0.05
8:2 FTS	µg/L	0.001	<0.05	<0.05	<0.05
EtFOSA	µg/L	0.001	<0.05	<0.05	<0.05
EtFOSAA	µg/L	0.0005	<0.02	<0.02	<0.02
EtFOSE	µg/L	0.001	<0.05	<0.05	<0.05
MeFOSA	µg/L	0.001	<0.05	<0.05	<0.05
MFOSAA	µg/L	0.0005	<0.02	<0.02	<0.02
MeFOSE	µg/L	0.001	<0.05	<0.05	<0.05
PFBS	µg/L	0.0005	<0.02	<0.02	<0.02
PFBA	µg/L	0.002	<0.1	<0.1	<0.1
PFDS	µg/L	0.0005	<0.02	<0.02	<0.02
PFDA	µg/L	0.0005	<0.02	<0.02	<0.02
PFDoDA	µg/L	0.0005	<0.02	<0.02	<0.02
PFHpS	µg/L	0.0005	<0.02	<0.02	<0.02
PFHpA	µg/L	0.0005	<0.02	<0.02	<0.02
PFHxA	µg/L	0.0005	<0.02	<0.02	<0.02
PFNA	µg/L	0.0005	<0.02	<0.02	<0.02
FOSA	µg/L	0.0005	<0.02	<0.02	<0.02
PFPeS	µg/L	0.0005	<0.02	<0.02	<0.02
PFPeA	µg/L	0.0005	<0.02	<0.02	<0.02
PFTeDA	µg/L	0.0005	<0.05	<0.05	<0.05
PFTrDA	µg/L	0.0005	<0.02	<0.02	<0.02
PFUnDA	µg/L	0.0005	<0.02	<0.02	<0.02
PFOS	µg/L	0.0003	<0.01	<0.01	<0.01
PFOA	µg/L	0.0005	<0.01	<0.01	<0.01
PFHxS	µg/L	0.0005	<0.01	<0.01	<0.01

Appendix D

Chain of Custody Forms

Appendix D Chain of Custody Forms

Appendix E

Laboratory Analytical Certificates and QA/QC Reports

Appendix E Laboratory Analytical Certificates and QA/QC Reports

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2132640**

Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	:	Telephone	:
Facsimile	:	Facsimile	:
Project	: QLD_0224_PFASOMP	Page	: 1 of 2
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 12-Nov-2021 13:02	Issue Date	: 12-Nov-2021
Client Requested Due Date	: 19-Nov-2021	Scheduled Reporting Date	: **19-Nov-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: -1.2/6.1°C
Receipt Detail	: MEDIUM HARD ESKY	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2132640-001	11-Nov-2021 12:30	0224_SW021_211111	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) — Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT) — Email

[redacted]

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

[redacted]

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2132640**	Page	: 1 of 5
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 02 8934 0000	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021 13:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 17-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021 10:44
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
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*
[redacted]	Senior Organic Chemist - PFAS	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X-ST PFAS Super Trace: Sample "0224_SW021_211111" required dilution due to sample matrix. LOR values have been adjusted accordingly.
- 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	0224_SW021_211111	----	----	----	----
				Sampling date / time	11-Nov-2021 12:30	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2132640-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0032	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0032	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0032	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0032	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.016	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0032	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0032	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0080	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0032	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.008	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.008	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW021_211111	----	----	----	----
				Sampling date / time	11-Nov-2021 12:30	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2132640-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.008	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.008	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0032	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0032	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.003	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.003	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.003	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.003	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		<0.0032	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		<0.0032	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L		<0.0032	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**111**	----	----	----	----
13C8-PFOA	----	0.0005	%		**110**	----	----	----	----

Surrogate Control Limits

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2132640**	Page	: 1 of 4
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 02 8934 0000	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 17-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
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*
[redacted]	Senior Organic Chemist - PFAS	Brisbane Organics, Stafford, QLD

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: 4015094)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	84.3	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	88.1	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	82.7	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	120	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	87.1	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	96.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4015094)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	94.2	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	105	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	100	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	86.8	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	104	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	99.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	96.8	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	85.6	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	95.0	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4015094)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	94.0	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	124	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	116	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	112	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	86.2	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	113	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	101	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4015094)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	102	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	91.4	64.0	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4015094) - continued								
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	93.8	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	119	53.1	133
EP231P: PFAS Sums (QCLot: 4015094)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2132640**	Page	: 1 of 4
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021
Site	: ----	Issue Date	: 22-Nov-2021
Sampler	: BRENT HAMMOND	No. of samples received	: 1
Order number	: 60612563 4.1	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
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	4	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	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST) 0224_SW021_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST) 0224_SW021_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST) 0224_SW021_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST) 0224_SW021_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST) 0224_SW021_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	4	**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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2132641**

Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	:	Telephone	:
Facsimile	:	Facsimile	:
Project	: QLD_0224_PFASOMP	Page	: 1 of 4
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 12-Nov-2021 13:02	Issue Date	: 12-Nov-2021
Client Requested Due Date	: 19-Nov-2021	Scheduled Reporting Date	: **19-Nov-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 2	Temperature	: -1.2/6.1°c - Ice present
Receipt Detail	: MEDIUM HARD ESKY	No. of samples received / analysed	: 49 / 49

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please be advised, that there was 3x 20mL PFAS container labelled "0224_MW118_211110". One of these containers has been identified as sample "0224_MW114_211110" as it was in a Ziploc with the remaining samples for "0224_MW114_211110". If this is incorrect, please contact Client Services at [redacted].**
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2132641-001	11-Nov-2021 14:45	0244_MW101_211111	✓	
EB2132641-002	11-Nov-2021 14:25	0244_MW102_211111	✓	
EB2132641-003	09-Nov-2021 08:00	0244_MW103_211109	✓	
EB2132641-004	09-Nov-2021 08:45	0244_MW104_211109	✓	
EB2132641-005	10-Nov-2021 08:45	0244_MW105_211110	✓	
EB2132641-006	09-Nov-2021 14:35	0244_MW106_211109	✓	
EB2132641-007	09-Nov-2021 10:45	0244_MW107_211109	✓	
EB2132641-008	09-Nov-2021 11:20	0244_MW108_211109	✓	
EB2132641-009	08-Nov-2021 14:55	0244_MW109_211108	✓	
EB2132641-010	08-Nov-2021 14:00	0244_MW110_211108	✓	
EB2132641-011	09-Nov-2021 13:10	0244_MW111_211109	✓	
EB2132641-012	10-Nov-2021 14:10	0244_MW112_211110	✓	
EB2132641-013	10-Nov-2021 11:50	0244_MW113_211110	✓	
EB2132641-014	10-Nov-2021 11:15	0244_MW114_211110	✓	
EB2132641-015	10-Nov-2021 15:00	0244_MW115_211110	✓	
EB2132641-016	10-Nov-2021 09:55	0244_MW116_211110	✓	
EB2132641-017	10-Nov-2021 09:30	0244_MW117_211110	✓	
EB2132641-018	10-Nov-2021 10:35	0244_MW118_211110	✓	
EB2132641-019	10-Nov-2021 15:50	0244_MW119_211110	✓	
EB2132641-020	11-Nov-2021 13:20	0244_MW120_211111	✓	
EB2132641-021	11-Nov-2021 14:00	0244_MW121_211111	✓	
EB2132641-022	11-Nov-2021 14:15	0244_MW122_211111	✓	
EB2132641-023	10-Nov-2021 12:40	0244_POT001_211110	✓	
EB2132641-024	10-Nov-2021 13:00	0244_POT005_211110	✓	
EB2132641-025	10-Nov-2021 13:25	0244_OTH001_211110	✓	
EB2132641-026	11-Nov-2021 07:20	0244_SW004_211111		✓
EB2132641-027	11-Nov-2021 09:10	0244_SW005_211111		✓
EB2132641-028	09-Nov-2021 11:45	0244_SW006_211109		✓
EB2132641-029	09-Nov-2021 09:20	0244_SW007_211109		✓
EB2132641-030	10-Nov-2021 07:50	0244_SW008_211110		✓
EB2132641-031	08-Nov-2021 13:00	0244_SW009_211108		✓
EB2132641-032	08-Nov-2021 12:20	0244_SW012_211108		✓
EB2132641-033	08-Nov-2021 15:05	0244_SW013_211108		✓
EB2132641-034	08-Nov-2021 15:45	0244_SW014_211108		✓
EB2132641-035	09-Nov-2021 09:50	0244_SW016_211109		✓

			WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2132641-036	09-Nov-2021 14:05	0244_SW017_211109		✓
EB2132641-037	09-Nov-2021 13:25	0244_SW018_211109		✓
EB2132641-038	09-Nov-2021 13:40	0244_SW019_211109		✓
EB2132641-039	09-Nov-2021 16:15	0244_SW025_211109		✓
EB2132641-040	09-Nov-2021 16:30	0244_SW027_211109		✓
EB2132641-041	08-Nov-2021 00:00	0244_QC115_211108		✓
EB2132641-042	09-Nov-2021 00:00	0244_QC116_211109		✓
EB2132641-043	10-Nov-2021 00:00	0244_QC117_211110		✓
EB2132641-044	10-Nov-2021 00:00	0244_QC118_211110	✓	
EB2132641-045	11-Nov-2021 00:00	0244_QC119_211111	✓	
EB2132641-046	11-Nov-2021 00:00	0244_QC120_211111	✓	
EB2132641-047	08-Nov-2021 00:00	0244_QC310_211108	✓	
EB2132641-048	09-Nov-2021 00:00	0244_QC311_211109	✓	
EB2132641-049	10-Nov-2021 00:00	0244_QC312_211110	✓	

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV) — Email

[redacted]

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

DERP ESDAT REPORTS

- EDI Format - ESDAT (ESDAT) — Email

[redacted]

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

[redacted]

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2132641**	Page	: 1 of 25
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021 13:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 15-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021 10:48
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 49		
No. of samples analysed	: 49		

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*
[redacted]	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
[redacted]	Senior Organic Chemist - PFAS	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231X-ST PFAS: Particular samples required dilution prior to extraction due to matrix interferences (high sediment content). LOR values have been adjusted accordingly. LOR of PFPeA has been further raised for samples"0244_SW004_211111" & "0244_SW005_211111" due to additional matrix interferences.
- EP231X PFAS: Particular samples required dilution due to sample matrix(Sediments). LOR values have been adjusted accordingly.
- 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	0244_MW101_211111	0244_MW102_211111	0244_MW103_211109	0244_MW104_211109	0244_MW105_211110
				Sampling date / time	11-Nov-2021 14:45	11-Nov-2021 14:25	09-Nov-2021 08:00	09-Nov-2021 08:45	10-Nov-2021 08:45
Compound	CAS Number	LOR	Unit		EB2132641-001	EB2132641-002	EB2132641-003	EB2132641-004	EB2132641-005
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.09	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.09	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.4	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.09	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.22	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.22	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.22	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_MW101_211111	0244_MW102_211111	0244_MW103_211109	0244_MW104_211109	0244_MW105_211110
				Sampling date / time	11-Nov-2021 14:45	11-Nov-2021 14:25	09-Nov-2021 08:00	09-Nov-2021 08:45	10-Nov-2021 08:45
					EB2132641-001	EB2132641-002	EB2132641-003	EB2132641-004	EB2132641-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.22	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.22	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.09	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.09	<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		<0.09	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.09	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.09	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.09	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.09	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.09	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.09	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**102**	**104**	**98.2**	**96.0**	**105**
13C8-PFOA	----	0.02	%		**95.8**	**96.7**	**95.3**	**96.3**	**98.2**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0244_MW106_211109	0244_MW107_211109	0244_MW108_211109	0244_MW109_211108	0244_MW110_211108
				Sampling date / time	09-Nov-2021 14:35	09-Nov-2021 10:45	09-Nov-2021 11:20	08-Nov-2021 14:55	08-Nov-2021 14:00
Compound	CAS Number	LOR	Unit		EB2132641-006	EB2132641-007	EB2132641-008	EB2132641-009	EB2132641-010
					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	<0.01	<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	0244_MW106_211109	0244_MW107_211109	0244_MW108_211109	0244_MW109_211108	0244_MW110_211108
				Sampling date / time	09-Nov-2021 14:35	09-Nov-2021 10:45	09-Nov-2021 11:20	08-Nov-2021 14:55	08-Nov-2021 14:00
Compound	CAS Number	LOR	Unit		EB2132641-006	EB2132641-007	EB2132641-008	EB2132641-009	EB2132641-010
					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	<0.01	<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	%		**99.8**	**99.3**	**112**	**101**	**109**
13C8-PFOA	----	0.02	%		**99.2**	**102**	**97.7**	**98.7**	**102**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_MW111_211109	0244_MW112_211110	0244_MW113_211110	0244_MW114_211110	0244_MW115_211110
				Sampling date / time	09-Nov-2021 13:10	10-Nov-2021 14:10	10-Nov-2021 11:50	10-Nov-2021 11:15	10-Nov-2021 15:00
					EB2132641-011	EB2132641-012	EB2132641-013	EB2132641-014	EB2132641-015
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (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	0244_MW111_211109	0244_MW112_211110	0244_MW113_211110	0244_MW114_211110	0244_MW115_211110
				Sampling date / time	09-Nov-2021 13:10	10-Nov-2021 14:10	10-Nov-2021 11:50	10-Nov-2021 11:15	10-Nov-2021 15:00
Compound	CAS Number	LOR	Unit		EB2132641-011	EB2132641-012	EB2132641-013	EB2132641-014	EB2132641-015
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**122**	**95.6**	**119**	**103**	**118**
13C8-PFOA	----	0.02	%		**101**	**104**	**102**	**102**	**102**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_MW116_211110	0244_MW117_211110	0244_MW118_211110	0244_MW119_211110	0244_MW120_211111
				Sampling date / time	10-Nov-2021 09:55	10-Nov-2021 09:30	10-Nov-2021 10:35	10-Nov-2021 15:50	11-Nov-2021 13:20
					EB2132641-016	EB2132641-017	EB2132641-018	EB2132641-019	EB2132641-020
					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		<0.01	<0.02	<0.02	<0.02	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.02	<0.02	<0.02	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.02	<0.02	<0.02	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.06	<0.06	<0.06	<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	<0.06	<0.06	<0.06	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.06	<0.06	<0.06	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0244_MW116_211110	0244_MW117_211110	0244_MW118_211110	0244_MW119_211110	0244_MW120_211111
				Sampling date / time	10-Nov-2021 09:55	10-Nov-2021 09:30	10-Nov-2021 10:35	10-Nov-2021 15:50	11-Nov-2021 13:20
Compound	CAS Number	LOR	Unit		EB2132641-016	EB2132641-017	EB2132641-018	EB2132641-019	EB2132641-020
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.06	<0.06	<0.06	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.06	<0.06	<0.06	<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	<0.02	<0.02	<0.02	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.02	<0.02	<0.02	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.02	<0.02	<0.02	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**105**	**108**	**107**	**102**	**103**
13C8-PFOA	----	0.02	%		**102**	**104**	**103**	**101**	**99.8**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_MW121_211111	0244_MW122_211111	0244_POT001_211110	0244_POT005_211110	0244_OTH001_211110
				Sampling date / time	11-Nov-2021 14:00	11-Nov-2021 14:15	10-Nov-2021 12:40	10-Nov-2021 13:00	10-Nov-2021 13:25
					EB2132641-021	EB2132641-022	EB2132641-023	EB2132641-024	EB2132641-025
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<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**	**0.10**	**0.02**	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.04**	**0.02**	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (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	0244_MW121_211111	0244_MW122_211111	0244_POT001_211110	0244_POT005_211110	0244_OTH001_211110
				Sampling date / time	11-Nov-2021 14:00	11-Nov-2021 14:15	10-Nov-2021 12:40	10-Nov-2021 13:00	10-Nov-2021 13:25
Compound	CAS Number	LOR	Unit		EB2132641-021	EB2132641-022	EB2132641-023	EB2132641-024	EB2132641-025
					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		**0.11**	**0.12**	**0.02**	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.11**	**0.12**	**0.02**	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.11**	**0.12**	**0.02**	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**92.7**	**97.4**	**96.3**	**92.7**	**93.4**
13C8-PFOA	----	0.02	%		**105**	**100**	**103**	**103**	**97.4**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_SW004_211111	0244_SW005_211111	0244_SW006_211109	0244_SW007_211109	0244_SW008_211110
				Sampling date / time	11-Nov-2021 07:20	11-Nov-2021 09:10	09-Nov-2021 11:45	09-Nov-2021 09:20	10-Nov-2021 07:50
					EB2132641-026	EB2132641-027	EB2132641-028	EB2132641-029	EB2132641-030
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.004	<0.004	<0.008	<0.008	<0.004
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.202	<0.0120	<0.0016	<0.0016	<0.0008
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0019	<0.0020	<0.0040	<0.0040	<0.0020
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.002	<0.002	<0.004	<0.004	<0.002
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.002	<0.002	<0.004	<0.004	<0.002

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0244_SW004_211111	0244_SW005_211111	0244_SW006_211109	0244_SW007_211109	0244_SW008_211110
				Sampling date / time	11-Nov-2021 07:20	11-Nov-2021 09:10	09-Nov-2021 11:45	09-Nov-2021 09:20	10-Nov-2021 07:50
Compound	CAS Number	LOR	Unit		EB2132641-026	EB2132641-027	EB2132641-028	EB2132641-029	EB2132641-030
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.002	<0.002	<0.004	<0.004	<0.002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.002	<0.002	<0.004	<0.004	<0.002
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.001	<0.001	<0.002	<0.002	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.001	<0.001	<0.002	<0.002	<0.001
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.001	<0.001	<0.002	<0.002	<0.001
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	<0.001	<0.002	<0.002	<0.001
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
Sum of PFAS (WA DER List)	----	0.0003	µg/L		<0.0008	<0.0008	<0.0016	<0.0016	<0.0008
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**86.8**	**92.5**	**101**	**94.9**	**96.2**
13C8-PFOA	----	0.0005	%		**103**	**102**	**109**	**112**	**106**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_SW009_211108	0244_SW012_211108	0244_SW013_211108	0244_SW014_211108	0244_SW016_211109
				Sampling date / time	08-Nov-2021 13:00	08-Nov-2021 12:20	08-Nov-2021 15:05	08-Nov-2021 15:45	09-Nov-2021 09:50
					EB2132641-031	EB2132641-032	EB2132641-033	EB2132641-034	EB2132641-035
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0016	<0.0005	<0.0005	**0.0027**	<0.0016
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0016	<0.0003	<0.0003	<0.0016	<0.0016
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.008	<0.002	<0.002	<0.008	<0.008
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	<0.0005	<0.0005	<0.0016	<0.0016
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	<0.0032	<0.0032	<0.0016	<0.0016
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	<0.0032	<0.0032	<0.0016	<0.0016
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0016	<0.0032	<0.0032	<0.0016	<0.0016
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0040	<0.0080	<0.0080	<0.0040	<0.0040
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	<0.0032	<0.0032	<0.0016	<0.0016
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	<0.008	<0.008	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	<0.008	<0.008	<0.004	<0.004

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_SW009_211108	0244_SW012_211108	0244_SW013_211108	0244_SW014_211108	0244_SW016_211109
				Sampling date / time	08-Nov-2021 13:00	08-Nov-2021 12:20	08-Nov-2021 15:05	08-Nov-2021 15:45	09-Nov-2021 09:50
					EB2132641-031	EB2132641-032	EB2132641-033	EB2132641-034	EB2132641-035
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	<0.008	<0.008	<0.004	<0.004
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.004	<0.008	<0.008	<0.004	<0.004
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	<0.0032	<0.0032	<0.0016	<0.0016
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	<0.0032	<0.0032	<0.0016	<0.0016
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	<0.001	<0.001	<0.002	<0.002
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	<0.001	<0.001	<0.002	<0.002
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	<0.001	<0.001	<0.002	<0.002
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	<0.001	<0.001	<0.002	<0.002
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		<0.0016	<0.0003	<0.0003	**0.0027**	<0.0016
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		<0.0016	<0.0003	<0.0003	**0.0027**	<0.0016
Sum of PFAS (WA DER List)	----	0.0003	µg/L		<0.0016	<0.0003	<0.0003	**0.0027**	<0.0016
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**100**	**89.8**	**84.4**	**95.1**	**94.0**
13C8-PFOA	----	0.0005	%		**103**	**99.1**	**97.8**	**98.7**	**107**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_SW017_211109	0244_SW018_211109	0244_SW019_211109	0244_SW025_211109	0244_SW027_211109
				Sampling date / time	09-Nov-2021 14:05	09-Nov-2021 13:25	09-Nov-2021 13:40	09-Nov-2021 16:15	09-Nov-2021 16:30
					EB2132641-036	EB2132641-037	EB2132641-038	EB2132641-039	EB2132641-040
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0008	<0.0008	**0.0008**	<0.0016	<0.0032
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0008	<0.0008	**0.0018**	**0.0024**	<0.0032
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.004	<0.004	<0.004	<0.008	<0.016
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0020	<0.0020	<0.0020	<0.0040	<0.0080
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.002	<0.002	<0.002	<0.004	<0.008
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.002	<0.002	<0.002	<0.004	<0.008

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0244_SW017_211109	0244_SW018_211109	0244_SW019_211109	0244_SW025_211109	0244_SW027_211109
				Sampling date / time	09-Nov-2021 14:05	09-Nov-2021 13:25	09-Nov-2021 13:40	09-Nov-2021 16:15	09-Nov-2021 16:30
Compound	CAS Number	LOR	Unit		EB2132641-036	EB2132641-037	EB2132641-038	EB2132641-039	EB2132641-040
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.002	<0.002	<0.002	<0.004	<0.008
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.002	<0.002	<0.002	<0.004	<0.008
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0008	<0.0008	<0.0008	<0.0016	<0.0032
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.001	<0.001	<0.001	<0.002	<0.003
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.001	<0.001	<0.001	<0.002	<0.003
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.001	<0.001	<0.001	<0.002	<0.003
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	<0.001	<0.001	<0.002	<0.003
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		<0.0008	<0.0008	**0.0026**	**0.0024**	<0.0032
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		<0.0008	<0.0008	**0.0026**	**0.0024**	<0.0032
Sum of PFAS (WA DER List)	----	0.0003	µg/L		<0.0008	<0.0008	**0.0026**	**0.0024**	<0.0032
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**92.6**	**82.0**	**89.9**	**87.3**	**93.4**
13C8-PFOA	----	0.0005	%		**105**	**93.9**	**102**	**96.9**	**103**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	0244_QC115_211108	0244_QC116_211109	0244_QC117_211110	0244_QC118_211110	0244_QC119_211111
				Sampling date / time	08-Nov-2021 00:00	09-Nov-2021 00:00	10-Nov-2021 00:00	10-Nov-2021 00:00	11-Nov-2021 00:00
					EB2132641-041	EB2132641-042	EB2132641-043	EB2132641-044	EB2132641-045
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0032**	<0.0008	<0.0032	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		----	----	----	<0.02	**0.07**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0016	<0.0008	**0.0038**	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		----	----	----	<0.02	**0.03**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		----	----	----	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.008	<0.004	<0.016	----	----
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		----	----	----	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		----	----	----	<0.02	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0244_QC115_211108	0244_QC116_211109	0244_QC117_211110	0244_QC118_211110	0244_QC119_211111
				Sampling date / time	08-Nov-2021 00:00	09-Nov-2021 00:00	10-Nov-2021 00:00	10-Nov-2021 00:00	11-Nov-2021 00:00
Compound	CAS Number	LOR	Unit		EB2132641-041	EB2132641-042	EB2132641-043	EB2132641-044	EB2132641-045
					Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		----	----	----	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0040	<0.0020	<0.0080	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		----	----	----	<0.06	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		----	----	----	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.004	<0.002	<0.008	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		----	----	----	<0.06	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.004	<0.002	<0.008	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		----	----	----	<0.06	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.004	<0.002	<0.008	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		----	----	----	<0.06	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0244_QC115_211108	0244_QC116_211109	0244_QC117_211110	0244_QC118_211110	0244_QC119_211111
				Sampling date / time	08-Nov-2021 00:00	09-Nov-2021 00:00	10-Nov-2021 00:00	10-Nov-2021 00:00	11-Nov-2021 00:00
Compound	CAS Number	LOR	Unit		EB2132641-041	EB2132641-042	EB2132641-043	EB2132641-044	EB2132641-045
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.004	<0.002	<0.008	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		----	----	----	<0.06	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		----	----	----	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0016	<0.0008	<0.0032	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		----	----	----	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.002	<0.001	<0.003	----	----
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		----	----	----	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.002	<0.001	<0.003	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		----	----	----	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.002	<0.001	<0.003	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		----	----	----	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.002	<0.001	<0.003	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		----	----	----	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		**0.0032**	<0.0008	**0.0038**	----	----
Sum of PFAS	----	0.01	µg/L		----	----	----	<0.02	**0.10**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0244_QC115_211108	0244_QC116_211109	0244_QC117_211110	0244_QC118_211110	0244_QC119_211111
				Sampling date / time	08-Nov-2021 00:00	09-Nov-2021 00:00	10-Nov-2021 00:00	10-Nov-2021 00:00	11-Nov-2021 00:00
Compound	CAS Number	LOR	Unit		EB2132641-041	EB2132641-042	EB2132641-043	EB2132641-044	EB2132641-045
					Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued									
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		**0.0032**	<0.0008	**0.0038**	**----**	**----**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**----**	**----**	**----**	<0.02	**0.10**
Sum of PFAS (WA DER List)	**----**	0.0003	µg/L		**0.0032**	<0.0008	**0.0038**	**----**	**----**
Sum of PFAS (WA DER List)	**----**	0.01	µg/L		**----**	**----**	**----**	<0.02	**0.10**
EP231S: PFAS Surrogate									
13C4-PFOS	**----**	0.0005	%		**86.8**	**96.3**	**82.7**	**----**	**----**
13C4-PFOS	**----**	0.02	%		**----**	**----**	**----**	**91.2**	**92.6**
13C8-PFOA	**----**	0.0005	%		**99.1**	**102**	**103**	**----**	**----**
13C8-PFOA	**----**	0.02	%		**----**	**----**	**----**	**99.5**	**102**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0244_QC120_211111	0244_QC310_211108	0244_QC311_211109	0244_QC312_211110	----
				Sampling date / time	11-Nov-2021 00:00	08-Nov-2021 00:00	09-Nov-2021 00:00	10-Nov-2021 00:00	----
Compound	CAS Number	LOR	Unit		EB2132641-046	EB2132641-047	EB2132641-048	EB2132641-049	--------
					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		**0.12**	<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		**0.02**	<0.01	<0.01	<0.01	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
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	0244_QC120_211111	0244_QC310_211108	0244_QC311_211109	0244_QC312_211110	----
				Sampling date / time	11-Nov-2021 00:00	08-Nov-2021 00:00	09-Nov-2021 00:00	10-Nov-2021 00:00	----
Compound	CAS Number	LOR	Unit		EB2132641-046	EB2132641-047	EB2132641-048	EB2132641-049	--------
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**0.14**	<0.01	<0.01	<0.01	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.14**	<0.01	<0.01	<0.01	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.14**	<0.01	<0.01	<0.01	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**87.3**	**91.1**	**98.2**	**91.9**	----
13C8-PFOA	----	0.02	%		**106**	**101**	**104**	**98.9**	----

Surrogate Control Limits

Sub-Matrix: **WATER**

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2132641**	Page	: 1 of 10
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: MS CATHERINE HANSEN	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 15-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 49		
No. of samples analysed	: 49		

ilac-MRA NATA
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*
[redacted]	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
[redacted]	Senior Organic Chemist - PFAS	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4019479)									
EB2132641-023	0244_POT001_211110	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EB2132641-025	0244_OTH001_211110	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4019479)									
EB2132641-023	0244_POT001_211110	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit

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: 4019479) - continued									
EB2132641-025	0244_OTH001_211110	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4019479)									
EB2132641-023	0244_POT001_211110	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
EB2132641-025	0244_OTH001_211110	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4019479)									
EB2132641-023	0244_POT001_211110	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4019479) - continued									
EB2132641-023	0244_POT001_211110	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
EB2132641-025	0244_OTH001_211110	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: 4019479)									
EB2132641-023	0244_POT001_211110	EP231X: Sum of PFAS	----	0.01	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.02	0.02	0.0	No Limit
EB2132641-025	0244_OTH001_211110	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit

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

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

Sub-Matrix: **WATER**

				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: 4015093)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	80.2	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	97.9	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	84.8	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	110	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	88.8	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	97.7	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4019476)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	95.4	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	92.7	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	89.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	94.7	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	81.7	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	82.0	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4019479)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	91.5	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	98.8	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	88.7	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	112	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	88.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.6	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4020586)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	73.5	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	73.6	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	75.6	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	116	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	78.5	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	90.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4015093)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	105	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	108	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	106	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	102	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	87.6	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	104	69.0	130

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: 4015093) - continued								
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	97.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	110	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	103	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	96.4	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	97.9	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4019476)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	98.8	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	90.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	89.8	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	98.4	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	95.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	93.6	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	99.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	90.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.6	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	95.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4019479)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	92.6	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	98.2	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	85.2	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	89.8	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	88.6	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	88.6	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	88.8	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	86.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4020586)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	89.2	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	96.4	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	92.8	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	87.6	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	78.0	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	87.6	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	89.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.0	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: 4020586) - continued								
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	90.8	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	86.0	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	85.0	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4015093)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	105	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	112	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	108	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	128	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	105	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	109	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	109	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4019476)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	90.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	93.3	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	89.8	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	89.6	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.6	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	94.0	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	96.6	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4019479)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	98.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	87.4	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	96.7	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	88.2	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	88.6	62.6	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	93.0	65.0	136

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: 4019479) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	109	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4020586)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	99.6	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	102	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	93.4	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	91.0	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	90.7	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	89.2	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	88.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4015093)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	105	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	117	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	111	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	120	53.1	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4019476)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	89.2	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	93.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	114	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	93.8	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4019479)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	99.4	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	89.6	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	106	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	88.4	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4020586)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	101	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	111	64.0	140
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	76.2	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	100	53.1	133
EP231P: PFAS Sums (QCLot: 4015093)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----

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
EP231P: PFAS Sums (QCLot: 4015093) - continued								
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231P: PFAS Sums (QCLot: 4019476)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 4019479)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 4020586)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
				Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4019479)							
EB2132641-024	0244_POT005_211110	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	92.8	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	89.4	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	86.2	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	110	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	93.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	96.9	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4019479)							
EB2132641-024	0244_POT005_211110	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	91.6	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	98.7	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	86.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.8	72.0	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: 4019479) - continued							
EB2132641-024	0244_POT005_211110	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	94.1	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	97.6	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	91.6	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	84.8	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	89.9	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	87.4	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	89.4	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4019479)							
EB2132641-024	0244_POT005_211110	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	100	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	86.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	94.9	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	95.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	97.3	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	104	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	99.6	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4019479)							
EB2132641-024	0244_POT005_211110	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	102	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	108	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	97.1	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	71.2	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2132641**	Page	: 1 of 9
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021
Site	: ----	Issue Date	: 22-Nov-2021
Sampler	: BRENT HAMMOND	No. of samples received	: 49
Order number	: 60612563 4.1	No. of samples analysed	: 49

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
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	2	36	5.56	10.00	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	36	2.78	5.00	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	18	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)								
0244_QC310_211108		**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**17-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X-ST)								
0244_SW009_211108,	0244_SW012_211108,	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
0244_SW013_211108,	0244_SW014_211108,							
0244_QC115_211108								
HDPE (no PTFE) (EP231X)								
0244_MW109_211108,	0244_MW110_211108	**08-Nov-2021**	**18-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X)								
0244_QC311_211109		**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**17-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X-ST)								
0244_SW006_211109,	0244_SW007_211109,	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
0244_SW016_211109,	0244_SW017_211109,							
0244_SW018_211109,	0244_SW019_211109,							
0244_SW025_211109,	0244_SW027_211109,							
0244_QC116_211109								
HDPE (no PTFE) (EP231X)								
0244_MW103_211109,	0244_MW104_211109,	**09-Nov-2021**	**18-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
0244_MW106_211109,	0244_MW107_211109,							
0244_MW108_211109,	0244_MW111_211109							
HDPE (no PTFE) (EP231X)								

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 - Continued							
0244_POT001_211110, 0244_POT005_211110, 0244_OTH001_211110, 0244_QC118_211110, 0244_QC312_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**17-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW008_211110, 0244_QC117_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW105_211110, 0244_MW112_211110, 0244_MW113_211110, 0244_MW114_211110, 0244_MW115_211110, 0244_MW116_211110, 0244_MW117_211110, 0244_MW118_211110, 0244_MW119_211110	**10-Nov-2021**	**18-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW121_211111, 0244_MW122_211111, 0244_QC119_211111, 0244_QC120_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**17-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW004_211111, 0244_SW005_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW101_211111, 0244_MW102_211111, 0244_MW120_211111	**11-Nov-2021**	**18-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓

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) 0244_QC310_211108	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**17-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW009_211108, 0244_SW012_211108, 0244_SW013_211108, 0244_SW014_211108, 0244_QC115_211108	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW109_211108, 0244_MW110_211108	**08-Nov-2021**	**18-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_QC311_211109	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**17-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW006_211109, 0244_SW007_211109, 0244_SW016_211109, 0244_SW017_211109, 0244_SW018_211109, 0244_SW019_211109, 0244_SW025_211109, 0244_SW027_211109, 0244_QC116_211109	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW103_211109, 0244_MW104_211109, 0244_MW106_211109, 0244_MW107_211109, 0244_MW108_211109, 0244_MW111_211109	**09-Nov-2021**	**18-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_POT001_211110, 0244_POT005_211110, 0244_OTH001_211110, 0244_QC118_211110, 0244_QC312_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**17-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW008_211110, 0244_QC117_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW105_211110, 0244_MW112_211110, 0244_MW113_211110, 0244_MW114_211110, 0244_MW115_211110, 0244_MW116_211110, 0244_MW117_211110, 0244_MW118_211110, 0244_MW119_211110	**10-Nov-2021**	**18-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW121_211111, 0244_MW122_211111, 0244_QC119_211111, 0244_QC120_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**17-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW004_211111, 0244_SW005_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW101_211111, 0244_MW102_211111, 0244_MW120_211111	**11-Nov-2021**	**18-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓

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) 0244_QC310_211108	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**17-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW009_211108, 0244_SW012_211108, 0244_SW013_211108, 0244_SW014_211108, 0244_QC115_211108	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW109_211108, 0244_MW110_211108	**08-Nov-2021**	**18-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_QC311_211109	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**17-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW006_211109, 0244_SW007_211109, 0244_SW016_211109, 0244_SW017_211109, 0244_SW018_211109, 0244_SW019_211109, 0244_SW025_211109, 0244_SW027_211109, 0244_QC116_211109	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW103_211109, 0244_MW104_211109, 0244_MW106_211109, 0244_MW107_211109, 0244_MW108_211109, 0244_MW111_211109	**09-Nov-2021**	**18-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_POT001_211110, 0244_POT005_211110, 0244_OTH001_211110, 0244_QC118_211110, 0244_QC312_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**17-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW008_211110, 0244_QC117_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW105_211110, 0244_MW112_211110, 0244_MW113_211110, 0244_MW114_211110, 0244_MW115_211110, 0244_MW116_211110, 0244_MW117_211110, 0244_MW118_211110, 0244_MW119_211110	**10-Nov-2021**	**18-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW121_211111, 0244_MW122_211111, 0244_QC119_211111, 0244_QC120_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**17-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW004_211111, 0244_SW005_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW101_211111, 0244_MW102_211111, 0244_MW120_211111	**11-Nov-2021**	**18-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓

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) 0244_QC310_211108	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**17-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW009_211108, 0244_SW012_211108, 0244_SW013_211108, 0244_SW014_211108, 0244_QC115_211108	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW109_211108, 0244_MW110_211108	**08-Nov-2021**	**18-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_QC311_211109	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**17-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW006_211109, 0244_SW007_211109, 0244_SW016_211109, 0244_SW017_211109, 0244_SW018_211109, 0244_SW019_211109, 0244_SW025_211109, 0244_SW027_211109, 0244_QC116_211109	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW103_211109, 0244_MW104_211109, 0244_MW106_211109, 0244_MW107_211109, 0244_MW108_211109, 0244_MW111_211109	**09-Nov-2021**	**18-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_POT001_211110, 0244_POT005_211110, 0244_OTH001_211110, 0244_QC118_211110, 0244_QC312_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**17-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW008_211110, 0244_QC117_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW105_211110, 0244_MW112_211110, 0244_MW113_211110, 0244_MW114_211110, 0244_MW115_211110, 0244_MW116_211110, 0244_MW117_211110, 0244_MW118_211110, 0244_MW119_211110	**10-Nov-2021**	**18-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW121_211111, 0244_MW122_211111, 0244_QC119_211111, 0244_QC120_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**17-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW004_211111, 0244_SW005_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW101_211111, 0244_MW102_211111, 0244_MW120_211111	**11-Nov-2021**	**18-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓

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) 0244_QC310_211108	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**17-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW009_211108, 0244_SW012_211108, 0244_SW013_211108, 0244_SW014_211108, 0244_QC115_211108	**08-Nov-2021**	**17-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW109_211108, 0244_MW110_211108	**08-Nov-2021**	**18-Nov-2021**	07-May-2022	✓	**18-Nov-2021**	07-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_QC311_211109	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**17-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW006_211109, 0244_SW007_211109, 0244_SW016_211109, 0244_SW017_211109, 0244_SW018_211109, 0244_SW019_211109, 0244_SW025_211109, 0244_SW027_211109, 0244_QC116_211109	**09-Nov-2021**	**17-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW103_211109, 0244_MW104_211109, 0244_MW106_211109, 0244_MW107_211109, 0244_MW108_211109, 0244_MW111_211109	**09-Nov-2021**	**18-Nov-2021**	08-May-2022	✓	**18-Nov-2021**	08-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_POT001_211110, 0244_POT005_211110, 0244_OTH001_211110, 0244_QC118_211110, 0244_QC312_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**17-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW008_211110, 0244_QC117_211110	**10-Nov-2021**	**17-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW105_211110, 0244_MW112_211110, 0244_MW113_211110, 0244_MW114_211110, 0244_MW115_211110, 0244_MW116_211110, 0244_MW117_211110, 0244_MW118_211110, 0244_MW119_211110	**10-Nov-2021**	**18-Nov-2021**	09-May-2022	✓	**18-Nov-2021**	09-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW121_211111, 0244_MW122_211111, 0244_QC119_211111, 0244_QC120_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**17-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X-ST) 0244_SW004_211111, 0244_SW005_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
HDPE (no PTFE) (EP231X) 0244_MW101_211111, 0244_MW102_211111, 0244_MW120_211111	**11-Nov-2021**	**18-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	**5.56**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	18	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	36	**2.78**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	18	**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.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB2132649**

Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	:	Telephone	:
Facsimile	:	Facsimile	:
Project	: QLD_0224_PFASOMP	Page	: 1 of 2
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 12-Nov-2021 13:02	Issue Date	: 12-Nov-2021
Client Requested Due Date	: 19-Nov-2021	Scheduled Reporting Date	: **19-Nov-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 2	Temperature	: -1.2/.1°c - Ice present
Receipt Detail	: MEDIUM HARD ESKY	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2132649-001	11-Nov-2021 12:55	0224_SW024_211111	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE
- A4 - AU Tax Invoice (INV) — Email

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

DERP ESDAT REPORTS
- EDI Format - ESDAT (ESDAT) — Email

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

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2132649**	Page	: 1 of 5
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021 13:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 17-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021 10:48
Sampler	: BRENT HAMMOND		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
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*
[redacted]	Senior Organic Chemist - PFAS	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X-ST PFAS Super Trace: Sample "0224_SW021_211111" required dilution due to sample matrix. LOR values have been adjusted accordingly.
- 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	0224_SW024_211111	----	----	----	----
				Sampling date / time	11-Nov-2021 12:55	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2132649-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0032	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0032	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0032	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0032	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.016	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0032	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0032	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0032	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0080	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0032	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.008	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.008	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW024_211111	----	----	----	----
				Sampling date / time	11-Nov-2021 12:55	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2132649-001	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.008	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.008	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0032	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0032	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.003	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.003	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.003	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.003	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		<0.0032	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		<0.0032	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L		<0.0032	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**99.7**	----	----	----	----
13C8-PFOA	----	0.0005	%		**101**	----	----	----	----

Surrogate Control Limits

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2132649**	Page	: 1 of 4
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 17-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
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*
[redacted]	Senior Organic Chemist - PFAS	Brisbane Organics, Stafford, QLD

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: 4015094)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	84.3	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	88.1	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	82.7	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	120	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	87.1	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	96.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4015094)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	94.2	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	105	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	100	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	86.8	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	104	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	99.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	96.8	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	85.6	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	95.0	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4015094)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	94.0	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	124	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	116	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	112	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	86.2	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	113	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	101	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4015094)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	102	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	91.4	64.0	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4015094) - continued								
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	93.8	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	119	53.1	133
EP231P: PFAS Sums (QCLot: 4015094)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2132649**	Page	: 1 of 4
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021
Site	: ----	Issue Date	: 22-Nov-2021
Sampler	: BRENT HAMMOND	No. of samples received	: 1
Order number	: 60612563 4.1	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
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	4	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	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST)							
0224_SW024_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	4	**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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EB2132652**		
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: [redacted]	Telephone	: [redacted]
Facsimile	: [redacted]	Facsimile	: [redacted]
Project	: QLD_0224_PFASOMP	Page	: 1 of 2
Order number	: 60612563 4.1	Quote number	: ES2020AECOMAU0024 (SY/139/19 V3_QLD)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: [redacted]		

Dates

Date Samples Received	: 12-Nov-2021 13:02	Issue Date	: 12-Nov-2021
Client Requested Due Date	: 19-Nov-2021	Scheduled Reporting Date	: **19-Nov-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 2	Temperature	: -1.2/6.1°C - Ice present
Receipt Detail	: MEDIUM HARD ESKY	No. of samples received / analysed	: 2 / 2

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**

Sample Container(s)/Preservation Non-Compliances

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

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X-ST PFAS - Super Trace Waters Long Suite (28
EB2132652-001	11-Nov-2021 12:10	0224_SW022_211111	✓
EB2132652-002	11-Nov-2021 11:55	0224_SW023_211111	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS PAYABLE
- A4 - AU Tax Invoice (INV) Email

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

DERP ESDAT REPORTS
- EDI Format - ESDAT (ESDAT) Email

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

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

[redacted]

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB2132652**	Page	: 1 of 5
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021 13:02
Order number	: 60612563 4.1	Date Analysis Commenced	: 17-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021 10:44
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 2		
No. of samples analysed	: 2		

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*
[redacted]	Senior Organic Chemist - PFAS	Brisbane Organics, Stafford, QLD

General Comments

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

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

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

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

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

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

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

- EP231X-ST PFAS Super Trace: The LOR of PFOS for samples “0224_SW022_211111” and "0224_SW023_211111" has been raised due to sample matrix interferences.
- EP231X-ST PFAS Super Trace: Samples “0224_SW022_211111” and "0224_SW023_211111" required dilution due to sample matrix. LOR values have been adjusted accordingly.
- 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	0224_SW022_211111	0224_SW023_211111	----	----	----
				Sampling date / time	11-Nov-2021 12:10	11-Nov-2021 11:55	----	----	----
Compound	CAS Number	LOR	Unit		EB2132652-001	EB2132652-002	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L		<0.0054	<0.0069	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0032	<0.0032	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L		<0.016	<0.016	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0032	<0.0032	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0080	<0.0080	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0032	<0.0032	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.008	<0.008	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.008	<0.008	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	0224_SW022_211111	0224_SW023_211111	----	----	----
				Sampling date / time	11-Nov-2021 12:10	11-Nov-2021 11:55	----	----	----
Compound	CAS Number	LOR	Unit		EB2132652-001	EB2132652-002	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.008	<0.008	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.008	<0.008	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0032	<0.0032	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0032	<0.0032	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.003	<0.003	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.003	<0.003	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.003	<0.003	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.003	<0.003	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L		<0.0032	<0.0032	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L		<0.0032	<0.0032	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L		<0.0032	<0.0032	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**89.7**	**110**	----	----	----
13C8-PFOA	----	0.0005	%		**98.3**	**106**	----	----	----

Surrogate Control Limits

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

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB2132652**	Page	: 1 of 4
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Contact	: [redacted]
Address	: PO BOX 1307 FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021
Order number	: 60612563 4.1	Date Analysis Commenced	: 17-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021
Sampler	: [redacted]		
Site	: ----		
Quote number	: SY/139/19 V3_QLD		
No. of samples received	: 2		
No. of samples analysed	: 2		

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*
[redacted]	Senior Organic Chemist - PFAS	Brisbane Organics, Stafford, QLD

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: 4015094)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	84.3	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	88.1	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	82.7	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	120	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	87.1	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	96.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4015094)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	94.2	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	105	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	100	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	94.8	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	86.8	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	104	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	99.6	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	96.8	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	85.6	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	95.0	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4015094)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	94.0	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	124	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	116	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	112	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	86.2	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	113	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	101	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4015094)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	102	63.0	143
EP231X-ST: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	91.4	64.0	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4015094) - continued								
EP231X-ST: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	93.8	67.0	138
EP231X-ST: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	119	53.1	133
EP231P: PFAS Sums (QCLot: 4015094)								
EP231X-ST: Sum of PFAS	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0003	µg/L	<0.0003	----	----	----	----
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----

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.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB2132652**	Page	: 1 of 4
Client	: **AECOM AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: [redacted]	Telephone	: [redacted]
Project	: QLD_0224_PFASOMP	Date Samples Received	: 12-Nov-2021
Site	: ----	Issue Date	: 22-Nov-2021
Sampler	: [redacted]	No. of samples received	: 2
Order number	: 60612563 4.1	No. of samples analysed	: 2

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	4	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-ST)								
0224_SW022_211111,	0224_SW023_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X-ST)								
0224_SW022_211111,	0224_SW023_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X-ST)								
0224_SW022_211111,	0224_SW023_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X-ST)								
0224_SW022_211111,	0224_SW023_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X-ST)								
0224_SW022_211111,	0224_SW023_211111	**11-Nov-2021**	**17-Nov-2021**	10-May-2022	✓	**18-Nov-2021**	10-May-2022	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	4	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	4	**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-ST	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, 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.

Australian Government
Department of Industry, Science, Energy and Resources

National Measurement Institute

SAMPLE RECEIPT NOTIFICATION

CUSTOMER DETAILS

Attention: [redacted]

Customer: AECOM AUSTRALIA PTY LTD

Address: LEVEL 8
FORTITUDE VALLEY QLD 4006

Email: [redacted]

Telephone:

Fax:

LABORATORY DETAILS

Lab: National Measurement Institute

Contact: [redacted]

Address: 105 Delhi Road, North Ryde, NSW
NSW 2113

Email: [redacted]

Telephone: [redacted]

Fax:

SAMPLE DETAILS

NMI Job Name: **AECO06/211116**

Total No. of Samples: **6**

LRNs	Estimated Report Date	Customer Sample ID	Lab Sample Description
N21/025483	25-NOV-2021	0224_QC215_211108	WATER 08-NOV-21
N21/025484	25-NOV-2021	0224_QC216_211109	WATER 09-NOV-21
N21/025485	25-NOV-2021	0224_QC217_211110	WATER 10-NOV-21
N21/025486	25-NOV-2021	0224_QC218_211110	WATER 10-NOV-21
N21/025487	25-NOV-2021	0224_QC219_211111	WATER 11-NOV-21
N21/025488	25-NOV-2021	0224_QC220_211111	WATER 11-NOV-21

SAMPLE RECEIVED CONDITION

Date samples received:	16-NOV-2021
Sample received in good order:	Yes
NMI Quotation no. provided:	
Client purchase order number:	60612563_4_1
Temperature of samples:	Chilled
Comments:	ALL OK
Mode of Delivery:	Courier

Additional Terms and Conditions

Incomplete / unclear information about samples or required testing will delay the start of the analysis work

If you require your Purchase Order (PO) number to be included on our invoice, please provide the number during sample submission and before the completion of work to avoid unnecessary delays and/or additional processing/handling fees.

The lodgement of an order or receipt of samples for NMI services referenced in this Sample Receipt Notification constitutes an acceptence of the current version of NMI Terms and Conditions or other applicable Terms referenced in the NMI Quotation. NMI Terms and Conditions are available on the web at https://www.industry.gov.au/client-services/testing-and-analysis-services/chemical-and-biological-analysis-services-terms-and-conditions

REPORT OF ANALYSIS

Client	: AECOM AUSTRALIA PTY LTD	**Job No.**	: AECO06/211116
	LEVEL 8	**Quote No.**	: QT-02018
	540 WICKHAM STREET	**Order No.**	: 60612563_4_1
		Date Received	: 16-NOV-2021
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: QLD_0224_PFASOMP		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N21/025483	0224_QC215_211108	WATER 08-NOV-21
N21/025484	0224_QC216_211109	WATER 09-NOV-21
N21/025485	0224_QC217_211110	WATER 10-NOV-21

Lab Reg No.		N21/025483	N21/025484	N21/025485		
Date Sampled		08-NOV-2021	09-NOV-2021	10-NOV-2021		
	Units					Method
PFAS (per-and poly-fluoroalkyl substances)						
PFBA (375-22-4)	ug/L	0.0079	0.0071	0.0082		NR70
PFPeA (2706-90-3)	ug/L	0.013	<0.002	0.0023		NR70
PFHxA (307-24-4)	ug/L	<0.001	<0.001	0.0010		NR70
PFHpA (375-85-9)	ug/L	<0.001	<0.001	<0.001		NR70
PFOA (335-67-1)	ug/L	<0.001	<0.001	<0.001		NR70
PFNA (375-95-1)	ug/L	<0.001	<0.001	<0.001		NR70
PFDA (335-76-2)	ug/L	<0.001	<0.001	<0.001		NR70
PFUdA (2058-94-8)	ug/L	<0.001	<0.001	<0.001		NR70
PFDoA (307-55-1)	ug/L	<0.001	<0.001	<0.001		NR70
PFTrDA (72629-94-8)	ug/L	<0.002	<0.002	<0.002		NR70
PFTeDA (376-06-7)	ug/L	<0.002	<0.002	<0.002		NR70
PFHxDA (67905-19-5)	ug/L	<0.002	<0.002	<0.002		NR70
PFODA (16517-11-6)	ug/L	<0.005	<0.005	<0.005		NR70
FOUEA (70887-84-2)	ug/L	<0.001	<0.001	<0.001		NR70
PFBS (375-73-5)	ug/L	<0.001	<0.001	<0.001		NR70
PFPeS (2706-91-4)	ug/L	<0.001	<0.001	<0.001		NR70
PFHxS (355-46-4)	ug/L	0.0035	<0.001	0.0024		NR70
PFHpS (375-92-8)	ug/L	<0.001	<0.001	<0.001		NR70
PFOS (1763-23-1)	ug/L	<0.002	<0.002	0.0028		NR70
PFNS (68259-12-1)	ug/L	<0.001	<0.001	<0.001		NR70
PFDS (335-77-3)	ug/L	<0.001	<0.001	<0.001		NR70
PFOSA (754-91-6)	ug/L	<0.001	<0.001	<0.001		NR70
N-MeFOSA (31506-32-8)	ug/L	<0.002	<0.002	<0.002		NR70
N-EtFOSA (4151-50-2)	ug/L	<0.002	<0.002	<0.002		NR70
N-MeFOSAA (2355-31-9)	ug/L	<0.002	<0.002	<0.002		NR70
N-EtFOSAA(2991-50-6)	ug/L	<0.002	<0.002	<0.002		NR70
N-MeFOSE (24448-09-7)	ug/L	<0.005	<0.005	<0.005		NR70
N-EtFOSE (1691-99-2)	ug/L	<0.005	<0.005	<0.005		NR70

REPORT OF ANALYSIS

Lab Reg No.		N21/025483	N21/025484	N21/025485		
Date Sampled		08-NOV-2021	09-NOV-2021	10-NOV-2021		
	Units					Method
PFAS (per-and poly-fluoroalkyl substances)						
4:2 FTS (757124-72-4)	ug/L	<0.001	<0.001	<0.001		NR70
6:2 FTS (27619-97-2)	ug/L	<0.001	<0.001	<0.001		NR70
8:2 FTS (39108-34-4)	ug/L	<0.001	<0.001	<0.001		NR70
10:2 FTS (120226-60-0)	ug/L	<0.001	<0.001	<0.001		NR70
8:2 diPAP (678-41-1)	ug/L	<0.002	<0.002	<0.002		NR70
PFBA (Surrogate Recovery)	%	105	98	111		NR70
PFPeA (Surrogate Recovery)	%	191	207	227		NR70
PFHxA (Surrogate Recovery)	%	83	80	80		NR70
PFHpA (Surrogate Recovery)	%	89	93	90		NR70
PFOA (Surrogate Recovery)	%	94	95	99		NR70
PFNA (Surrogate Recovery)	%	90	93	91		NR70
PFDA (Surrogate Recovery)	%	87	83	100		NR70
PFUdA (Surrogate Recovery)	%	80	74	88		NR70
PFDoA (Surrogate Recovery)	%	75	57	67		NR70
PFTeDA (Surrogate Recovery)	%	71	56	39		NR70
PFHxDA (Surrogate Recovery)	%	73	69	34		NR70
FOUEA (Surrogate Recovery)	%	73	66	84		NR70
PFBS (Surrogate Recovery)	%	91	93	87		NR70
PFHxS (Surrogate Recovery)	%	91	102	104		NR70
PFOS (Surrogate Recovery)	%	104	89	95		NR70
PFOSA (Surrogate Recovery)	%	78	69	74		NR70
N-MeFOSA (Surrogate Recovery)	%	40	47	61		NR70
N-EtFOSA (Surrogate Recovery)	%	38	46	56		NR70
N-MeFOSAA (Surrogate Recovery)	%	68	53	68		NR70
N-EtFOSAA (Surrogate Recovery)	%	66	52	59		NR70
N-MeFOSE (Surrogate Recovery)	%	59	55	68		NR70
N-EtFOSE (Surrogate Recovery)	%	48	46	53		NR70
4:2 FTS (Surrogate Recovery)	%	118	102	110		NR70
6:2 FTS (Surrogate Recovery)	%	117	124	142		NR70
8:2 FTS (Surrogate Recovery)	%	89	82	102		NR70
8:2 diPAP (Surrogate Recovery)	%	65	77	30		NR70
Dates						
Date extracted		18-NOV-2021	18-NOV-2021	18-NOV-2021		
Date analysed		19-NOV-2021	19-NOV-2021	19-NOV-2021		

N21/025483
to
N21/025488

REPORT OF ANALYSIS

PFOS and PFHxS are quantified using a combined branched and linear standard,
linear and branched isomers are totalled for reporting.
All results corrected for labelled surrogate recoveries.

Selected PFAS surrogate recoveries are biased due to matrix effects.ô
High PFAS surrogate recoveries accepted - results corrected for recovery.
Surrogate recoveries low for selected analytes - PFAS LORs not raised since S/N >10.

[redacted]
Organics - NSW
Accreditation No. 198

25-NOV-2021

REPORT OF ANALYSIS

Report No. RN1335135

Client	: AECOM AUSTRALIA PTY LTD	**Job No.**	: AECO06/211116
	LEVEL 8	**Quote No.**	: QT-02018
	540 WICKHAM STREET	**Order No.**	: 60612563_4_1
		Date Received	: 16-NOV-2021
Attention	: [redacted]	**Sampled By**	: CLIENT
Project Name	: QLD_0224_PFASOMP		
Your Client Services Manager	: [redacted]	**Phone**	: [redacted]

Lab Reg No.	Sample Ref	Sample Description
N21/025486	0224_QC218_211110	WATER 10-NOV-21
N21/025487	0224_QC219_211111	WATER 11-NOV-21
N21/025488	0224_QC220_211111	WATER 11-NOV-21

Lab Reg No.			N21/025486	N21/025487	N21/025488		
Date Sampled			10-NOV-2021	11-NOV-2021	11-NOV-2021		
		Units					Method
PFAS (per-and poly-fluoroalkyl substances)							
PFBA (375-22-4)		ug/L	<0.05	<0.05	<0.05		NR70
PFPeA (2706-90-3)		ug/L	<0.02	<0.02	<0.02		NR70
PFHxA (307-24-4)		ug/L	<0.01	<0.01	<0.01		NR70
PFHpA (375-85-9)		ug/L	<0.01	<0.01	<0.01		NR70
PFOA (335-67-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFNA (375-95-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFDA (335-76-2)		ug/L	<0.01	<0.01	<0.01		NR70
PFUdA (2058-94-8)		ug/L	<0.01	<0.01	<0.01		NR70
PFDoA (307-55-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFTrDA (72629-94-8)		ug/L	<0.02	<0.02	<0.02		NR70
PFTeDA (376-06-7)		ug/L	<0.02	<0.02	<0.02		NR70
PFHxDA (67905-19-5)		ug/L	<0.02	<0.02	<0.02		NR70
PFODA (16517-11-6)		ug/L	<0.05	<0.05	<0.05		NR70
FOUEA (70887-84-2)		ug/L	<0.01	<0.01	<0.01		NR70
PFDS (335-77-3)		ug/L	<0.01	<0.01	<0.01		NR70
PFPeS (2706-91-4)		ug/L	<0.01	<0.01	0.011		NR70
PFHxS (355-46-4)		ug/L	0.019	0.081	0.11		NR70
PFHpS (375-92-8)		ug/L	<0.01	<0.01	<0.01		NR70
PFOS (1763-23-1)		ug/L	<0.02	0.031	<0.02		NR70
PFNS (68259-12-1)		ug/L	<0.01	<0.01	<0.01		NR70
PFBS (375-73-5)		ug/L	<0.01	<0.01	0.011		NR70
PFOSA (754-91-6)		ug/L	<0.01	<0.01	<0.01		NR70
N-MeFOSA (31506-32-8)		ug/L	<0.02	<0.02	<0.02		NR70
N-EtFOSA (4151-50-2)		ug/L	<0.02	<0.02	<0.02		NR70
N-MeFOSAA (2355-31-9)		ug/L	<0.01	<0.01	<0.01		NR70
N-EtFOSAA(2991-50-6)		ug/L	<0.01	<0.01	<0.01		NR70
N-MeFOSE (24448-09-7)		ug/L	<0.05	<0.05	<0.05		NR70
N-EtFOSE (1691-99-2)		ug/L	<0.05	<0.05	<0.05		NR70

REPORT OF ANALYSIS

Lab Reg No.		Units	N21/025486	N21/025487	N21/025488		Method
Date Sampled			10-NOV-2021	11-NOV-2021	11-NOV-2021		
PFAS (per-and poly-fluoroalkyl substances)							
4:2 FTS (757124-72-4)		ug/L	<0.01	<0.01	<0.01		NR70
6:2 FTS (27619-97-2)		ug/L	<0.01	<0.01	<0.01		NR70
8:2 FTS (39108-34-4)		ug/L	<0.01	<0.01	<0.01		NR70
10:2 FTS (120226-60-0)		ug/L	<0.01	<0.01	<0.01		NR70
8:2 diPAP (678-41-1)		ug/L	<0.02	<0.02	<0.02		NR70
PFBA (Surrogate Recovery)		%	109	108	109		NR70
PFPeA (Surrogate Recovery)		%	106	98	110		NR70
PFHxA (Surrogate Recovery)		%	110	114	108		NR70
PFHpA (Surrogate Recovery)		%	106	111	109		NR70
PFOA (Surrogate Recovery)		%	110	112	110		NR70
PFNA (Surrogate Recovery)		%	101	108	115		NR70
PFDA (Surrogate Recovery)		%	109	111	111		NR70
PFUdA (Surrogate Recovery)		%	100	97	100		NR70
PFDoA (Surrogate Recovery)		%	95	95	95		NR70
PFTeDA (Surrogate Recovery)		%	93	107	111		NR70
PFHxDA (Surrogate Recovery)		%	78	100	89		NR70
FOUEA (Surrogate Recovery)		%	94	101	93		NR70
PFBS (Surrogate Recovery)		%	107	118	109		NR70
PFHxS (Surrogate Recovery)		%	105	111	107		NR70
PFOS (Surrogate Recovery)		%	106	101	107		NR70
PFOSA (Surrogate Recovery)		%	97	106	98		NR70
N-MeFOSA (Surrogate Recovery)		%	85	90	82		NR70
N-EtFOSA (Surrogate Recovery)		%	86	93	88		NR70
N-MeFOSAA (Surrogate Recovery)		%	99	99	103		NR70
N-EtFOSAA (Surrogate Recovery)		%	96	97	110		NR70
N-MeFOSE (Surrogate Recovery)		%	91	100	93		NR70
N-EtFOSE (Surrogate Recovery)		%	83	90	81		NR70
4:2 FTS (Surrogate Recovery)		%	109	111	110		NR70
6:2 FTS (Surrogate Recovery)		%	100	111	107		NR70
8:2 FTS (Surrogate Recovery)		%	93	100	99		NR70
8:2 diPAP (Surrogate Recovery)		%	79	90	103		NR70
Dates							
Date extracted			18-NOV-2021	18-NOV-2021	18-NOV-2021		
Date analysed			19-NOV-2021	19-NOV-2021	19-NOV-2021		

[redacted]

Organics - NSW
Accreditation No. 198

25-NOV-2021

REPORT OF ANALYSIS

This Report supersedes reports: *RN1334902*

Measurement Uncertainty is available upon request.
Chemical Accreditation 198: 105 Delhi Road, North Ryde, NSW, 2113

Australian Government

National Measurement Institute

QUALITY ASSURANCE REPORT

Client: AECOM AUSTRALIA PTY LTD

NMI QA Report No: AECO06/211116 **Sample Matrix:** Liquid

Analyte	Method	LOR	Blank	Sample Duplicates			Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		ug/L	ug/L	ug/L	ug/L	%	%	%
PFBA (375-22-4)	NR70	0.005	<0.005	NA	NA	NA	126	NA
PFPeA (2706-90-3)	NR70	0.002	<0.002	NA	NA	NA	104	NA
PFHxA (307-24-4)	NR70	0.001	<0.001	NA	NA	NA	102	NA
PFHpA (375-85-9)	NR70	0.001	<0.001	NA	NA	NA	104	NA
PFOA (335-67-1)	NR70	0.001	<0.001	NA	NA	NA	104	NA
PFNA (375-95-1)	NR70	0.001	<0.001	NA	NA	NA	107	NA
PFDA (335-76-2)	NR70	0.001	<0.001	NA	NA	NA	104	NA
PFUdA (2058-94-8)	NR70	0.001	<0.001	NA	NA	NA	103	NA
PFDoA (307-55-1)	NR70	0.001	<0.001	NA	NA	NA	104	NA
PFTrDA (72629-94-8)	NR70	0.002	<0.002	NA	NA	NA	98	NA
PFTeDA (376-06-7)	NR70	0.002	<0.002	NA	NA	NA	109	NA
PFHxDA (67905-19-5)	NR70	0.002	<0.002	NA	NA	NA	113	NA
PFODA (16517-11-6)	NR70	0.005	<0.005	NA	NA	NA	127	NA
FOUEA (70887-84-2)	NR70	0.001	<0.001	NA	NA	NA	109	NA
PFBS (375-73-5)	NR70	0.001	<0.001	NA	NA	NA	110	NA
PFPeS (2706-91-4)	NR70	0.001	<0.001	NA	NA	NA	102	NA
PFHxS (355-46-4)	NR70	0.001	<0.001	NA	NA	NA	102	NA
PFHpS (375-92-8)	NR70	0.001	<0.001	NA	NA	NA	104	NA
PFOS (1763-23-1)	NR70	0.002	<0.002	NA	NA	NA	107	NA
PFNS (68259-12-1)	NR70	0.001	<0.001	NA	NA	NA	101	NA
PFDS (335-77-3)	NR70	0.001	<0.001	NA	NA	NA	100	NA
PFOSA (754-91-6)	NR70	0.001	<0.001	NA	NA	NA	109	NA
N-MeFOSA (31506-32-8)	NR70	0.002	<0.002	NA	NA	NA	97	NA
N-EtFOSA (4151-50-2)	NR70	0.002	<0.002	NA	NA	NA	103	NA
N-MeFOSAA (2355-31-9)	NR70	0.002	<0.002	NA	NA	NA	113	NA
N-EtFOSAA(2991-50-6)	NR70	0.002	<0.002	NA	NA	NA	99	NA
N-MeFOSE (24448-09-7)	NR70	0.005	<0.005	NA	NA	NA	120	NA
N-EtFOSE (1691-99-2)	NR70	0.005	<0.005	NA	NA	NA	108	NA
4:2 FTS (757124-72-4)	NR70	0.001	<0.001	NA	NA	NA	97	NA
6:2 FTS (27619-97-2)	NR70	0.001	<0.001	NA	NA	NA	120	NA
8:2 FTS (39108-34-4)	NR70	0.001	<0.001	NA	NA	NA	124	NA
10:2 FTS (120226-60-0)	NR70	0.001	<0.001	NA	NA	NA	96	NA
8:2 diPAP (678-41-1)	NR70	0.002	<0.002	NA	NA	NA	88	NA

Results expressed in percentage (%) or ug/L wherever appropriate.
Acceptable Spike recovery is 50-150%.
Maximum acceptable RPDs on spikes and duplicates is 40%.
'NA ' = Not Applicable.
RPD= Relative Percentage Difference.

Signed: [redacted]

Organics Manager, NMI-North Ryde

Date: **22/11/2021**

Appendix F

Equipment Calibration Certificates

Appendix F Equipment Calibration Certificates

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 11K101263

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		372012	pH 6.98
2. pH 4.00		pH 4.00		368314	pH 3.98
3. ORP		235mV		375760/367457	232.1mV
4. EC		2760uS		369734	2501uS
6. D.O		0.00%		11171	0.00%
7. Temp		21.1oC		MultiTherm 09000528	21.0oC

Calibrated by: [redacted]

Calibration date: 2/11/2021

Next calibration due: 2/12/2021

Oil / Water Interface Meter

Instrument Interface Meter (30M)
Serial No. 312522

airmet
Air-Met Scientific Pty Ltd
1300 137 067

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

Certificate of Calibration

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

Calibrated by: [redacted]

Calibration date: 4/11/2021

Next calibration due: 3/01/2022

AECOM

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	WBTA OMP	**Project Number:**	60612563
Project Location:	WBTA	**Client:**	DoD
PM Name:	[redacted]	**Fieldwork Staff Name:**	[redacted]

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	AEROMET
Make and Model:	YSI PRO PLUS
Serial Number:	11K101263

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	ORP
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:	7	4	2760	0	
Calibration Reading:	7.28	4.50	2765	0.07	202.6
Calibration Temperature:	22.5	23.1	23.3	23.3	23.6

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

☐ Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.

[redacted]
Fieldwork Staff Signature

09-Nov-2021 @ 07:00
Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	WBTA OMP	**Project Number:**	60612563
Project Location:	WBTA	**Client:**	DoD
PM Name:	[redacted]	**Fieldwork Staff Name:**	[redacted]

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	AIRMET
Make and Model:	YSI PRO PLUS
Serial Number:	

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:	7.0	4			
Calibration Reading:	6.98	4.26			
Calibration Temperature:	22.0	22.3			

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	~~ppm~~ %	ppm
Calibration Standard Concentration:			2760	0%	
Bump Test Reading:			2738	0.02	
Bump Test Temperature:			22.3	22.5	

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

☐ Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.

[redacted] — Fieldwork Staff Signature

10-Nov-2021 @ 08:45 — Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	WBTA OMP	**Project Number:**	60612563
Project Location:	WBTA	**Client:**	DoD
PM Name:	[redacted]	**Fieldwork Staff Name:**	[redacted]

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	AIRMET
Make and Model:	YSI PRO PLUS
Serial Number:	11H101263

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:	7	4	2760	0	
Bump Test Reading:	7.21	4.25	2746	0.3%	
Bump Test Temperature:	22.3	22.9	23.1	23.6	

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

☐ Each individual [redacted] and bump tested as required by fieldwork staff.

[redacted]
Fieldwork Staff Signature

11-Nov-2021 @ 10:15
Date

Distribution: Project Central File

Appendix E

Sampling Analysis and Quality Plan

AECOM Imagine it. Delivered.

Department of Defence
23-Apr-2021

PFAS OMP - WBTA Sampling and Analysis Quality Plan

PFAS OMP - WBTA Sampling and Analysis Quality Plan

Client: Department of Defence

ABN: 68 706 814 312

Prepared by

AECOM Australia Pty Ltd
Level 8, 540 Wickham Street, PO Box 1307, Fortitude Valley QLD 4006, Australia
T +61 7 3553 2000 F +61 7 3553 2050 www.aecom.com
ABN 20 093 846 925

23-Apr-2021

Job No.: 60612563

Quality Information

Document PFAS OMP - WBTA Sampling and Analysis Quality Plan

Ref 60612563

Date 23-Apr-2021

Prepared by Camden McCosker

Reviewed by James Peachey

Revision History

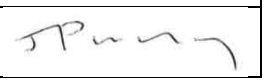
Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	06-Oct-2020	Draft	James Peachey Project Manager	
0	16-Oct-2020	Final	James Peachey Project Manager	
1	19-Feb-2021	Final	James Peachey Project Manager	
2	16-Mar-2021	Final	James Peachey Project Manager	
3	23-Mar-2021	Final	James Peachey Project Manager	
4	23-Apr-2021	Final	James Peachey Project Manager	

Table of Contents

1.0 Introduction

1.1 Preamble

AECOM Australia Pty Ltd (AECOM) has prepared this Sampling and Analysis Quality Plan (SAQP) for the per- and poly-fluoroalkyl substances (PFAS) Ongoing Monitoring Program at the **Wide Bay Training Area (WBTA)** (the 'site') and the **WBTA Management Area** in the **South Queensland Region**.

The SAQP supports the *PFAS Ongoing Monitoring Plan (OMP) – Wide Bay Training Area* which was included in the WBTA PFAS Management Area Plan (PMAP) (Defence, 2020), and here-in referred to as the OMP.

The purpose of the OMP program is to collect data that will enable Defence to maintain an up-to-date understanding of the distribution, concentration, transport (migration pathways and flow) and transformation of PFAS at the site and wider WBTA Management Area. The data will assist in the timely identification of risks and inform Defence's approach to the management of PFAS, including updates and revisions to the PMAP. The WBTA Management Area is presented on **Figure 1**, **Appendix A**.

1.2 SAQP Objectives

The objectives of this SAQP are to:

- define the proposed scope of works in detail
- outline the proposed sampling methodology to be adopted
- outline the proposed data quality assurance and quality control (QA/QC) measures to be adopted
- define the data collection requirements for the project.

1.3 Scope of Works

To meet the project objectives, the following scope of work is proposed as per the OMP (Defence, 2020):

- Biannual sampling events in October 2020[1], April 2021, October 2022, April 2022, October 2022 and April 2023 including:
  - groundwater sampling of 17 on-site groundwater monitoring wells and five off-site groundwater monitoring wells
  - surface water sampling at 15 on-site and five off-site sampling locations
  - Tap sampling of the two on-site extraction bores
  - Tap sampling of the treated wastewater from the outlet tap of the Camp Kerr wastewater treatment plant (WWTP)
- Sediment samples (co-located with the surface water samples) will be collected once per year in April 2021, April 2022 and April 2023
- Up to two event-based sampling of the WWTP during times of high site usage
- Preparation of reports including a sampling event factual report (following each sampling event) and an annual interpretative report following the completion of each 12-month sampling period.

[1] The October 2020 sampling event is reported in AECOM (2021).

1.4 Guidelines and Legislation

The SAQP has been developed with reference to the following guidelines and legislation:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018) at https://www.waterquality.gov.au/anz-guidelines/guideline-values/default.
- Australian Government, 2019. *National Health and Medical Research Council (2019), Guidance on Per- and Poly-fluoroalkyl Substances (PFAS) in Recreational Water, 2019.*
- Department of Defence, *Routine Environment Water Quality Monitoring Manual*, 2016.
- Department of Defence, *Contamination Management Manual*, 2018 amended August 2019.
- Department of Health, *Health Based Guidance Values for PFAS for use in site investigations in Australia*, 2019.
- Department of Environment and Science, *Environmental Protection Act 1994.*
- Environmental Protection Policy, (Water and Wetland Biodiversity), 2019.
- PFAS National Environmental Management Plan (NEMP), *Heads of Environmental Protection Agencies (HEPA)*, Version 2.0 2020
- FSANZ, 2017, *Perfluorinated chemicals in food. Food Standards Australia New Zealand and associated supporting documents,* 2017.
- National Environment Protection Council, 1999. *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013.
- National Health and Medical Research Council (NHMRC), *Guidance on PFAS in Recreational Water.* August 2019.
- Standards Australia 1998. AS/NZ 5667:1998 Water Quality – Sampling.
- US EPA, 2002. *Guidance on Environmental Data Verification and Data Validation*, November 2002.
- US EPA, 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4: EPA/240/B-06/001), February 2006*.

2.0 Site Identification and Conceptual Site Model

2.1 The Base and Management Area

The Preliminary Site Investigation (PSI) (AECOM, 2019) reported that the site was likely to have been in use by Defence since 1958. Prior to 1958, the site is likely to have been used for logging. Development of the site did not occur until circa 1965 when the airstrip and a small building were constructed in the southern portion of the site.

WBTA covers approximately 19,100 hectares (ha) of remnant bush and coastal to sub-coastal wetland. The site comprises 16 Training Area sectors including an approximately 20 ha cantonment at Camp Kerr in the southern portion of the site. Infrastructure within Camp Kerr includes a vehicle wash point, a refuelling area, accommodation and associated amenities, administrative facilities, a water treatment plant (WTP) and a WWTP. The remainder of the site comprises remnant bush and wetlands and is principally used to conduct combat team training, live firing activities and unmanned aerial vehicle (UAV) training. Infrastructure associated with the training areas include several firing ranges, training facilities, an ammunition storage compound, a road base quarry, a UAV airstrip and a disused airfield, (refer to **Figure 1, Appendix A**).

The Management Area is located on Tin Can Bay Road, Tin Can Bay, Queensland, 4580, approximately 50 km southeast of Maryborough and 175 km north of the Brisbane central business district (CBD), Queensland. The Management Area comprises WBTA and the small residential area of Wallu located adjacent to the southwestern corner of the Base. The Management Area is bordered by Toolara State Forest to the west and south, the Great Sandy Strait to the east, and the township of Tin Can Bay to the southwest, refer to **Figure 1**, **Appendix A**.

The small residential area of Wallu has approximately 34 properties and 110 residents. Some of the properties have dams. Bore water is used at individual properties for different purposes including household and outdoor purposes, topping up swimming pools, dam storage, crop irrigation, washing livestock. The Detailed Site Investigation (DSI) (AECOM, 2020) reported that dam water in some individual properties is used for recreational purposes and irrigating crops or watering livestock.

2.2 Conceptual Site Model

The conceptual site model (CSM) for the site is presented in detail in the OMP (Defence, 2020) which summarises the linkages between sources, pathways and receptors.

3.0 Data Quality Assessment

3.1 Data Quality Objectives

The amended National Environmental Protection Measure (NEPM, Schedule B [2]) Guideline on Site Characterisation (2013) specifies that the nature and quality of the data produced in an investigation will be determined by the Data Quality Objectives (DQOs). As referenced by the NEPM, the DQO process is detailed in the United States Environmental Protection Agency (US EPA) *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4: EPA/240/B-06/001), February 2006.*

The US EPA defines the process as *'a strategic planning approach based on the Scientific Method that is used to prepare for a data collection activity. It provides a systematic procedure for defining the criteria that a data collection design should satisfy, including when to collect samples, where to collect samples, the tolerable level of decision errors for the study, and how many samples to collect'.*

The process of establishing appropriate DQOs is defined according to the following seven steps:

Table 1 The seven steps in defining DQOs

Step	Data Quality Objective Step
1	***State the problem*** – Define the problem that necessitates the study; identify the planning team, examine budget, schedule.
2	***Identify the goal of the study*** – State how environmental data will be used in meeting objectives and solving the problem, identify study questions, define alternative outcomes.
3	***Identify information inputs*** – Identify data and information needed to answer study questions.
4	***Define the boundaries of the study*** – Specify the target population and characteristics of interest, define spatial and temporal limits, scale of inference.
5	***Develop the analytic approach*** – Define the parameter of interest, specify the type of inference, and develop the logic for drawing conclusions from findings.
6	***Specify performance or acceptance criteria*** – Develop performance criteria for new data being collected or acceptable criteria for existing data being considered for use.
7	***Develop the plan for obtaining data*** – Select the resource-effective sampling and analysis plan that meets the performance criteria.

The approach adopted relative to the seven steps presented above is discussed below.

3.1.1 Step 1 – State the Problem

There is limited temporal and spatial data available to evaluate if PFAS in groundwater, surface water and sediment is increasing, stable or decreasing. More information is required on the impact of seasonality on PFAS concentrations in these media. Data are also required to demonstrate that at locations where PFAS has not been detected, this remains unchanged over time and at different times of the year.

Defence and State agencies require up-to-date data to enable informed risk management decisions to protect human health and the environment, given that elevated concentrations of PFAS have been identified in environmental media.

The data collected by this SAQP will provide a detailed dataset that can be used to assist with assessment of temporal changes in PFAS concentrations in groundwater and surface water / sediment on- and off-site. This will facilitate refinement of the CSM, allow update of the human health and ecological risk assessments and inform management decisions by Defence and government agencies.

3.1.2 Step 2 – Identify the Goal of the Study

The overall goal of the study is to establish a systematic routine groundwater, surface water / sediment and wastewater sampling and analysis program to provide current and ongoing information on the distribution and migration of PFAS contaminants of potential concern in groundwater and surface water / sediment in the Management Area.

Specific goals of the program are to:

- understand the changes and trends in the nature, extent and magnitude of PFAS concentrations in the groundwater, surface water and sediment within the Management Area
- understand if the nature, extent and magnitude of PFAS concentrations has changed significantly to warrant a revision to the human health and environmental risk assessments
- understand whether monitoring can be incorporated into existing Defence monitoring programs.

3.1.3 Step 3 – Identify Information Inputs

To allow assessment of the data against the study goal listed in Step 2 above, the following inputs will be considered:

- PFAS and investigation (groundwater levels and flow direction) results from previous investigations
- meteorological data including rainfall
- quantitative site characterisation data including visual observations and field measurements made during the monitoring program (sediment, groundwater and surface water), analytical data comparisons with screening criteria appropriate for the land use
- groundwater, surface water, sediment and wastewater data collected and analysed for PFAS, as part of the SAQP
- hydrogeological and hydrological data across the Management Area including gradient and flow direction
- statistical analysis to identify trends
- advances in laboratory analytical approaches and changes in regulatory requirements
- sampling event factual reports (e.g. AECOM, 2021).

3.1.4 Step 4 – Define the Boundaries of the Study

The spatial and temporal boundaries that apply for data collection are detailed below and will influence the decision-making process for ongoing monitoring:

- The lateral extent of the study area defined for decision making in this OMP is the Management Area as outlined in **Figure 1**, **Appendix A**). The vertical extent of the investigation will be the depth of the water supply bores (Bore 1 and Bore 2) at the Base (78.5 m below ground level).
- The sampling completed as part of the SAQP includes groundwater, surface water, sediment and wastewater at the frequencies defined in **Section 4.3**.
- The temporal boundary of the study is the primary implementation period, which is three years in duration. The monitoring may potentially be ongoing depending on the outcomes of the initial three-year monitoring period.

The SAQP will also cover the primary implementation period of the OMP (Defence, 2020). The SAQP will also cover the extended implementation period to the extent required by specific characteristics of the site and surrounds, and behaviour of PFAS in groundwater, measured against specified data trends.

3.1.5 Step 5 – Develop the Analytical Approach

The decision rules can be defined as:

- Analytical selection; all samples will be analysed for the extended PFAS suite.

- Analytical method selection for PFAS is based on achieving appropriate laboratory limits of reporting (LOR) in the various media to be analysed.
- Sample locations have been selected with the objective of monitoring PFAS trends (temporal and seasonal), providing early warning of changes in the migration of PFAS in surface water and groundwater.
- If the laboratory quality assurance / quality control data are within the acceptable ranges, the data will be considered suitable for use.
- If PFAS concentrations are reported above the laboratory LOR, where it was previously <LOR, then it will be considered whether further assessment of the data will be required.
- If the PFAS is reported at a concentration that is above drinking water guideline in groundwater, then it will be considered that further assessment is required and / or notification.
- If the PFAS is reported at a concentration that is inside a trigger value or acceptable range, then it will be considered whether monitoring is continued or reduced, this assessment will be undertaken after two years of monitoring.

The decision on the acceptance of the analytical data will be made on the basis of the Data Quality Indicators (DQIs) as follows:

- **Precision:** A quantitative measure of the variability (or reproducibility) of data.
- **Accuracy**: A quantitative measure of the closeness of reported data to the “true” value.
- **Representativeness**: The confidence (expressed qualitatively) that data are representative of each media present on site.
- **Completeness**: A measure of the amount of useable data from a data collection activity.
- **Comparability**: The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event.

3.1.6 Step 6 – Specify Performance or Acceptance Criteria

Specific limits for the works included in the OMP (Defence, 2020) are in accordance with the appropriate guidance made or endorsed by state and national regulations, appropriate indicators of data quality, and standard procedures for field sampling and handling.

This step also examines the certainty of conclusive statements based on the available new data collected. This should include the following points to quantify tolerable limits:

- A decision can be made based on a certainty assumption of 95% confidence in any given data set. A limit on the decision error will be 5% that a conclusive statement may be a false positive or false negative.
- A decision error in the context of the decision rule presented above would lead to either underestimation or overestimation of the risk level associated with a particular sampling area.
- Sampling errors may occur when the sampling program does not adequately detect the variability of a contaminant from point to point across the site. To address this, the OMP outlines minimum numbers of samples proposed to be collected from each media.
- As such, there may be limitations in the data if aspects of the OMP cannot be implemented. Some examples of this scenario include but are not limited to:
    - Proposed surface water sample locations may be dry at the time of sampling
    - Proposed groundwater well locations are damaged or destroyed and therefore cannot be sampled
    - Proposed samples are not collected due to access being restricted to a given location.
- Limitations in ability to acquire useful and representative information from the data collected. The data are proposed to be collected from multiple locations and sample media.

- Measurement errors can occur during sample collection, handling, preparation, analysis and data reduction. To address this the following measures are proposed:
    - Collection of sufficient sample mass to facilitate analysis reported to standard laboratory detections limits. Collection of insufficient sample mass may result in raised detection limits.
    - Field staff to follow a standard procedure when collecting samples, including decontamination of tools, and use of appropriate sample containers and preservation methods.
    - Laboratories to follow a standard procedure when preparing samples for analysis and undertaking analysis.
    - Laboratories to report quality assurance/ quality control data for comparison with the DQIs established for the SAQP.

3.1.7 Step 7 – Optimise the Design for Obtaining Data

The methodology presented in this SAQP is designed to meet the project objectives described in **Section 1.2** and to achieve the nominated DQOs. Optimisation of the data collection process will be achieved by:

- working closely with the analytical laboratories and sampling equipment suppliers to ensure that appropriate procedures and processes are developed and implemented prior to and during the fieldwork, to ensure that sample handling, and transport to and processing by the analytical laboratories is appropriate
- conducting sampling according to NEMP, Defence and Australian Standards. These standards are as follows:
    - Department of Defence (July 2018, Amended August 2019), *Contamination Management Manual.*
    - National Environment Protection Council, 1999. *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013.
    - Standards Australia (AS/NZS5667.11–1998) *Water Quality – Sampling, part 11: Guidance on sampling of groundwater.*
    - Standards Australia (AS 4482.1-2005) *Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.*
    - Standards Australia (AS 4482.2-1999) *Guide to the sampling and investigation of potentially contaminated soil, Part 2: Volatile Substances.*
- conducting sampling in accordance with AECOM's internal PFAS Sample Collection Guidance
- sampling conducted by suitably qualified and experienced field staff
- basing the sampling upon a CSM developed using the information available at the implementation of the SAQP. Updating the CSM as new data becomes available in the course of the implementation of the SAQP, as required
- progressive review of the data throughout the initial three-year OMP period and modification of sampling programs to optimise the value of data generated.

If the objectives of the SAQP are not being met, the sampling design and approach will be reviewed and amended, as required.

3.2 Assessment of Data Quality

The quality of data collected as part of the sampling will be assessed on a range of factors including:

- Documentation and data completeness
- Data quality – comparability, representativeness, precision and accuracy of the analytical data.

The project target for data completeness is to achieve 95% of data as suitable for use.

The acceptance criteria for DQIs for samples are specified in **Table 2**.

Table 2 Acceptance Criteria for Data Quality Indicators for Sample Analysis

Data Quality Indicators	Acceptance Criteria
Water and Sediment Samples	
Rinsates (where sampling equipment is reused)	Less than the laboratory LOR.
Field duplicates/Inter-lab duplicates	The RPDs will be assessed as acceptable if less than or equal to 30% as per the NEPM Schedule B3. Where the results show greater than 30% difference a review of the cause will be conducted (NEPM, 2013). It is noted that RPDs that exceed this range may be considered acceptable where: • Results are less than 10 times the LOR (no limit) • Results are less than 20 times the LOR and the RPD is less than 50%; and • Heterogeneous materials are encountered.
Laboratory duplicates	RPDs less than: • 20% for high level laboratory duplicates (i.e. >20 x LOR); and • 50% for medium level laboratory duplicates (i.e. 10 to 20 x LOR).
Matrix spikes	Recoveries between 70-130% of the theoretical recovery or as nominated in the laboratory's QC report, based on their historical database.
Method blanks	Less than the laboratory LOR.
Laboratory control samples	Recoveries between laboratories specified range for each particular analyte / analytical suite.

4.0 Sampling Location Rationale and Methodology

4.1 OMP

The OMP (Defence, 2020) presents an overview of specific monitoring works to be undertaken and provides the basis for the preparation of this SAQP. This scope of works presented in this SAQP is consistent with that detailed in the OMP (Defence, 2020).

4.2 Proposed Schedule

4.2.1 Sampling Events

Groundwater, surface water, sediment and wastewater sampling from across the Management Area will be performed biannually as part of a post-wet season sampling event in April and a post-dry season sampling event in October for an initial period of three years, with the initial targeted sampling event scheduled to be completed in October 2020.

The proposed schedule of fieldworks across the initial three-year period is presented in **Table 3** below.

Table 3 Proposed Fieldwork Schedule

Sampling Round No.	Description of works	Proposed Schedule
1	Post-dry season groundwater, surface water, sediment and wastewater sampling	October 2020
2	Post-wet season groundwater, surface water and wastewater sampling	April 2021
3	Post-dry season groundwater, surface water, sediment and wastewater sampling	October 2021
4	Post-wet season groundwater, surface water and wastewater sampling	April 2022
5	Post-dry season groundwater, surface water, sediment and wastewater sampling	October 2022
6	Post-wet season groundwater, surface water and wastewater sampling	April 2023

4.3 Sample Location Rationale

4.3.1 Groundwater Sampling Locations

Groundwater monitoring will be undertaken on selected monitoring wells. The rationale for monitoring well selection for each area is summarised in **Table 4** below.

It is noted that the OMP (Defence, 2020) does not propose to sample private residential bores in Wallu as groundwater at these locations have been characterised as part of the DSI (AECOM, 2020). Groundwater monitoring will include wells MW116 and MW117, positioned between Camp Kerr and Wallu, which will allow identification of PFAS migrating from the base towards Wallu.

Access permissions will be required for the sampling of off-Site monitoring locations on Council and DTMR land. A stakeholder engagement plan may need to be prepared to manage this process.

Table 4 Groundwater Monitoring Locations and rationale

MW101	POL refuelling point	To characterise groundwater quality down-gradient of the refuelling point where aqueous film forming foam (AFFF) containing PFAS may have been used historically. Resampling of this well, which was installed in 2018.
MW102	POL refuelling point	To characterise groundwater quality down-gradient of refuelling point where AFFF may have been used historically. Resampling of this well, which was installed in 2018.
MW103	To the southeast of the airstrip	To characterise groundwater quality cross-gradient of the south eastern airfield. Resampling of this well, which was installed in 2018.
MW104	To the northeast of the airstrip	To characterise groundwater quality down-gradient of the south eastern airfield. Resampling of this well, which was installed in 2018.
MW105	To the west of the airstrip	To characterise groundwater quality up-gradient of the south eastern airfield. Resampling of this well, which was installed in 2018.
MW106	Along southern Site boundary	To characterise groundwater quality adjacent to the southern Site boundary close to an off-site landfill. Resampling of this well, which was installed in 2018.
MW107	Near the 600m range / Electronic Classification Range	To characterise groundwater quality up gradient of the former on-Site landfill and downgradient of the 600m Range. Resampling of this well, which was installed in 2018.
MW108	At the scrape (Landfill 1)	To characterise groundwater quality down gradient of a former landfill and downgradient of the 600m range. Resampling of this well, which was installed in 2018.
MW109	Close to eastern site boundary	To characterise groundwater quality down-gradient of the MUFP close to the eastern Site boundary. Resampling of this well, which was installed in 2018.
MW110	MUFP (multiuser firing point) Range	To characterise groundwater quality downgradient of the MUFP. Resampling of this well, which was installed in 2018.
MW111	North west of Camp Kerr	To characterise groundwater in an area potentially historically used for AFFF demonstration. Resampling of this well, which was installed in 2018.
MW112	East of the caretaker's residence	To characterise the lateral extent of PFAS in the area of the caretaker's residence. Resampling of wells installed in 2019.
MW113 (Off-site)	South of the caretaker's residence (Department of Transport and Main Roads land)	
MW114 (Off-site)	Southwest of the caretaker's residence (Department of Transport and Main Roads land)	

MW115	West of the POL, southwest of the WTP	To characterise the lateral extent of PFAS in the area of the POL/WTP and potential risk to groundwater users in Wallu. Resampling of wells installed in 2019.
MW116 (Off-site)	West of Camp Kerr (Council land)	
MW117 (Off-site)	West of Camp Kerr (Council land)	
MW118 (Off-site)	South of Camp Kerr (DTMR land)	To characterise the lateral extent of PFAS in the area of the caretaker's residence and potential risk to groundwater users in Wallu. Resampling of the well, which was installed in 2019.
MW119	Central portion of Camp Kerr	To provide information on groundwater flow directions and PFAS concentrations in the central portion of Camp Kerr. Resampling of the well, which was installed in 2019.
MW120	West of WWTP	To characterise groundwater to the east of the wastewater treatment plant. Resampling of this well, which has been sampled in monitoring events conducted since 2017.
MW121	Southwest of the caretaker's residence	To characterise groundwater in the area of the caretaker's residence. Resampling of these wells which have recorded PFAS in monitoring events conducted since 2017.
MW122	Southwest of the caretaker's residence	
POT001	WTP- tap outlet prior to treatment	These are abstraction bores in the WTP, which are 78.4 m (Bore 1) and 51.5 m deep (Bore 2). The purpose of the monitoring is to understand PFAS concentrations in the deeper part of the aquifer.
POT005	WTP- tap outlet prior to treatment	

Note: Off-site sampling locations will require the agreement of the landholder/leaseholder.

4.3.2 Wastewater monitoring

A sample of the treated wastewater will be collected from the outlet tap of the Camp Kerr WWTP twice a year, in April and October. The sample location and rationale is set out in **Table 5** below.

Table 5 Groundwater monitoring locations and rationale

OTH001	Wastewater treatment plant	The purpose of the sampling is to monitor PFAS concentrations in the effluent that is irrigated to ground at three locations in Camp Kerr.

Up to two event-based sampling events will be conducted at the WWTP (OTH001) at times of high site usage during the three-year implementation period. The timing of the event-based sampling will be in response to the Base advising of increase in personnel, such as for a training exercise.

4.3.3 Surface Water and Sediment Sampling Locations

The proposed 20 surface water and sediment monitoring locations are set out in **Table 6** below and on **Figure 2** and **Figure 3**, **Appendix A**. Sampling of surface water locations is proposed twice a year, in April and October. Sampling of sediment is proposed to occur once a year in April only.

Water may not be consistently present at sample locations SW017, SW018, SW019, SW025 and SW027, therefore, sampling of these locations should be timed to occur following rain events.

Table 6 Surface Water and Sediment Sampling Locations and Rationale

SD/SW004	Kauri Creek	Characterisation along Kauri Creek.
SD/SW008	Kauri Creek	
SD/SW012	Near boat ramp and sentry post	
SD/SW005	Mosquito Creek	Characterisation along Mosquito Creek.
SD/SW006	Tributary of Kangaroo Creek	Characterisation along Kangaroo Creek.
SD/SW007	Upper part of Kangaroo Creek	
SD/SW009	Central section Kangaroo Creek	
SD/SW013	Snapper Creek, downstream of MUFP and airstrip	Characterisation along Snapper Creek.
SD/SW014	Tributary of Snapper Creek	
SD/SW016	Tributary of Snapper Creek	
SD/SW017	Unlined channel to south of the caretaker's residence	Characterisation of surface water in drainage feature which received runoff from the irrigation of treated effluent containing PFAS.
SD/SW018	Vehicle washpoint drainage channel	Characterisation along unlined drainage channel downstream of vehicle wash point to characterise the potential for PFAS concentrations.
SD/SW019	Ponded water from surface water flows	Sampling of area of ponded water on the western site boundary to inform potential for PFAS to be present in surface water flowing overland from the Camp Kerr area.
SD/SW020*	Residential dams in Wallu	PFAS was detected in residential dams in Wallu in the DSI. Sampling will provide temporal data.
SD/SW021*		
SD/SW022*		
SD/SW023*		
SD/SW024*		
SD/SW025	Ephemeral waterway	Resampling of an ephemeral waterway that drains the residential dams in Wallu.
SD/SW027	Drainage pipe at Clyde Road	Sampling at the point where overland water discharges from the western portion of Camp Kerr into residential dams. Not previously sampled.

Note: * Location is on a private residential property and will require the agreement of the landholder / leaseholder

4.4 Sample Collection and Handling

4.4.1 Groundwater Sampling

The groundwater sampling methodology and schedule are presented in **Table 7**.

Table 7 Groundwater Sampling Methodology and Schedule

Item	Details
Groundwater gauging	The depth to groundwater will be measured in each monitoring well immediately prior to collection of groundwater samples. Groundwater gauging will be conducted in as short a period as possible, noting there may be access restrictions during the fieldworks due to operational activities at the Base. The gauging event will include all monitoring wells listed in **Table 4** and shown on **Figure 2 and Figure 3** in **Appendix A** to enable a groundwater contour map to be prepared and groundwater flow directions to be inferred. Groundwater gauging will consider environmental variables including tidal influence at the Base.
Sample Collection Methodology	**Groundwater Monitoring Wells** Groundwater samples will be collected from all monitoring wells using no-purge methodology HydraSleeves™, which will be installed within the screened interval of the wells (approximately 1 m above the base of the well) for a minimum of 24 hours prior to the sampling round. Monitoring well construction details are presented in **Appendix B**. Once sampling is completed, new HydraSleeves™ will be deployed at the screened interval depth in preparation for the next sampling round. **Abstraction Bores** The tap/valve will be opened, and water allowed to run prior to a sample being collected. Water samples will be collected by placing the laboratory provided sample bottle beneath the tap outlet.
QA/QC Samples to be Collected	Field QA/QC samples are to include intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and equipment rinsate blank (rinsate) samples. Duplicate samples are to be collected at a minimum frequency of 1 in 10 primary samples. Rinsate samples are to be collected at a rate of one sample per fieldwork day by pouring laboratory supplied PFAS-free deionised water over the decontaminated sampling equipment. QA/QC samples will be targeted at locations where PFAS is expected to be detected (MW118, MW121 and MW122).
Field Parameters	Temperature, electrical conductivity (EC), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH and observations of water quality will be recorded for all samples.
Sample Analysis	All primary samples will be submitted for PFAS extended suite using the standard levels of detection.
Sampling Schedule	The monitoring at WBTA will include two biannual monitoring events of all monitoring wells specified in **Section 4.3.1** in April and October.

4.4.2 Surface Water Sampling

The surface water sampling methodology and schedule is presented in **Table 8**.

Table 8 Surface Water Sampling Methodology and Schedule

Item	Details
Sample Collection Methodology	Samples to be collected from immediately below the water surface to minimise collection of sediment or floating materials in the samples. At each location, a new, laboratory supplied container should be lowered into the water with the cap immediately applied once the container is full.
Sample Location Observations	Descriptions on the sample location characteristics (drain / stream width, water height, flow direction and strength of flow) will be recorded.
QA/QC Samples to be Collected	Field QA/QC samples are to include intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and equipment rinsate blank (rinsate) samples. Duplicate samples are to be collected at a minimum frequency of 1 in 10 primary samples. Rinsate samples are to be collected at a rate of one sample per fieldwork day by pouring laboratory supplied PFAS-free deionised water over the decontaminated sampling equipment. QA/QC samples will be targeted at locations where PFAS is expected to be detected (i.e. SW06, SW014, SW027).
Field Parameters	Temperature, EC, DO, ORP, pH and observations of water quality will be recorded for all samples.
Sample Analysis	All primary samples will be submitted for PFAS extended suite using the trace levels of detection.
Sampling Schedule	The monitoring at WBTA will include two biannual monitoring events, in April and October.

4.4.3 Sediment Sampling

The surface water sampling methodology and schedule are outlined in **Table 9**.

Table 9 Sediment Sampling Methodology and Schedule

Item	Details
Sample Collection Methodology	Samples representative of potentially deposited sediments to be collected from within the water body if possible. Sediment samples will be collected using a trenching shovel from the base of the drain (where possible) or edge of the dam, or using a Dormer Piston Sediment Sampler. At each location, a new laboratory supplied container should be used for each sample.
Sample Location Observations	Descriptions on the sample location characteristics (drain / stream width, water height, flow direction and strength of flow) will be recorded.
QA/QC Samples to be Collected	Field QA/QC samples are to include intra-laboratory duplicate and inter-laboratory duplicate samples (i.e. splits) and equipment rinsate blank (rinsate) samples. Duplicate samples are to be collected at a minimum frequency of 1 in 10 primary samples. Rinsate samples are to be collected at a rate of one sample per fieldwork day by pouring laboratory supplied PFAS free deionised water over the decontaminated sampling equipment.
Sample Analysis	All primary samples will be submitted for PFAS extended suite using the standard levels of detection.
Sampling Schedule	The sediment sampling will be conducted annually as part of the post-wet season event (April).

4.4.4 Biota Sampling

Biota sampling is not included in the OMP (Defence, 2020). However, ad hoc biota samples may be collected at the request of Defence in accordance with the sampling methodology presented in **Table 10**.

Table 10 Biota Sampling Methodology and Schedule

Item	Details
Sample Collection Methodology	Targeting sampling of biota (e.g. aquatic biota such as fish, crayfish) may need to be conducted on an ad hoc basis. Appropriate sampling techniques will be used to collect the samples; for example, gill nets or electro fishing will be used to collect fish, sample traps could be used to collect crayfish. Where required, samples will be collected by a qualified contractor holding a general fisheries permit for the collection of tissue samples. Where required to obtain sufficient sample mass for laboratory analysis, multiple specimens of the same species may need to be composited. Sampling of fish for human health assessment will require targeting of fish of consumptive size. Samples will be identified, measured, weighed, photographed and placed in a zip lock bag following euthanasia in ice slurry.
QA/QC Samples to be Collected	No QA/QC samples will be collected.
Sample Analysis	All primary samples will be submitted for PFAS extended suite using the standard levels of detection for biota samples.
Sampling Schedule	Samples will be collected on an ad hoc basis at the request of Defence.

4.4.5 Sample Handling and Transport to Laboratory

AECOM personnel will attempt to reduce potential heterogeneity in the sample media matrix by dividing the sample collected between primary and intra-laboratory jars or bottles during sampling. All samples will be placed on ice in eskies immediately after sampling.

All samples will be kept, if possible, at or below 4°C during transit to the laboratory. Prior to sampling, assessment of the analytical holding times will be made and the sampling planned accordingly to help ensure that holding times are not breached or is minimised.

Samples will be transported to the laboratory for analytical testing under standard Chain of Custody documentation. Primary and associated duplicate QA/QC samples will be analysed by ALS Brisbane. The inter-laboratory duplicate samples will be analysed by the National Measurement Institute (NMI).

4.5 Calibration

The water quality meter will be calibrated each day prior to the commencement of field activities with relevant solutions, including pH, EC and ORP. The calibration will be in accordance with manufacturers' instructions or NATA publication "General Requirements for Registration: Supplementary Requirement: Chemical Testing (NATA 1993) and Technical Note N0. 19 (NATA 1994)". Where satisfactory calibration cannot be achieved, the water quality data will not be used for interpretive purposes.

Calibration details will be recorded on field sheets and included in the Sampling Events Factual Reports.

4.6 Logistics

The laboratory sample containers will be collected from the laboratory prior to the commencement of fieldwork. All samples will be transported by an ALS by the field team or a supplied courier at the

completion of fieldwork. All inter-laboratory duplicate samples will be couriered from ALS to the secondary laboratory under a separate CoC documentation for analysis.

4.7 Analytical Suite and Laboratory Analysis Methods

4.7.1 Laboratory NATA Accreditation Details

The laboratory is required to use NATA accredited methods based on NEPM, US EPA, Table B 15 of the US Department of Defence/Department of Energy (US DOD/DoE) and American Society for Testing and Materials (ASTM) methods as appropriate.

The primary and secondary laboratories selected for this program are ALS (NATA Accreditation Number 825) and NMI (NATA Accreditation Number 198), respectively.

4.7.2 Analytical Schedule

All media sampled shall be analysed for the extended PFAS suite as outlined in **Table 11** below.

Table 11 Sample Analytical Suite for PFAS

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

The current standard laboratory limits of reporting (LOR) are described in **Table 12** below.

Table 12 Laboratory Limits of Reporting

Sample Media	Parameter	Technique/Method Reference	LOR*
Groundwater and Surface Water	Standard PFAS Suite (groundwater samples)	LC/MS-MS	0.002 – 0.1 µg/L
	Trace level PFAS Suite (surface water samples)	LC/MS-MS	0.0005 to 0.002 µg/L
Sediment	Standard PFAS Suite	LC/MS-MS	0.0002 – 0.001 mg/kg

LC/MS-MS = Liquid chromatography–mass spectrometry, GC = Gas chromatography

*LOR for Australian Laboratory Services (ALS)

4.8 Sample Nomenclature

In order to meet Defence data management requirements, a consistent sample nomenclature has been adopted for the Program. All primary samples will be labelled using the following Defence Contamination Management Manual (DCCM) naming convention:

PPPP_XX000 _YYMMDD

[property ID]_[type of sample][THREE DIGIT sample number]_[yearmonthday]

e.g. 0224_MW101_201001

Location types and codes are prescribed by Defence and the Site's investigation history.

Primary Sample Types/Location Codes relevant to this OMP include:

- SD = sediment – top depth required
- MW = monitoring well
- SW = surface water - no depth required

QAQC Samples will be labelled in accordance with the following convention:

- Duplicate: PPPP_QC1XX_YYMMDD
- Triplicate: PPPP_QC2XX_YYMMDD
- Rinsate: PPPP_QC3XX_YYMMDD

4.9 Defence ESdat Requirements

Defence has contracted Earth Science Information Systems (EScIS), to provide contamination data management services through a cloud instance of its ESdat product.

All OMP field and laboratory data collected by AECOM will be uploaded, stored and managed in Defence's ESdat database in accordance with Section 6 of Annex L to the Defence Contamination Management Manual. AECOM will refer to historical investigation data to ensure consistent location codes are used to enable analysis of data trends. Where required under Annex L, non-compliant location codes will be resolved under direction from Defence.

AECOM will upload the data from each monitoring event into ESdat prior to submitting the Sampling Event Factual Report.

4.10 Adopted Screening Criteria

Adopted screening criteria references national guidance in the form of the PFAS National Environmental Management Plan, Defence estate and environmental strategies, and Defence PFAS-specific strategies and guidance.

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

- PFAS National Environmental Management Plan (NEMP), Version 2.0, (HEPA 2020)
- Department of Health, 2019. Health Based Guidance Values for PFAS for use in site investigations in Australia
- National Health and Medical Research Council (NHMRC), 2019. Guidance on PFAS in Recreational Water. August 2019 (NHMRC 2019)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B1, as amended in 2013 (ASC NEPM)

The adopted PFAS screening criteria to assess the data generated as part of the OMP are presented in **Table 13** below.

Groundwater will be screened against drinking water guidelines. Surface water in creeks and dams will be screened against recreational water and ecological guidelines.

There are no HEPA (2020) endorsed guideline values available for PFAS in sediment.

Table 13 Summary of Adopted Screening Criteria

Pathway	Compound	Criteria	Comment / Reference
Human Health Receptors			
Drinking water - groundwater	PFOS + PFHxS	0.07 µg/L	The values presented in the PFAS NEMP, 2020 are from DoH 2019, which published final health-based guidance values for PFAS for use in site investigations in Australia. DoH utilised the TDI for PFOS and PFOA from FSANZ, 2017 and the methodology described in Chapter 6.3.3 of the National Health and Medical Research Council's (NHMRC) Australian Drinking Water Guidelines (ADWG), 2016 to determine drinking water values. For PFHxS, DoH 2019 noted that '*FSANZ concluded that there was not enough toxicological and epidemiological information to justify establishing a tolerable daily intake. However, as a precaution, and for the purposes of site investigations, the PFOS tolerable daily intake should apply to PFHxS. In practice, this means that the level of PFHxS exposure should be added to the level of PFOS exposure; and this combined level be compared to the tolerable daily intake for PFOS*'. *All groundwater results will be compared to these criteria.*
	PFOA	0.56 µg/L	
Recreational use – surface water	PFOS + PFHxS	2 µg/L	In August 2019, NHMRC released guidance on the assessment of PFAS in surface water. Rather than adopting an ingestion rate of 0.2 L of water per day (as per the ADWG formula), NHMRC adjusted this rate with consideration of an event frequency (150 events / year) to calculate an annual ingestion rate of 30 L per year. *All surface water results will be compared to these criteria.*
	PFOA	10 µg/L	
Ecological Receptors			
Freshwater (99% species protection values)	PFOS	0.00023 µg/L	The values are from the PFAS NEMP, 2020 which endorsed the Australian and New Zealand Guidelines for Fresh and Marine Water Quality – draft default guideline values. AECOM understands that these guidelines are currently being reviewed and will consider the appropriateness of considering any future revision. The 99% level of protection has been applied for high conservation ecosystems. This approach is generally adopted for chemicals that bioaccumulate and biomagnify in wildlife. For the purposes of preliminary screening of analytical water results, the laboratory LOR will be adopted rather than sole use of the criteria value. *All surface water (except SW025) and groundwater results will be compared to these criteria.*
	PFOA	19 µg/L	
Freshwater (95% species protection values)	PFOS	0.13 µg/L	Surface water in the ephemeral waterway south of Clyde Road (SW025) should be screened against freshwater ecological guidelines for slight to moderately disturbed ecosystems (95% species protection).
	PFOA	220 µg/L	

4.11 Waste Management

Due to the proposed “no purge” sampling methodology, it is not anticipated that significant volumes of liquid waste would be generated that would require management or disposal.

Wastewater generated will be provided to the on-site groundwater treatment plant for disposal.

All consumables (i.e. HydraSleeves^{TM}, filter cartridges, general rubbish) will be bagged and placed in on-site general waste bins for disposal.

4.12 Quality Assurance/Quality Control Sampling

4.12.1 Field Duplicate and Inter-laboratory Duplicate Samples

Field duplicate (intra-laboratory) duplicate samples and split (inter-laboratory field duplicates) are to be collected and analysed at a minimum frequency of 1 in 10 primary samples.

4.12.2 Rinsate Samples

Rinsate samples are to be collected at a rate of one sample per fieldwork day or at least one rinsate sample per ten primary samples (whichever rate is lower) by pouring laboratory supplied deionised water over the decontaminated sampling equipment.

4.13 Fieldwork Documentation

4.13.1 Field Notes

Field notes will be maintained to record all field sampling events and include observations made at each sample location. Field notes will include information specific to the sample media as follows:

- Groundwater samples – comments on the observed characteristics of the sample (e.g. colour, turbidity, odour, sheen) and reported field water quality parameters (pH, EC, DO, ORP, temperature) will be recorded at regular intervals. The date and time of the Hydrasleeve installation and sampling will be recorded;
- Surface water samples – comments on the observed characteristics of the sample (e.g. colour, turbidity, odour, sheen), field water quality parameters (pH, EC, DO, ORP, temperature) and sample location characteristics (drain / stream width, water height, flow direction and strength of flow) will be recorded; and
- Sediment samples - comments on the morphology of the sample location, the depth, flow direction and strength of water flow (if water is present), the water and sediment/soil colour and odour, and the presence of flora and fauna. The soil/sediment types observed at each sample location will be described using the Unified Soil Classification System (USCS).

The geo-coordinates for each sample location will be noted. The location of quality control (e.g. duplicate and inter-laboratory duplicate) sample collection points will also be noted.

AECOM’s tablet-based data capture (‘EDCA’) system will be utilized by field staff to minimise potential data recording errors and allow on-the-spot identification of potentially erroneous data in comparison to historical data.

4.13.2 Sample Labels

Sample containers will be labelled, as a minimum, with the following information:

- AECOM project number
- Name of sampler
- Sample ID
- Date of sample collection
- Filtered vs non-filtered (for water samples only).

An indelible felt pen will be used for labelling, to ensure that the lettering is not erased during transit to the laboratory.

AECOM will utilize the tablet-based ALS 'Compass' sample management application to streamline sample labelling and chain of custody (CoC) creation to ensure compliant sample IDs are used in the field.

4.13.3 Chain of Custody Forms

A CoC form will be completed, documenting the sample identification number and analytes. The CoC documents the chain of events from sample collection to delivery at the laboratory and provides a traceable account of sample handling. The CoC form will be signed by both the sample collector and the receiving laboratory.

The CoC form will include the following information:

- Job number (Note: the name of the site is not identified for confidentiality purposes)
- Date and time of sample collection
- Sample ID
- Type of containers
- Name of sampler
- Laboratory to be used
- Analyses required
- Any comments
- Signatures of the sampler and laboratory receiver.

In the event that additional samples are collected during the field investigations due to observations made by the field team, (i.e. samples not proposed in this SAQP), Defence will be provided the rationale for collection of those samples and proposed laboratory analyses. Defence approval will be sought to include these samples on the CoC and to dispatch these samples to the laboratory.

Upon receipt of the original documents accompanying the samples at the laboratory, the laboratory will provide a sample receipt document (noting the temperature of samples upon receipt, analyses required and any non-conformances) and return the signed CoC form to confirm analyses to be performed and the due date for the analytical results.

4.13.4 Sampling Documentation

Field sampling sheets will be completed for each location, and will include the following information (as appropriate for the media being sampled):

- Name of sampler
- Sample location
- Date /time of monitoring/ sampling
- Sampling method
- Observations of the sampled media
- Calibration records.

Records of all equipment calibration will be included in the Sampling Event Factual Reports.

4.14 Reporting

4.14.1 Sampling Event Factual Report

No later than four weeks following receipt of the laboratory reports, AECOM will prepare and submit a Sampling Event Factual Report to Defence. Each Sampling Event Factual Report will include:

- details of the scope of monitoring completed
- a description of the sampling methodologies used
- a summary of observations made while sampling (e.g. any visual or olfactory observations that may indicate impacts to surface water or groundwater)
- a summary of any changes to the monitoring network condition that may affect data integrity, or require rectification works, and recommendations for repair, replacement of decommissioning of a location
- a presentation of the analysis results in a table that includes comparisons with PFAS guidelines, highlighting any significant statistical deviations from historical monitoring and investigation data
- a presentation of the reduced groundwater levels for the event on a figure with inferred contours and inferred groundwater flow direction
- discussion of the analytical data quality, including review of the quality control sampling results and laboratory quality control data
- inclusion of the following information as attachments:
    - Groundwater sampling forms including field water quality parameter measurements;
        i. Chain of custody forms;
        ii. Laboratory analytical certificates; and
        iii. Equipment calibration certificates.

4.14.2 Annual Interpretive Report

At the end of each 12-month monitoring period following the April monitoring event, AECOM will prepare and submit an Annual Interpretive Report to Defence. Each Interpretive Report will include:

- evidence of compliance with the requirements of the SAQP and meeting stated objectives of the OMP (Defence, 2020)
- relevant figures depicting sampling locations and site-specific hydrogeological features
- laboratory results and analysis including comparison with relevant screening criteria as identified in each OMP (Defence, 2020)
- assessment and commentary on appropriate QA/QC procedures
- a review of the CSM and provision of a revised CSM if required
- data interpretation, including trends in groundwater concentration, gradient and flow directions
- assessment of statistically based trends that may inform decision making when it comes to the revision of an OMP (Defence, 2020)
- a statement as to whether the risk profile has changed overall, or for any specific location at the Site, and a recommendation as to whether this should trigger an OMP and/or PMAP review, or other action.

4.15 Deviations from OMP

A review of the SAQP has been conducted, prior to the implementation of the April 2021 sampling event. The scope of works and methodology described in this SAQP are consistent with that presented in the OMP (Defence, 2020) with the exception of the following deviation:

- The OMP included analysis for a non-PFAS suite for approximately 20% of groundwater, surface water and sediment samples. The first OMP sampling event, completed in October 2020, included these analyses. Following a review of the SAQP, the collection and analysis of samples for non-PFAS analytes is not justified at the Base at this time to meet the requirements of the OMP and hence has been removed from the analytical schedule.

5.0 References

AECOM, 2019, *PFAS Preliminary Site Investigation, Wide Bay Training Area*, July 2019.

AECOM, 2020, *PFAS Detailed Site Investigation, Wide Bay Training Area*, September 2020.

AECOM, 2021, *Sampling Event Factual Report October 2020, PFAS OMP Wide Bay Training Area*, March 2021.

Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2018, at https://www.waterquality.gov.au/anz-guidelines/guideline-values/default.

Australian Government, 2019. *National Health and Medical Research Council (2019), Guidance on Per- and Poly-fluoroalkyl Substances (PFAS) in Recreational Water, 2019.*

ASC NEPM, 2013. *Schedule B2. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B2 Guideline on Site Characterisation*.

ASC NEPM, 2013. *Schedule B4. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B4 Guideline on Site-Specific Health Risk Assessment Methodology*.

ASC NEPM, 2013. *Schedule B7. National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedule B7 Guideline on Derivation of Health-Based Investigation Levels*.

Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

Department of Defence, 2012. *Defence Contamination Directive (DCD) #7 Naming Convention – Surface Water, Groundwater, Bore, Soil and Sediment Sampling Identification*. 27 July 2012.

Department of Defence, 2016. *Routine Environment Water Quality Monitoring Manual.*

Department of Health, *Health Based Guidance Values for PFAS for use in site investigations in Australia*. September 2019.

Department of Defence, July 2018, Amended August 2019, *Defence Contamination Management Manual.*

Department of Defence, 2020. *PFAS Area Management Plan – Wide Bay Training Area*, September 2020.

enHealth, 2012a. *Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards*.

enHealth, 2012b. *Australian Exposure Factor Guide. Department of Health and Ageing*.

FSANZ, 2017. *Supporting Document 1: Hazard assessment report – Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), Perfluorohexane Sulfonate (PFHxS)*.

Heads of EPAs Australia and New Zealand (HEPA) 2020. *PFAS National Environmental Management Plan*. Version 2.0 January 2020.

National Health and Medical Research Council (NHMRC), 2019. *Guidance on PFAS in Recreational Water. August 2019*. August 2019.

Standards Australia 1998. AS/NZ 5667:1998 *Water quality – sampling.*

US EPA, 2002. *Guidance on Environmental Data Verification and Data Validation*, November 2002.

US EPA, 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4: EPA/240/B-06/001), February 2006*.

Appendix A

Figures

Appendix A Figures

Wide Bay Training Area

Tin Can Bay

Inskip

Pannikin Island

Little Stony Creek

Teelaw Creek

Griffin Creek

Carlo Island

Carlo Point

Tuddo Point

Tin Can Inlet

Snapper Point

Smooger Point

CARAVAN PARK

Tin Can Bay

CARAVAN PARK

TIN CAN BAY STATE SCHOOL

TOOLARA GOLF COURSE

Toolara

Tudd Point

TOOLARA AIRPORT

Teewah Point

North Cooloola Point

TOOLARA STATE FOREST

Mosquito Creek

Kauri Creek

Kingyan Creek

Maryborough - Cooloola Road

Tin Can Bay Road

CAMP KERR

Wallu

Wallu Heights

Rainbow Beach Road

Unnamed Creek

Snapper Creek

Cooloola Cove

South Cooloola Point

Poverty Point

KEY

- Wide Bay Training Area
- Management Area
- Parks and recreation reserves
- Major road
- Road
- Watercourse

0 2km

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\60580555 F2 Investigation Area 08 01 2020 TO Rev B

AECOM Imagine it. Delivered.

MANAGEMENT AREA

Ongoing Monitoring Plan,

Wide Bay Training Area, Queensland

FIGURE 1

Pioneer Point Boat Ramp
Tin Can Bay
Inskip
Pannikin Island
UOTF/EHTA
Demolition Range
SW012
Old Boat Ramp/Sentry Post
Little Sandy Creek
Airstrip UAV
24m Tower
Wide Bay Training Area
SW005
SW008
Mosquito Creek
Tookar Creek
Griffin Creek
Forward Operating Base
SW009
Carlo Island
AGR/SGR/DFSW
SW004
Kauri Creek
Kingfisher Creek
Easy Feature/MUFP/MCR/BIF
Quarry
Tin Can Bay
Tin Can Bay Waste Transfer Station and Sewage Treatment Works
Ammunition Storage
MW110
MW109
SW013
SW014
Maryborough - Cooloola Road
MW107
MW108
SW06
Landfill 1
Range/ECR
SW07
MW104
MW105
MW103
SW016
Tin Can Bay Road
MW111
MW106
Area shown in Figure 3
Wallu
Wallu Heights
Rainbow Beach Road
Snapper Creek
Tuan Creek
Cooloola Cove
Toolara
Teewah Point
North Cooloola Point
South Cooloola Point
Poverty Point
Snapper Point
Smooger Point
Tin Can Inlet

KEY

- Wide Bay Training Area
- Management Area
- Great Sandy Strait Ramsar
- Parks and recreation reserves
- Major road
- Road
- Watercourse
- Surface water sample location
- Groundwater monitoring well location

0 2km

G:\ENV\GIS\Projects\605\60580555 Wide Bay Training Area\FIGURES\60580555 F5 Sample Locations (Greater WBTA) 08 01 2020 TO Rev B

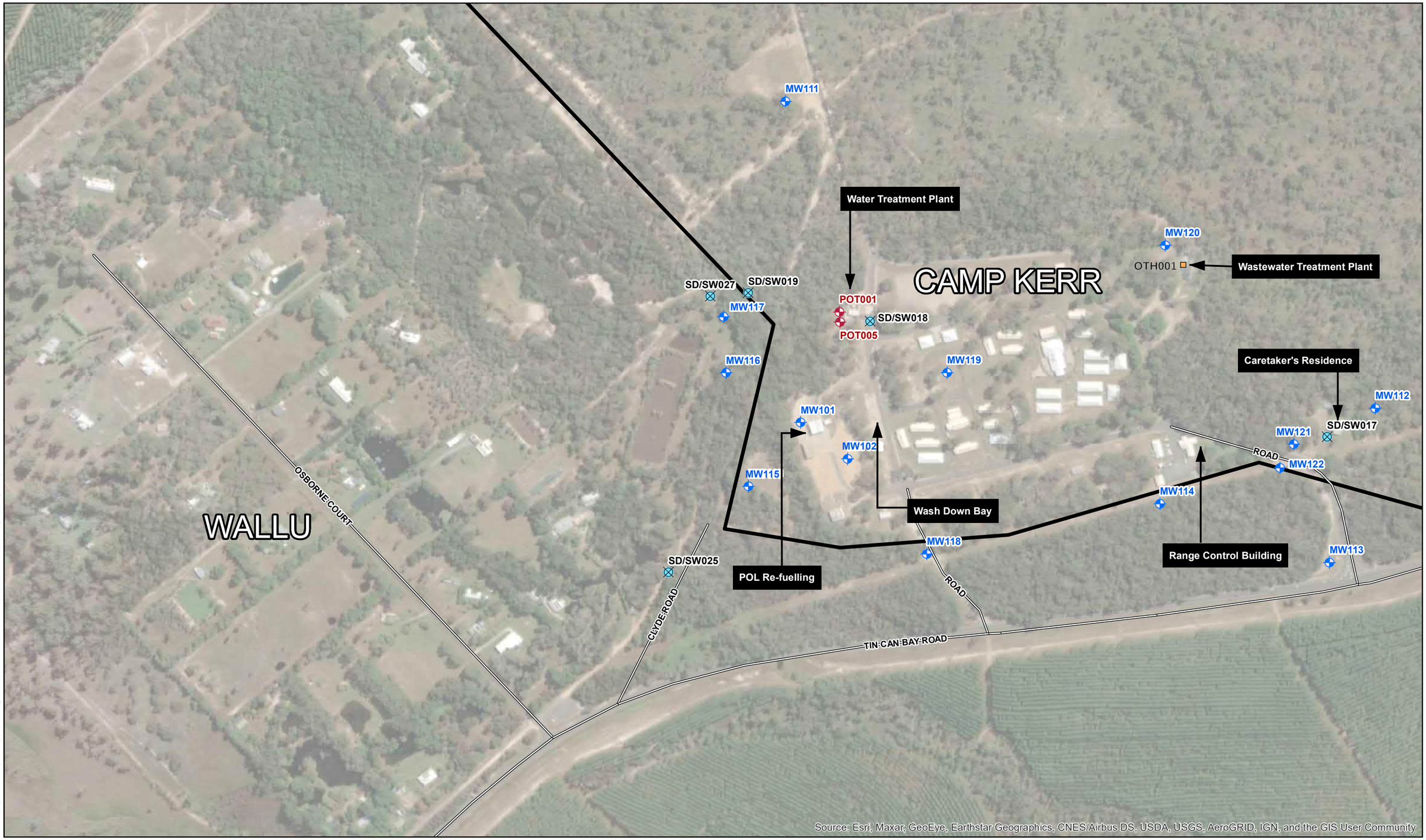
AECOM Imagine it. Delivered.

UOTF – Urban Operations Training Facility
AGR – Assault Grenade Range
SGR – Standard Grenade Range
MUFP - Multi User Firing point
MCR – Multi Classification Range
ECR – Electronic Classification Range
BIF – Battle Inoculation Facility

SAMPLING LOCATIONS (GREATER WIDE BAY TRAINING AREA)

Ongoing **M**onitoring **P**lan
Wide Bay Training Area, Queensland

FIGURE F2



AECOM

N

DATUM GDA 1994, PROJECTION MGA ZONE XX

0 55 110 220

metres

1:4,500 (when printed at A3)

LEGEND

- Abstraction Bore
- Groundwater sampling location
- Sediment / surface water sampling location
- Road
- Wide Bay Training Area
- Wastewater Treatment Plant sampling location

Notes:

1. Surface water samples SW020 to SW024 are located on residential properties and are not displayed on this figure.
2. Sample OTH001 is collected from the tap outlet of the Wastewater Treatment Plant.
3. POT001 and POT005 are collected from tap outlets at these bores.

Data sources:

Base Data: (c) 20XX (data source) (additional data)

SAMPLING LOCATIONS (CAMP KERR)
Ongoing Monitoring Program
Wide Bay Training Area, Queensland
Camp Kerr and Wallu

PROJECT ID	60612563
CREATED BY	ScottA3
LAST MODIFIED	cmccosker - 01/09/2020
VERSION:	1

Figure 3

Filename:P:\605X\60580555\4. Tech Work Area\4.99 GIS\02_MXDs\20200602_JPeachey_WBTA\60580555_F3_OMP_Sampling_Locations_CampKerr_20200602.mxd

A3 size

Appendix B

Monitoring Well Construction Details

Appendix B Monitoring Well Construction Details

Well ID	Easting	Northing	Relative Elevation of Top of Casing (mAHD)	Constructed Total Bore Depth (mbgl)	Depth of Screened Interval (mbtoc)	Targeted depth for Hydrasleeve (mbtoc)
MW101	491110.98	7129853.54	79.264	15.0	11.0 - 15.0	14.0
MW102	491164.14	7129808.09	78.564	20.0	14.0 - 20.0	19.0
MW103	496663.71	7131232.71	33.239	10.5	7.5 - 10.5	9.5
MW104	497121.86	7131937.54	20.815	11.0	8.0 - 11.0	10.0
MW105	496293.82	7131574.71	27.603	7.2	4.2 - 7.2	6.5
MW106	492729.31	7130284.43	69.468	10.0	4.0 - 10.0	9.0
MW107	492450.19	7131631.52	37.789	5.8	2.8 - 5.8	4.8
MW108	492639.22	7131306.77	39.99	17.5	14.5 - 17.5	16.5
MW109	497399.00	7133007.94	9.207	10.0	7.0 - 10.0	9.0
MW110	496044.47	7132934.25	17.967	4.0	0.5 - 4.0	3.0
MW111	491093.50	7130255.87	78.952	20.5	16.5 - 20.5	19.5
MW112	491760.84	7129872.04	65.183	9.0	6.0 - 9.0	8.0
MW113	491709.10	7129678.45	67.717	9.0	6.0 - 9.0	8.0
MW114	491517.49	7129752.02	73.016	14.5	8.5 - 11.5	10.5
MW115	491051.90	7129773.34	76.659	16.0	13.0 - 16.0	15.0
MW116	491026.40	7129915.59	69.815	11.0	8.0 -11.0	10.0
MW117	491023.74	7129985.77	68.914	10.0	7.0 - 10.0	9.0
MW118	491253.67	7129688.89	76.154	13.0	10.0 -13.0	12.0
MW119	491276.52	7129916.21	79.546	16.0	13.0 - 16.0	15.0
MW120 (MB1.1)	491523.05	7130075.59	71.332	Unknown	Unknown	12.5
MW121 (MB2.1)	491668.54	7129826.51	70.405	Unknown	Unknown	14.0
MW122 (MB3.1)	491653.19	7129797.48	70.575	Unknown	Unknown	19.0

Notes:
mbgl - metres below ground level
mbtoc - metres below top of casing
mAHD - metres above Australian Height Datum