

Appendix J

OMP Factual reports

PFAS OMP Biannual Monitoring Event Factual Report

November 2023

RAAF Learmonth

304700525



Prepared for
Department of Defence

9 April 2024



now



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Chemical Names

DOC	Dissolved Organic Carbon
DO	Dissolved Oxygen
PFAS	Per- and Poly-fluoroalkyl Substances
PFHxS	Per-fluorohexane Sulphonate
PFOA	Per-fluorooctanoic Acid
PFOS	Per-fluorooctane Sulfonate
TDS	Total Dissolved Solids (salinity of water)

Technical Terms

AFFF	Aqueous Film Forming Foam
AHD	Australian Height Datum
AS	Australian Standard
BGL	Below Ground Level
COC	Chain of Custody
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
EC	Electrical Conductivity
EPA	Environment Protection Authority
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
HIL	Health Investigation Level
HSL	Health Screening Level
LOR	Limit of Reporting
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
RWL	Reduced water level
SAQP	Sampling and Analysis Quality Plan
SWL	Standing water level

Units

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

Site Specific

OMP	Ongoing Monitoring Plan
OMR	Ongoing Monitoring Report
FTG	Fire Training Ground
RAAF	Royal Australian Airforce

1 Introduction

1.1 Background

Cardno now Stantec (“Cardno”) was engaged by the Australian Department of Defence (“Defence”) to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) biannual monitoring event at the Royal Australian Airforce (RAAF) Learmonth (“the site”). The site is located approximately 30 km south of Exmouth, Western Australia (WA) (Figure 1, Appendix A).

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

- > Cardno, October 2023, Reference: DEF19009, ‘*PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) RAAF Base Learmonth*’. Rev 10.

The SAQP was reviewed prior to the monitoring event, and no change relevant to this monitoring event was made.

For the purposes of this report:

- > “the site” was defined as RAAF Base Learmonth.
- > the “Management Area” was defined as comprising the site, plus the land east of the Base, including the salt pan, drainage channels, WAPET Creek and extends to Exmouth Gulf (Figure 2, Appendix A).

1.2 Purpose & Objectives

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

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

The objectives of the report are:

- > To provide a succinct summary of the November 2023 monitoring event and provision of analytical results with supporting tables and figures.
- > To provide confirmation of the current understanding of risk.
- > To provide supporting data for the assessment of management actions, where relevant.

1.3 Relevant Guidelines

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

- > National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended 2013) (ASC NEPM).
- > Heads of Environmental Protection Authority’s Australia and New Zealand (HEPA), January 2020, *PFAS National Environmental Management Plan (NEMP) 2.0*.
- > Australian Standard AS 4482-2005 *Guide to the investigation and sampling of sites with potentially contaminated soils, Part 1 - Non-volatile and semi-volatile compounds*.¹
- > Standards Australia 1998. AS/NZ 5667:1998 *Water quality – sampling*.
- > Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

¹ It is noted that this AS has been withdrawn and is referenced here as a state of knowledge document.

- > Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*².
- > Department of Defence, Department of Energy, 2018, *Quality System Manual Schedule B15*.
- > U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process (EPA QA/G-4)*.
- > USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8)*.
- > National Health and Medical Research Council (NHMRC), August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.

2 Scope of Work

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

2.1 Groundwater Monitoring

Sampling of selected groundwater wells was performed in accordance with the SAQP, applying methods set out in Section 3 of this report. The groundwater wells monitored as part of the OMP are presented in Table 2-1, and are shown on Figure 4, Appendix A.

Table 2-1 Groundwater Monitoring Locations

Monitoring Area	Location ID	Number
Source Area 1 – Maintenance Area	MW018, MW021, MW112, MW113, MW114, MW115, MW162, MW163, MW164, MW165, MW166, MW167, MW168, MW211, MW233.	15
Source Area 2 – Fuel Farm	MW105, MW148D, MW148S, MW151, MW159, MW238.	6
Pathway	MW102, MW103, MW104, MW122, MW124, MW126, MW127, MW134, MW135, MW138, MW139, MW140, MW143, MW144, MW145, MW146, MW147, MW170, MW172, MW175, MW180, MW181.	22
Receptor	MW137, MW141, MW176, MW177, MW178, MW179.	6

2.2 Seepage Water Monitoring

Sampling of selected seepage water monitoring locations was performed in accordance with the SAQP, applying methods set out in section 3 of this report. The seepage water locations monitored as part of the OMP are presented in Table 2-2 and are shown on Figure 4, Appendix A.

Table 2-2 Seepage Water Monitoring Locations

Monitoring Area	Location ID	Number
Seepage	OTH103, OTH106, OTH107, OTH129, OTH132, OTH134.	6

2.3 Surface water Monitoring

Sampling of selected surface water monitoring locations was performed in accordance with the SAQP, applying methods set out in Section 3 of this report. The surface water locations monitored as part of the OMP are presented in Table 2-3 and are shown on Figure 5, Appendix A.

² It is noted that site is located on Commonwealth Land and is regulated under the Commonwealth environmental legislation, the State based DWER guidelines are relevant for the sampling of off-Site private properties and waterways.

Table 2-3 Surface water Monitoring Locations

Monitoring Area	Location ID	Number
Drainage channels	SW108, SW113, SW114, SW121, SW122, SW123, SW124, SW125, SW157, SW166, SW168, SW170, SW174, SW176, SW189, SW190, SW192, SW193, SW198, SW199, SW200, SW219, SW227, SW231, SW234, SW235, SW243, SW265, SW277, SW278, SW279, SW288, SW291, SW292, SW293, SW298.	36
WAPET Creek	SW001, SW205, SW207, SW208, SW209, SW210, SW211, SW300, SW301, SW302, SW303, SW304, SW305.	13

2.4 Sediment Monitoring

Sampling of selected sediment (or shallow soil if dry) monitoring locations was performed in accordance with the SAQP, applying methods set out in Section 3 of this report. The sediment locations monitored as part of the OMP are presented in Table 2-4 and are shown on Figure 6, Appendix A.

Table 2-4 Sediment Monitoring Locations

Monitoring Area	Location ID	Number
Drainage channels	SD199, SD200, SD219, SS108, SS113, SS114, SS121, SS122, SS123, SS124, SS125, SS157, SS166, SS168, SS170, SS174, SS176, SS189, SS190, SS192, SS193, SS198, SS227, SS231, SS234, SS235, SS243, SS265, SS277, SS278, SS279, SS288, SS291, SS292, SS293, SS298.	36
WAPET Creek	SD205, SD207, SD208, SD209, SD210, SD211, SD300, SD301, SD302, SD303, SD304, SD305, SS301.	13

Note: 'SS' prefix indicates a shallow soil (dry) location, 'SD' prefix a sediment (wet) location

2.5 Data Management

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

- > The sample naming convention detailed in the DCMM Annex L was used in the field;
- > All field data collected was uploaded to the Defence ESdat database;
- > Laboratory data was uploaded and approved in ESdat; and
- > QA/QC data was reconciled.

2.6 Deviations from the OMP SAQP

Deviations from the SAQP (Cardno, October 2023) for the November 2023 monitoring event are presented in Table 2-5.

Table 2-5 Summary of deviations from the OMP SAQP

Location	Deviation	Comments
SW108, SW113, SW114, SW121, SW122, SW123, SW124, SW157, SW166, SW168, SW170, SW174, SW176, SW189, SW190, SW192, SW193, SW198, SW199, SW200, SW205, SW210, SW219, SW227, SW231, SW234, SW235, SW243, SW265, SW277, SW278, SW279, SW288, SW291, SW292, SW293, SW298, SW301.	Not sampled	These surface water monitoring locations were found dry. No impact on the OMP – sediment samples were collected at these locations and analysed for PFAS.
MW138	Not Sampled	Bores casings (multi level) have been damaged at 0.9 mbTOC. Medium impact – PFAS concentrations have been detected at this monitoring location since the start of the OMP. This well is located off-site along the central drainage channel exiting the site.

Location	Deviation	Comments
-	Inter-laboratory duplicate frequency not achieved for groundwater	Two duplicates were mistakenly labelled with the same ID. No impact on the OMP as this doesn't affect the reliability of the dataset (Refer to Appendix E for further details).

3 Methodology

3.1 Groundwater Sampling Methodology

Groundwater monitoring was undertaken applying the methods detailed in Table 3-1.

Table 3-1 Groundwater Sampling Method

Activity	Details
Well Gauging	Standing Water Level (SWL) were gauged using an interface probe. All wells were measured against a surveyed mark at the top of the well casing.
Groundwater Field Parameters	For the single level wells, the field parameters were recorded via a water quality meter from HydraSleeves® or hand-bailed water. For the multilevel wells, the field parameters were recorded with a flow cell during purging. The following field parameters were recorded: ▪ pH. ▪ electrical conductivity (EC). ▪ oxidation reduction potential (ORP). ▪ Dissolved oxygen (DO). ▪ Temperature. Once field parameters have stabilised (as indicated by at least three consecutive measurements falling within +/- 10% of each other) measurement were recorded on field data records. All field instruments (e.g. water quality meter) were calibrated by the equipment supplier and reading of reference solutions (bump tests) undertaken daily in the field to optimise the accuracy of the measurements taken. Calibration certificates and bump tests records are provided in Appendix D.
Deployment and Retrieval of HydraSleeves® (single level well sample collection)	HydraSleeves® were deployed with top weight sample collection to begin at the lowest point. HydraSleeves® sampling devices were left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment. Samples were collected via continuous pull method at a rate allowing the water to pass through the check valve into the sample sleeve. Samples were discharged immediately (minimise changes in chemistry) via discharge tube. Following sampling, HydraSleeves® were deployed in preparation for the next OMP monitoring event using the same string for consistency between event (same depth of sampling i.e. within screen).
Peristaltic pump (multi-level wells sample collection)	The shallowest (non-dry) screen intervals were sampled at each multi-level well location, using Teflon-free dedicated and disposable high-density polyethylene (HDPE) tubing coupled to a peristaltic pump system. The groundwater was purged at a low flow rate of 0.2 mL/min. SWL and field parameters were measured during purging and post sample collection to ensure limited drawdown effects. The groundwater was sampled when the field parameters had stabilised.
Alternative sampling methodology (hand bailing)	Disposable HDPE hand bailers, attached to a polypropylene string, were used when the water column wasn't sufficient to fill the HydraSleeve®. Purging of the well (i.e. removal of 3x well volume) was undertaken prior to sampling to ensure that a sample representative of the aquifer is taken. Field parameters were regularly recorded during the bailer purge to confirm field parameter stability is achieved.
Decontamination procedure	Dedicated HydraSleeves®/tubing and single use nitrile gloves were used at each groundwater well thus removing the need for decontamination. All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.

Activity	Details
Sample identification, preservation transport and holding times	Each sample container was pre-labelled by the laboratory with a unique barcode for identification. Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under Chain of Custody (CoC) documentation. Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).
Laboratory Testing	Groundwater samples were submitted for the following analysis: - Full PFAS analytical suite (refer to the SAQP for full list of analytes). - Major anions and cations (include calcium, magnesium, sodium, potassium, chloride, sulfate, alkalinity and ionic balance). The primary laboratory was ALS Global Laboratories (Perth), and the secondary laboratory (quality control) was Eurofins ARL (Perth). Both laboratories are NATA-accredited for the parameters tested. Copies of the NATA stamped laboratory reports and CoC documentation are included in Appendix C.
Laboratory Testing – Quality Control	Groundwater QC samples were collected at the following frequencies as detailed in the SAQP: - Field duplicate (intra-laboratory) samples at 1 per 10 water samples or 1 per batch if the batch is less than 10 samples. - Field triplicate (inter-laboratory) samples at 1 per 10 water samples and sent to a secondary laboratory. - Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. interface probe)]. - Field blank samples at 1 per day.

3.2 Seepage Water Sampling Methodology

Seepage water monitoring procedure is detailed in Table 3-2.

Table 3-2 Seepage water Sampling method

Activity	Details
Field parameters	The following field parameters were recorded using a water quality meter: - pH. - EC. - ORP. - DO. - Temperature. Field observations such as water flow, odours or sheen presence were also recorded on field sampling sheets.
Sampling Method	Sampling was carried out in a two-hour period; one hour each side of the low tide. Sampling protocol involved a shallow excavation in the beach sand; just above where inundation by wave action is occurring. Sampling containers were lowered into the exposed seepage water and filled.
Decontamination procedure	All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.
Sample identification, preservation transport and holding times	Each sample container was pre-labelled by the laboratory with a unique barcode for identification. Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under CoC documentation. Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).
Laboratory Testing	Seepage water samples were submitted for the following analysis:

Activity	Details
	- Full PFAS analytical suite (refer to the SAQP for full list of analytes). - Major anions and cations (include calcium, magnesium, sodium, potassium, chloride, sulfate, alkalinity and ionic balance).
Laboratory Testing – Quality Control	Seepage water QC samples were collected at the following frequencies as detailed in the SAQP (Cardno, October 2023): - Field duplicate (intra-laboratory) samples at 1 per 10 water samples or 1 per batch if the batch is less than 10 samples. - Field triplicate (inter-laboratory) samples at 1 per 10 water samples and sent to a secondary laboratory. - Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. interface probe)]. - Field blank samples at 1 per day.

3.3 Surface Water Sampling Methodology

Surface water monitoring procedure is detailed in Table 3-3.

Table 3-3 Surface water Sampling Method

Activity	Details
Field parameters	The following field parameters were recorded using a water quality meter: - pH. - EC. - ORP. - DO. - Temperature. Field observations such as water flow, odours or sheen presence were also recorded on field sampling sheets.
Sampling Method	Surface water samples were collected directly into sample containers using a 'Grab' (manual) sample method via a long-handled sampling device. Where depth permits, the sample container was positioned at least 10 cm below the surface water level and above the sediment bed and oriented with the capped opening facing downwards to avoid the collection of surface films.
Decontamination procedure	All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.
Sample identification, preservation transport and holding times	Each sample container was pre-labelled by the laboratory with a unique barcode for identification. Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under CoC documentation. Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).
Laboratory Testing	Surface water samples were submitted for the following analysis: - Full PFAS analytical suite (refer to the SAQP for full list of analytes). - Major anions and cations (include calcium, magnesium, sodium, potassium, chloride, sulfate, alkalinity and ionic balance).
Laboratory Testing – Quality Control	Surface water QC samples were collected at the following frequencies as detailed in the SAQP (Cardno, October 2023): - Field duplicate (intra-laboratory) samples at 1 per 10 water samples or 1 per batch if the batch is less than 10 samples. - Field triplicate (inter-laboratory) samples at 1 per 10 water samples and sent to a secondary laboratory.

Activity	Details
	- Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. interface probe)]. - Field blank samples at 1 per day.

3.4 Sediment Sampling Methodology

Sediment sampling methodology is detailed in Table 3-4.

Table 3-4 Sediment Sampling Method

Activity	Details
Sample Collection	Sediment samples were collected at the sediment/water interface using hand tools (e.g. trowel, hand auger, PVC pipe etc.) with samples placed directly into appropriately labelled, laboratory supplied sample containers and packed in chilled containers for delivery to the laboratory under CoC documentation. At each sampling location, the sediment sample was visually assessed, and observations (including physical description) recorded on field data sheets.
Field Records	The following information was recorded on the field data sheets: - Sample description. - Sampling time and date. - Weather conditions. - Sample Collection method. - Sampling equipment decontamination procedures where non-disposable sampling equipment is utilised.
Decontamination	All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.
Laboratory Testing	Sediment samples were submitted for the following analysis: Full PFAS analytical suite (refer to the SAQP for full list of analytes).
Laboratory Testing – Quality Control	Sediment QC samples were collected at the following frequencies as detailed in the SAQP (Cardno, October 2023): - Field duplicate (intra-laboratory) samples greater than 1 per 20 sediment samples or 1 per batch if the batch is less than 20 samples. - Field triplicate (inter-laboratory) samples greater than 1 per 20 sediment samples and sent to a secondary laboratory. - Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. trowel)]. - Field blank samples at 1 per day.

3.5 Quality Control / Quality Assurance

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

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

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

The QA/QC review concluded that there are no significant systematic errors in the data collection process and therefore, the dataset used for the assessment is considered valid and complete.

3.6 Assessment Criteria

3.6.1 Groundwater, seepage water and surface water

The adopted assessment criteria for groundwater, seepage water and surface water are detailed in Table 3-5.

Table 3-5 Criteria for groundwater, seepage water and surface water

Exposure Scenario	Adopted Assessment Criteria		Guidance
	PFHxS / PFOS µg/L	PFOA	
Human Health – Recreational Water	2 ¹	10	NHMRC 2019, HEPA 2020
Ecological – 99% species protection	0.00023 ²	19	HEPA 2020

1. Sum of PFOS and PFHxS.
2. PFOS only; Practical screening guideline of 0.01 µg/L is based on typical current laboratory limit of reporting. Therefore, it should be noted that warning and action levels would not be relevant until the detection limits are reduced or the screening levels are increased (HEPA 2020).

3.6.2 Sediment

It is noted that there are currently no Australian regulatory endorsed assessment levels for risk posed to ecology or human health by PFAS in sediment. Sediment results have been compared to available historical data for the purpose of this assessment.

4 Field Observations and Results

4.1 General Site Observations

No significant weather event or site activities that could have impacted the monitoring event or results obtained were noted during the November 2023 monitoring event. No rainfall occurred leading to or during the November 2023 monitoring event and the daily maximum temperature was 39.2°C.

4.2 Groundwater

4.2.1 Summary of Field Observations

4.2.1.1 Physicochemical parameters

Stabilised physicochemical parameters, water colour and observations recorded during the groundwater sampling program are presented in field sampling records, included in Appendix D. Groundwater was fresh to hyper saline [TDS ranging from 1,477 mg/L (MW112) to 65,083 mg/L (MW140)], and generally near neutral [pH ranging 6.07 (MW139) to 8.01 (MW164)]. Groundwater temperature was on average 29.6°C, and DO readings generally indicate aerobic groundwater condition at most monitoring wells [DO ranging from 0.02 mg/L (MW175) to 4.39 mg/L (MW018)]. Field parameters were generally consistent with the previous monitoring events.

4.2.1.2 Groundwater Elevation and Migration

Well gauging was undertaken over several tide cycles which has been considered when interpreting inferred groundwater contours and flow direction.

Groundwater elevations ranged from -0.171 mAHD (MW145) to 0.746 mAHD (MW113).

Groundwater flow beneath the site was interpreted to be easterly, towards the Exmouth Gulf, consistent with the previous monitoring events. Groundwater is generally inferred to flow towards an area of groundwater

depression that lie between the site and the coast (refer to Figure 3). Groundwater elevation in wells closer to the shore may be influenced by tidal pressure.

Groundwater elevation contours and flow direction are shown in Figure 3, Appendix A. Gauging records are presented in Appendix D.

4.2.2 Groundwater Laboratory Results

4.2.2.1 PFAS analytes

The results of laboratory analysis have been compared against adopted assessment criteria. Tabulated analytical results are provided within Appendix B. A summary of results exceeding the adopted criteria is presented in Table 4-1. Laboratory results have also been compared to available historical data to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 4 in Appendix A presents the groundwater monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-1 Summary of Groundwater Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	10 ²	2.17 (MW151)	48	0
PFOS	MW018, MW021, MW105, MW112, MW115, MW148D, MW148S, MW151, MW162, MW163, MW164, MW165, MW166, MW167, MW168, MW172, MW211, MW233, MW238.	0.01 ³	25.7 (MW148S)	48	19
Sum of PFOS and PFHxS	MW148D, MW148S, MW151, MW162, MW172, MW211, MW233, MW238	2 ²	54.9 (MW148S)	48	8

Notes:

1. Non-inclusive of quality control samples
2. HEPA 2020 guideline value for human health – Recreational Use
3. HEPA 2020 guideline value for ecological 99% species protection (LOR adopted)

Findings are summarised as follows:

- > There was no first-time detection of PFOA or the sum of PFOS and PFHxS for any of the groundwater monitoring locations in November 2023.
- > No new exceedance of a guideline value was reported for any of the groundwater monitoring locations in November 2023.

4.2.2.2 Non-PFAS analytes

Tabulated laboratory results for non-PFAS analytes are provided within Appendix B. Results were compared to historical range for each monitoring location. Total anions concentrations ranged from 18.9 (MW211) and 1,230 (MW140) meq/L. Total cations concentrations ranged from 19.4 (MW211) and 1,340 (MW147) meq/L. Non-PFAS analytes concentrations were of the same order of magnitude as previous monitoring events.

4.3 Seepage Water

4.3.1 Summary of Field Observations

Stabilised physiochemical parameters, water colour and turbidity observations recorded during the monitoring event are presented in field sampling record sheets, included in Appendix D. Seepage water temperature was on average 26.8°C, DO readings indicate aerobic conditions, pH was near neutral, and TDS indicates saline water condition. Field parameters were generally consistent with the previous monitoring events.

4.3.2 Laboratory Results

4.3.2.1 PFAS analytes

The results of laboratory analysis have been compared against adopted assessment criteria. Tabulated analytical results are provided within Appendix B. A summary of results is presented in Table 4-2. Laboratory results have also been compared to available historical data in order to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 4 in Appendix A presents the seepage water monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-2 Summary of Seepage water Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	10 ²	<0.01	6	0
PFOS	-	0.01 ³	<0.01	6	0
Sum of PFOS and PFHxS	-	2 ²	<0.01	6	0

Notes:

1. Non-inclusive of quality control samples
2. HEPA 2020 guideline value for human health – Recreational Use
3. HEPA 2020 guideline value for ecological 99% species protection (LOR adopted)

Findings are summarised as follows:

- > None of the six (6) seepage water samples reported PFAS concentrations above the LOR.
- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS or new exceedance of guideline values at the seepage water monitoring locations during the November 2023 monitoring event.

4.3.2.2 Non-PFAS analytes

Tabulated laboratory results for non-PFAS analytes are provided within Appendix B. Results were compared to historical range for each monitoring location. Total anions concentrations ranged from 589 (OTH134) and 680 (OTH103) meq/L. Total cations concentrations ranged from 658 (OTH107) and 754 (OTH103) meq/L. Non-PFAS analytes concentrations were of the same order of magnitude as previous monitoring events.

4.4 Surface Water

4.4.1 Summary of Field Observations

Stabilised physiochemical parameters, water colour and turbidity observations recorded during the monitoring event are presented in field sampling record sheets, included in Appendix D. Field parameters were generally consistent with the previous monitoring events. pH was near neutral to slightly alkaline, and water condition was aerobic and generally saline [TDS ranging from 906 (SW125) to 73,939 mg/L (SW300)].

4.4.2 Laboratory Results

4.4.2.1 PFAS analytes

The results of laboratory analysis have been compared against adopted assessment criteria. Tabulated analytical results are provided within Appendix B. A summary of results exceeding the adopted criteria is presented in Table 4-3. Laboratory results have also been compared to available historical data in order to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 5 in Appendix A presents the surface water monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-3 Summary of Surface water Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	10 ²	<0.01	11	0
PFOS	SW001, SW125	0.01 ³	0.07 (SW125)	11	2
Sum of PFOS and PFHxS	-	2 ²	0.07 (SW125)	11	0

Notes:

1. Non-inclusive of quality control samples
2. HEPA 2020 guideline value for human health – Recreational Use
3. HEPA 2020 guideline value for ecological 99% species protection (primary laboratory LOR adopted)

Findings are summarised as follows:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS or new exceedance of guideline values at the surface water monitoring locations during the November 2023 monitoring event.

4.4.2.2 Non-PFAS analytes

Tabulated laboratory results for non-PFAS analytes are provided within Appendix B. Results were compared to historical range, where available, for each monitoring location. Total anions concentrations ranged from 12.8 (SW125) and 1,330 (SW300) meq/L. Total cations concentrations ranged from 12.7 (SW125) and 1,470 (SW211) meq/L. Non-PFAS analytes concentrations were of the same order of magnitude as previous monitoring events.

4.5 Sediment

4.5.1 Summary of Field Observations

Observations recorded during the sediment sampling program are provided in the field sampling record sheets within Appendix D.

4.5.2 Laboratory Results

Tabulated analytical results are provided within Appendix B. Laboratory results have been compared to available historical data to identify sediment monitoring locations where a first-time detection of Sum of PFOS and PFHxS or PFOA was reported. Figure 6 in Appendix A presents the sediment monitoring locations.

Findings are summarised as follows:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS at the sediment monitoring locations during the November 2023 monitoring event.

4.6 Changes to the Monitoring Network Condition

No change to the monitoring network condition were noted during the November 2023 monitoring event.

5 Summary and Conclusions

Cardno undertook the November 2023 groundwater, seepage water, surface water and sediment monitoring event at RAAF Base Learmonth as part of the PFAS OMP. Sampling and testing was undertaken at 48 groundwater monitoring wells, 11 surface water locations, six (6) seepage water locations and 49 sediment monitoring locations. 38 surface water monitoring locations could not be sampled as these were found dry, and one monitoring well (MW138) was found damaged.

Groundwater levels were gauged in all wells before sampling. Groundwater is inferred to flow towards an area of groundwater depression that lies between the site and the coast.

The groundwater laboratory results reported the following:

- > Of the 48 samples that were tested, PFOS (19 samples) and Sum of PFHxS and PFOS (eight samples) reported concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection species and HEPA (2020) guideline value for recreational use respectively.
- > There was no first-time detection of PFOA or the Sum of PFOS and PFHxS for any of the groundwater monitoring locations.
- > No new exceedance of a guideline value was reported for any of the groundwater monitoring locations.

The seepage water laboratory results reported the following:

- > None of the six (6) seepage water samples reported PFAS concentrations above LOR.
- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS or new exceedance of guideline values at the seepage water monitoring locations during the November 2023 monitoring event.

The surface water laboratory results reported the following:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS or new exceedance of guideline values at the surface water monitoring locations during the November 2023 monitoring event.

The sediment laboratory results reported the following:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS at the sediment monitoring locations during the November 2023 monitoring event.

PFAS concentrations were generally within the historical range for all media sampled. No change in the risk understanding of the management area was identified based on the November 2023 sampling results.

The following action should be considered prior to the next monitoring event:

- > Repair or replacement of damaged monitoring well MW138.

The next OMP sampling event for RAAF Base Learmonth will be the 'first flush' 2024 monitoring event. Ongoing Monitoring Reports will be prepared for the November 2021 – October 2022 and November 2022 – October 2023 monitoring periods.

6 References

General References

1. Australian Standard AS 4482-2005 *Guide to the investigation and sampling of sites with potentially contaminated soils*, Part 1 – Non-volatile and semi-volatile compounds.
2. Australian Standard AS 4482-1999 *Guide to the investigation and sampling of sites with potentially contaminated soils*, Part 2 – Volatile substances.
3. *Contaminated Sites Act 2003*, Western Australia.
4. Department of Defence, May 2021, *PFAS OMP Factual Report Guidance* Version 0.2.
5. Department of Defence, July 2018 amended June 2021, *Contamination Management Manual*, Annex L *Guidance on Data Management*.
6. Department of the Environment and Energy (2017) in the National Greenhouse and Energy Reporting Scheme Measurement *Technical Guidelines for the Estimation of Emissions by Facilities in Australia*.
7. Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*.
8. Department of Water and Environment Regulation (DWER), 2018, Perth Groundwater Atlas, (<https://maps.water.wa.gov.au/#/webmap/gwm>).
9. Environmental Protection Agency (United States EPA), November 2002, Reference: EPA/240/R-02/004, 'Guidance on Environmental Data Verification and Data Validation'.
10. The Heads of EPAs Australia and New Zealand (HEPA; 2020) *PFAS National Environmental Management Plan (NEMP) 2.0*, January 2020.
11. National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended), registered May 2013.
12. National Health and Medical Research Council (NHMRC) (2011, as updated 2022) *National Water Quality Management Strategy Australian Drinking Water Guidelines 6*, Version 3.8, September 2022.
13. NHMRC, August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.
14. Standards Australia/Standards New Zealand (1998) AS5667.1:1998 'Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples'.
15. U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process* (EPA QA/G-4).
16. USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8).

Site Specific References

17. Cardno, October 2023, Reference: DEF19009, 'PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) RAAF Base Learmonth'. Rev 10.
18. Cardno, April 2023, *2021 Annual Interpretive Report RAAF Base Learmonth*.
19. Cardno, October 2022, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
20. Cardno, August 2022, *PFAS OMP First Flush Sampling Event Factual Report RAAF Base Learmonth*.
21. Cardno, April 2021, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
22. Cardno, August 2021, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
23. Cardno, July 2021, *PFAS OMP 2020 Annual Interpretive Report, RAAF Base Learmonth*.
24. Cardno, May 2021, *PFAS OMP First Flush Sampling Event Factual Report RAAF Base Learmonth*.
25. Cardno, February 2021, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
26. Cardno, July 2020, *PFAS OMP First Flush Sampling Event Factual Report RAAF Base Learmonth*.
27. Cardno, April 2020, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
28. Department of Defence, May 2019, *RAAF Base Learmonth PFAS Ongoing Monitoring Plan*.

29. GHD, December 2018, *RAAF Base Learmonth – PFAS Investigations – Preliminary and Detailed Site Investigation Report*.
30. GHD, April 2019, *RAAF Base Learmonth – PFAS Investigations – Ecological Risk Assessment Preliminary (ERA)*.

APPENDIX

A

FIGURES



now





Legend

 Management Area

 RAAF Learmonth

FIGURE 1
1:60,000 Scale at A3



Site Location

NOVEMBER 2023 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE




Map Produced by Cardno WA
Date: 2023-12-15 | Project: DEF19009
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Map: DEF19009_WA_0960-GS-001_RegionalLocation 02.mxd
Aerial Imagery Supplied by Google Earth

1a	Maintenance Area (Source Area)
1b	Pathway (site drains and groundwater)
1c	Pathway (groundwater)
1d	Southern Drainage Channel (Pathway)
1e	Central Drainage Channel (Pathway)
1f	Southern reach of WAPET Creek (Receptor)
1g	Northern reach of WAPET Creek (Receptor)
2a	Current Fuel Farm (Source Area)
2b	Former Fuel Farm (Pathway)
2c	Northern Drainage Channel (Pathway)
3a	Pathway (groundwater)
3b	Site drains (Pathway)

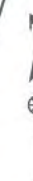


FIGURE 2
1:31,000 Scale at A3

Metres
0 1,000 2,000

Management Area

NOVEMBER 2023 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE



Cardno

Map Produced by Cardno WA
Date: 2023-12-15 | Project: DEF19009
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Map: DEF19009_WA_0960-GS-002_ManagementAreas 02.mxd
Aerial Imagery Supplied by Google Earth

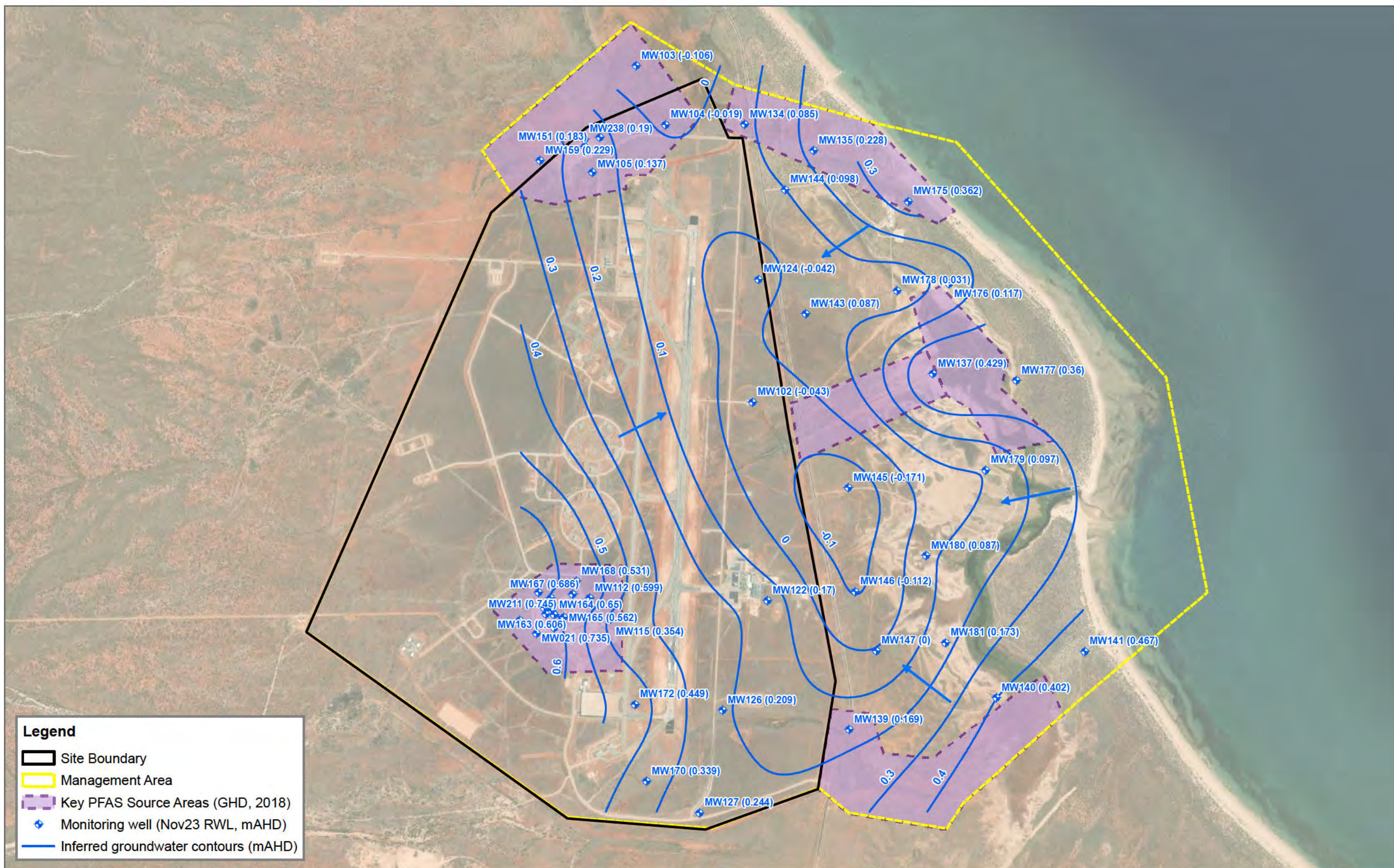


FIGURE 3
1:22,000 Scale at A3

Metres
0 750 1,500

Inferred Groundwater Contours

NOVEMBER 2023 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-12-17 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0960-GS-003_GroundwaterElevationContours 01.mxd
Aerial Imagery Supplied by Google Earth

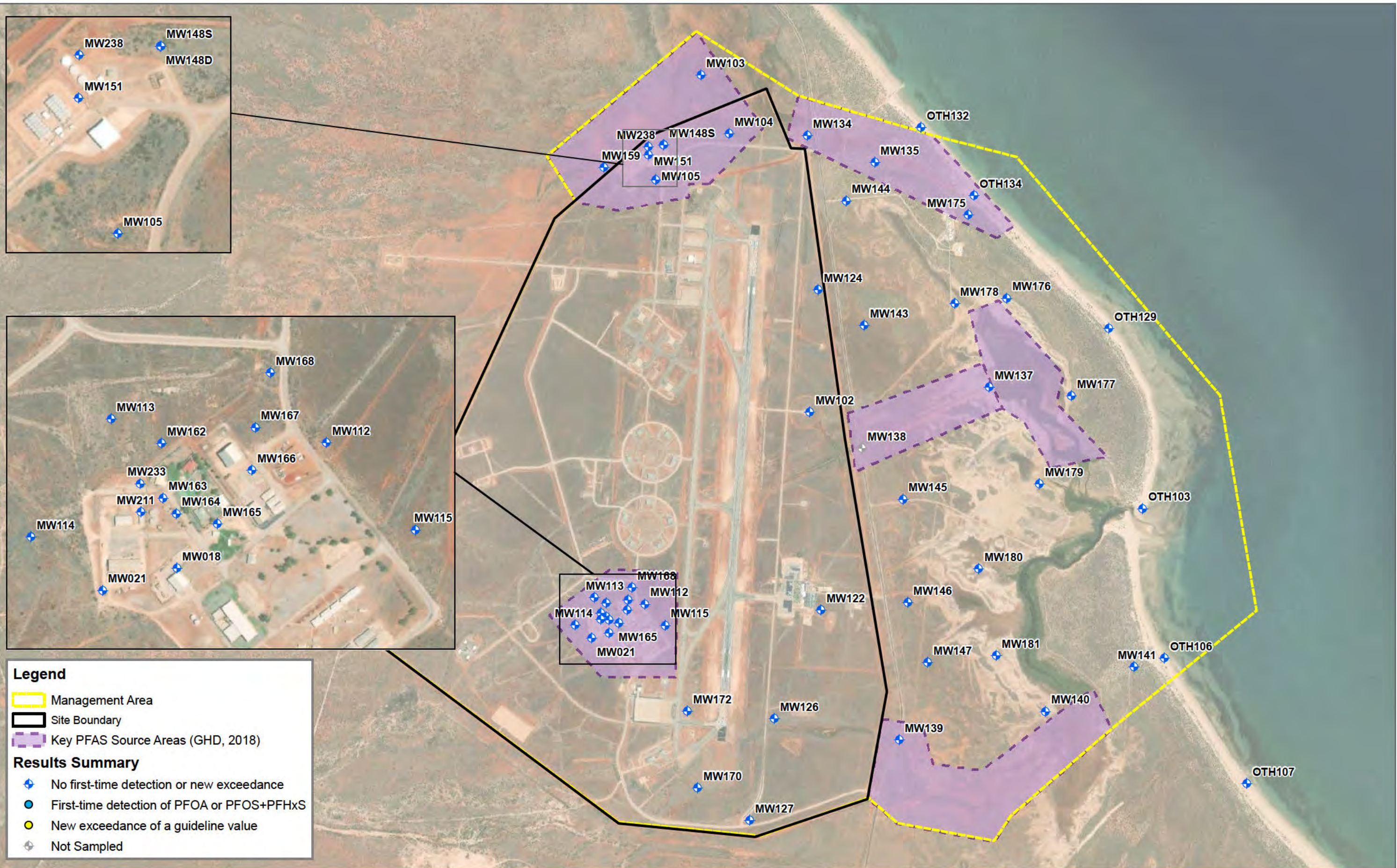


FIGURE 4
1:24,000 Scale at A3

Metres
0 1,000 2,000

Groundwater and Seepage water Monitoring Locations and Results

NOVEMBER 2023 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-12-18 | Project: DEF19009
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Map: DEF19009_WA_0960-GS-004_GWResults_Nov23 01.mxd
Aerial Imagery Supplied by Google Earth

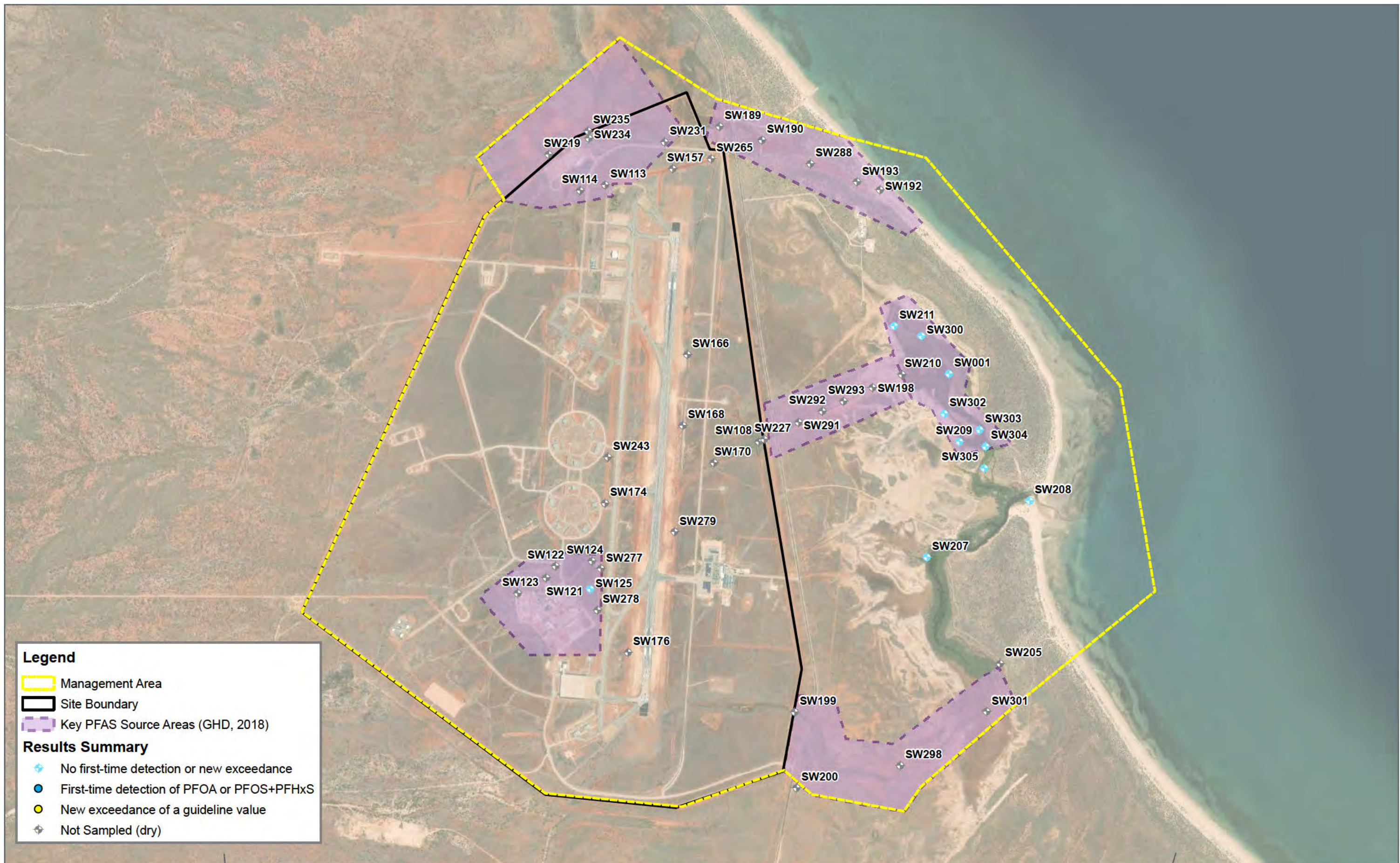


FIGURE 5
1:25,000 Scale at A3

Metres
0 1,000 2,000

Surface water Monitoring Locations and Results

NOVEMBER 2023 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-12-18 | Project: DEF19009
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Map: DEF19009_WA_0960-GS-005_SWResults_Nov23 01.mxd

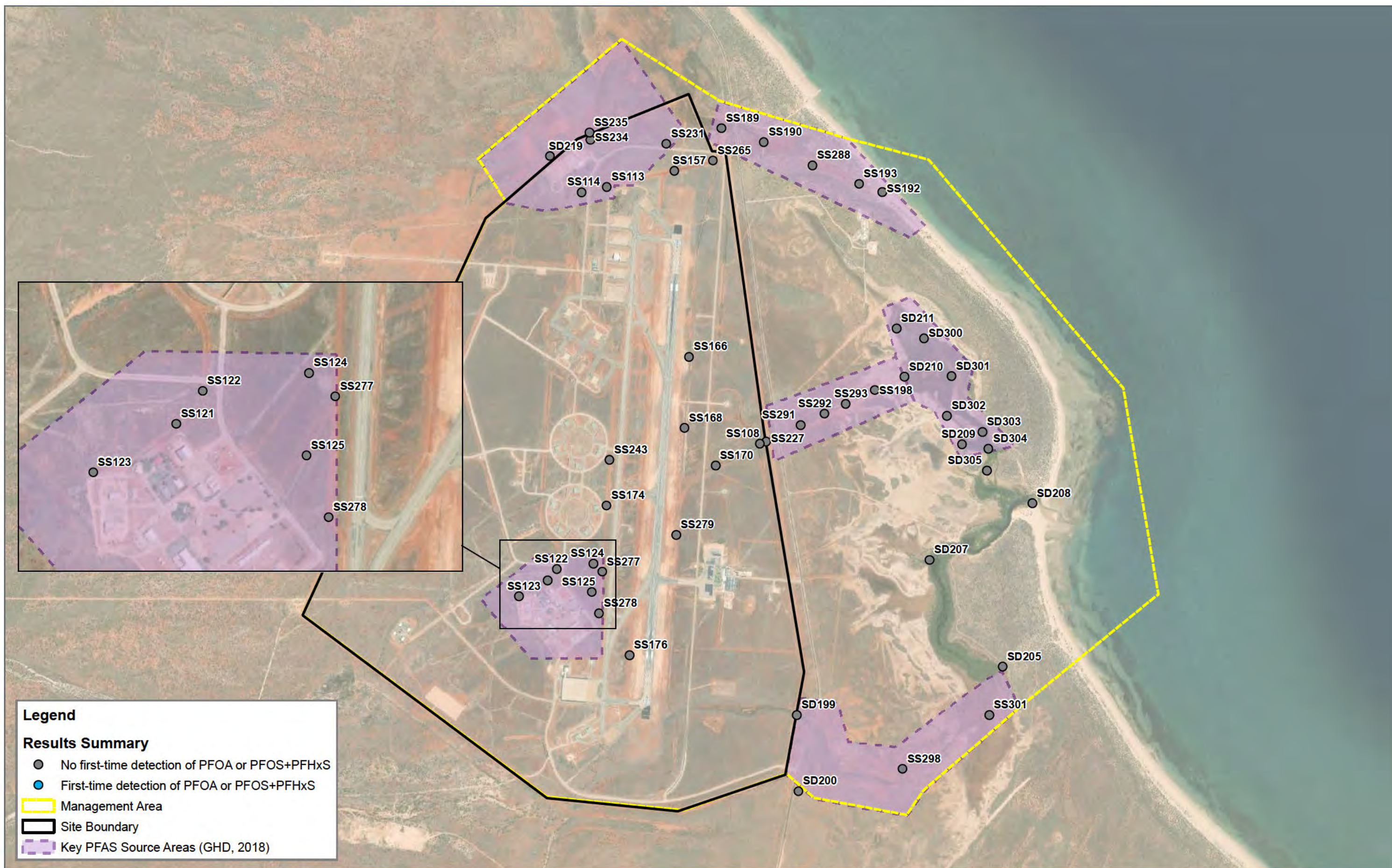
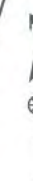


FIGURE 6
1:25,000 Scale at A3

Metres
0 1,000 2,000

Sediment Monitoring Locations and Results

NOVEMBER 2023 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2023-12-18 | Project: DEF19009
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Map: DEF19009_WA_0960-GS-006_SDResults_Nov23 01.mxd

APPENDIX

B

DATA ASSESSMENT TABLES



now



[illegible]

	PFAS - Perfluoroalkyl Sulfonic Acids							PFAS - Perfluoroalkyl Carboxylic Acids										PFAS - (n:2) Fluorotelomer Sulfonic Acids				PFAS - Perf		
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Perfluorooctane sulfonamide (FOS A)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)
LOR - Limit of Reporting	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.02	0.05	0.02
PFAS NEMP 2020 Freshwater 99%					0.00023*						19													
PFAS NEMP 2020 Recreational Water											10													

Location Code	Date	Field ID	Sample Type	Lab Report Number	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFDS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	FOS A	MeFOSA	FOS B
MW165	8/11/2023	0960_MW165_231108	Normal	EP2315733	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW166	8/11/2023	0960_MW166_231108	Normal	EP2315733	0.04	0.04	0.26	<0.01	0.29	<0.01	0.2	0.28	0.25	0.23	0.17	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW167	8/11/2023	0960_MW167_231108	Normal	EP2315733	0.03	0.05	0.57	0.02	0.67	<0.01	<0.01	0.10	0.20	0.12	0.19	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW168	8/11/2023	0960_MW168_231108	Normal	EP2315732	0.10	0.12	0.92	<0.01	0.13	<0.01	<0.01	0.06	0.27	0.03	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW170	8/11/2023	0960_MW170_231108	Normal	EP2315738	0.06	0.06	0.49	<0.01	<0.01	<0.01	<0.01	0.02	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW172	8/11/2023	0960_MW172_231108	Normal	EP2315738	0.76	1.07	7.43	0.27	2.13	<0.01	<0.01	0.3	0.55	2.52	0.30	0.42	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW175	8/11/2023	0960_MW175_4.0-4.5_231108	Normal	EP2315731	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW176	8/11/2023	0960_MW176_1.5-2.0_231108	Normal	EP2315731	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW177	8/11/2023	0960_MW177_1.5-2.0_231108	Normal	EP2315731	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW178	8/11/2023	0960_MW178_2.0-2.5_231108	Normal	EP2315732	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW179	8/11/2023	0960_MW179_3.2-3.7_231108	Normal	EP2315731	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW180	8/11/2023	0960_MW180_3.5-4.0_231108	Normal	EP2315733	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW181	8/11/2023	0960_MW181_1.5-2.0_231108	Normal	EP2315731	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW211	8/11/2023	0960_MW211_231108	Normal	EP2315733	0.10	0.08	0.66	0.03	6.71	<0.01	0.1	0.12	0.26	0.06	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW211	8/11/2023	0960_QC121_231108	Field Duplicate	EP2315733	0.10	0.08	0.65	0.03	6.96	<0.01	0.1	0.12	0.25	0.06	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW211	8/11/2023	0960_QC221_231108	Interlab Duplicate	1043510	0.08	0.07	0.57	0.04	6.9	<0.01	0.10	0.08	0.18	0.04	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW233	8/11/2023	0960_MW233_231108	Normal	EP2315733	1.44	3.48	26.5	2.10	8.41	<0.01	0.4	0.78	4.10	0.50	1.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.52	<0.01	<0.01	<0.01
MW238	8/11/2023	0960_MW238_231108	Normal	EP2315738	1.54	1.91	10.9	1.48	10.8	<0.01	0.7	1.21	5.34	0.44	0.87	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW238	8/11/2023	0960_QC119_231108	Field Duplicate	EP2315738	1.61	1.58	11.1	1.17	10.1	<0.01	0.7	1.15	5.45	0.46	0.83	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW238	8/11/2023	0960_QC219_231108	Interlab Duplicate	1043510	1.3	1.2	9.0	0.75	9.3	<0.01	0.72	1.1	4.4	0.39	0.74	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
OTH103	8/11/2023	0960_OTH103_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
OTH106	8/11/2023	0960_OTH106_231108	Normal	EP2315740	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
OTH107	8/11/2023	0960_OTH107_231108	Normal	EP2315740	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
OTH129	8/11/2023	0960_OTH129_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
OTH132	8/11/2023	0960_OTH132_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
OTH134	8/11/2023	0960_OTH134_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW001	8/11/2023	0960_SW001_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW125	8/11/2023	0960_SW125_231108	Normal	EP2315740	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW207	8/11/2023	0960_SW207_231108	Normal	EP2315741	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW208	8/11/2023	0960_QC124_231108	Field Duplicate	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW208	8/11/2023	0960_QC224_231108	Interlab Duplicate	1043510	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW208	8/11/2023	0960_SW208_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW209	8/11/2023	0960_SW209_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW211	8/11/2023	0960_SW211_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
SW300	8/11/2023	0960_SW300_231108	Normal	EP2315734	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0.												

LOR - Limit of Reporting
PFAS NEMP 2020 Freshwater 99%
PFAS NEMP 2020 Recreational Water

					uoroalkyl Sulfonamides				PFAS			Inorganics										Metals			
					N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidocetic acid (EtFOCAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	Sum of PFOS and PFO5	Sum of PFAS (MA DER List)	Sum of PFAS	Carbonate Alkalinity (as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (Total) as CaCO3	Anions Total	Cations Total	Chloride	Ionic Balance	Sulphate as SO4 - Turbidimetric (filtered)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	
LOR - Limit of Reporting					0.05	0.05	0.02	0.05	0.01	0.01	0.01	1	1	1	1	0.01	0.01	1	0.01	1	1	1	1	1	
PFAS NEMP 2020 Freshwater 99%																									
PFAS NEMP 2020 Recreational Water									2																
Location Code	Date	Field ID	Sample Type	Lab Report Number																					
MW165	8/11/2023	0960 MW165 231108	Normal	EP2315733	0.01	0.01	0.01	78	703	781	23.1	25.1	242	4.28	31	12	10	14	537						
MW166	8/11/2023	0960 MW166 231108	Normal	EP2315733	0.55	1.72	1.78	86	861	946	31.1	29.1	363	3.31	94	10	9	18	630						
MW167	8/11/2023	0960 MW167 231108	Normal	EP2315733	1.24	1.88	1.97	29	929	958	52.7	55.0	924	2.07	361	41	36	31	1,130						
MW168	8/11/2023	0960 MW168 231108	Normal	EP2315732	1.05	1.54	1.66	704	704	704	115	119	3,110	1.76	622	190	176	71	2,140						
MW170	8/11/2023	0960 MW170 231108	Normal	EP2315738	0.49	0.64	0.70	318	318	385	438	12,300	6.43	1,530	892	758	127	7,540							
MW172	8/11/2023	0960 MW172 231108	Normal	EP2315738	9.56	14.4	15.8	377	377	342	374	10,000	4.43	2,510	442	530	150	6,990							
MW175	8/11/2023	0960 MW175 4.0-4.5 231108	Normal	EP2315731	564	43.4	44.3	564	43.4	44.3	1,050	0.98	122	55	198	33	561								
MW176	8/11/2023	0960 MW176 1.5-2.0 231108	Normal	EP2315731	286	586	653	286	586	653	18,200	5.42	3,220	625	1,440	475	11,300								
MW177	8/11/2023	0960 MW177 1.5-2.0 231108	Normal	EP2315731	186	1,090	1,180	186	1,090	1,180	35,000	3.87	4,660	982	2,560	781	20,600								
MW178	8/11/2023	0960 MW178 2.0-2.5 231108	Normal	EP2315732	124	1,000	1,180	124	1,000	1,180	31,900	8.20	4,860	1,220	2,450	773	20,700								
MW179	8/11/2023	0960 MW179 3.2-3.7 231108	Normal	EP2315731	211	842	902	211	842	902	27,000	3.43	3,650	559	1,980	582	16,000								
MW180	8/11/2023	0960 MW180 3.5-4.0 231108	Normal	EP2315733	202	1,080	1,140	202	1,080	1,140	34,800	3.11	4,350	868	2,430	747	20,300								
MW181	8/11/2023	0960 MW181 1.5-2.0 231108	Normal	EP2315731	203	1,220	1,330	203	1,220	1,330	39,300	4.21	5,280	1,100	2,850	890	23,400								
MW211	8/11/2023	0960 MW211 231108	Normal	EP2315733	7.37	8.08	8.19	81	638	719	18.9	19.4	116	1.41	61	5	6	12	423						
MW211	8/11/2023	0960 QC121 231108	Field Duplicate	EP2315733	7.61	8.32	8.43																		
MW211	8/11/2023	0960 QC221 231108	Interlab Duplicate	1043510	7.47	8	8.15																		
MW233	8/11/2023	0960 MW233 231108	Normal	EP2315733	34.9	43.9	49.5	389	389	389	106	120	3,150	6.15	472	182	205	88	2,120						
MW238	8/11/2023	0960 MW238 231108	Normal	EP2315738	21.7	31.8	35.2	2	796	798	59.8	69.6	940	7.53	835	99	45	53	1,370						
MW238	8/11/2023	0960 QC119 231108	Field Duplicate	EP2315738	21.2	31.4	34.2																		
MW238	8/11/2023	0960 QC219 231108	Interlab Duplicate	1043510	18.3	26.95	29.68																		
OTH103	8/11/2023	0960 OTH103 231108	Normal	EP2315734	161	680	754	161	680	754	21,700	5.18	3,110	502	1,630	485	13,400								
OTH106	8/11/2023	0960 OTH106 231108	Normal	EP2315740	124	599	661	124	599	661	19,200	4.92	2,650	435	1,400	434	11,800								
OTH107	8/11/2023	0960 OTH107 231108	Normal	EP2315740	131	594	658	131	594	658	19,100	5.09	2,530	435	1,410	437	11,700								
OTH129	8/11/2023	0960 OTH129 231108	Normal	EP2315734	139	611	688	139	611	688	19,600	5.90	2,670	449	1,500	446	12,200								
OTH132	8/11/2023	0960 OTH132 231108	Normal	EP2315734	140	629	716	140	629	716	20,200	6.47	2,720	475	1,560	463	12,700								
OTH134	8/11/2023	0960 OTH134 231108	Normal	EP2315734	126	589	685	126	589	685	18,900	7.55	2,550	444	1,470	434	12,200								
SW001	8/11/2023	0960 SW001 231108	Normal	EP2315734	0.03	0.03	0.03	248	1,140	1,250	36,200	4.74	5,300	1,170	2,790	861	21,600								
SW125	8/11/2023	0960 SW125 231108	Normal	EP2315740	0.07	0.07	0.07	391	12.8	12.7	166	0.27	13	146	19	11	82								
SW207	8/11/2023	0960 SW207 231108	Normal	EP2315741	202	651	744	202	651	744	20,900	6.66	2,750	524	1,590	491	13,200								
SW208	8/11/2023	0960 QC124 231108	Field Duplicate	EP2315734	134	580	677	134	580	677	18,500	7.78	2,650	449	1,480	442	12,000								
SW208	8/11/2023	0960 QC224 231108	Interlab Duplicate	1043510	135	586	659	135	586	659	18,800	5.88	2,540	433	1,430	427	11,700								
SW208	8/11/2023	0960 SW208 231108	Normal	EP2315734	135	586	659	135	586	659	18,800	5.88	2,540	433	1,430	427	11,700								
SW209	8/11/2023	0960 SW209 231108	Normal	EP2315734	263	820	880	263	820	880	26,200	3.49	3,650	659	1,920	570	15,500								
SW211	8/11/2023	0960 SW211 231108	Normal	EP2315734	131	1,330	1,470	131	1,330	1,470	42,300	5.04	6,550	1,430	3,190	1,030	25,600								
SW300	8/11/2023	0960 SW300 231108	Normal	EP2315734	126	1,330	1,450	126	1,330	1,450	42,300	4.27	6,450	1,430	3,110	990	25,200								
SW302	8/11/2023	0960 SW302 231108	Normal	EP2315734	205	1,100	1,160	205	1,100	1,160	35,300	2.43	5,030	1,040	2,530	816	20,200								
SW303	8/11/2023	0960 SW303 231108	Normal	EP2315734	238	842	857	238	842	857	27,000	0.91	3,610	605	1,840	557	15,200								
SW304	8/11/2023	0960 QC127 231108	Field Duplicate	EP2315734	168	935	1,000	168	935	1,000	29,900	3.52	4,230	711	2,200	654	17,700								
SW304	8/11/2023	0960 QC227 231108	Interlab Duplicate	1043510	169	920	1,020	169	920	1,020	29,400	4.89	4,220	705	2,190	663	18,000								
SW304	8/11/2023	0960 SW304 231108	Normal	EP2315734	169	920	1,020	169	920	1,020	29,400	4.89	4,220	705	2,190	663	18,000								
SW305	8/11/2023	0960 SW305 231108	Normal	EP2315734	324	779	821	324	779	821	24,900	2.62	3,370	589	1,790	532	14,500								

Environmental Standards
HEPA, January 2020, PFAS NEMP 2020 Freshwater 99%
HEPA, January 2020, PFAS NEMP 2020 Recreational Water

Notes:
* Practical screening value of 0.01 µg/L adopted based on current laboratory limit of reporting (HEPA, 2020)

First-time detection of PFDA or PFOS+PFHxS
New exceedance of guideline value.

Notes:
First-time detection of PFOA or PFOS+PFHxS

Notes:
First-time detection of PFDA or PFOS+PFHxS

Date Field ID Matrix Type Lab Report Number			08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD
			0960_MW021_231108	0960_QC116_231108		0960_MW018_231108	0960_QC117_231108		0960_MW113_231108	0960_QC120_231108		0960_MW113_231108	0960_QC220_231108	
			Water	Water		Water	Water		Water	Water		Water	Water	
			EP2315733	EP2315733		EP2315733	EP2315733		EP2315732	EP2315732		EP2315732	1043510	
	Unit	LOR												
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	0.13	0.18	32	0.07	0.08	13			0			0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	0.15	0.17	13	0.08	0.10	22			0			0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.98	1.06	8	0.93	0.97	4			0			0
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	0.02	0.03	40	0.04	0.04	0			0			0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.68	0.85	22	0.51	0.56	9			0			0
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01			0			0			0			0
PFAS - Perfluoroalkyl Carboxylic Acids														
Perfluorobutanoic acid (PFBA)	µg/L	0.05			0	1.3	1.2	8			0			0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	0.07	0.07	0	2.36	1.88	23			0			0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	0.26	0.29	11	2.55	2.07	21			0			0
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	0.03	0.03	0	1.50	1.24	19			0			0
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.02	0.02	0	0.16	0.13	21			0			0
Perfluorononanoic acid (PFNA)	µg/L	0.01			0			0			0			0
Perfluorodecanoic acid (PFDA)	µg/L	0.01			0			0			0			0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01			0			0			0			0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01			0			0			0			0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01			0			0			0			0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01			0			0			0			0
PFAS - (n:2) Fluorotelomer Sulfonic Acids														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01			0			0			0			0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05			0			0			0			0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01			0			0			0			0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01			0			0			0			0
PFAS - Perfluoroalkyl Sulfonamides														
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02			0			0			0			0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05			0			0			0			0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02			0			0			0			0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05			0			0			0			0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05			0			0			0			0
PFAS														
Sum of PFHxS and PFOS	µg/L	0.01	1.66	1.91	14	1.44	1.53	6			0			0
Sum of PFAS (WA DER List)	µg/L	0.01	2.17	2.50	14	9.38	8.13	14			0			0
Sum of PFAS	µg/L	0.01	2.34	2.70	14	9.50	8.27	14			0			0

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

**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each LOR multiplier range are: No Limit (1 - 10 x LOR); 50 (10 - 20 x LOR); 20 (> 20 x LOR))

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

Date Field ID Matrix Type Lab Report Number			08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD
			0960_MW238_231108	0960_QC119_231108		0960_MW238_231108	0960_QC219_231108		0960_MW211_231108	0960_QC121_231108		0960_MW211_231108	0960_QC221_231108				
			Water	Water		Water	Water		Water	Water		Water	Water				
			EP2315738	EP2315738		EP2315738	1043510		EP2315733	EP2315733		EP2315733	1043510				
	Unit	LOR															
PFAS - Perfluoroalkyl Sulfonic Acids																	
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	1.54	1.61	4	1.54	1.3	17	0.10	0.10	0	0.10	0.08	22			
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	1.91	1.58	19	1.91	1.2	46	0.08	0.08	0	0.08	0.07	13			
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	10.9	11.1	2	10.9	9.0	19	0.66	0.65	2	0.66	0.57	15			
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	1.48	1.17	23	1.48	0.75	65	0.03	0.03	0	0.03	0.04	29			
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	10.8	10.1	7	10.8	9.3	15	6.71	6.96	4	6.71	6.9	3			
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
PFAS - Perfluoroalkyl Carboxylic Acids																	
Perfluorobutanoic acid (PFBA)	µg/L	0.05	0.7	0.7	0	0.7	0.72	3	0.1	0.1	0	0.1	0.10	0			
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	1.21	1.15	5	1.21	1.1	10	0.12	0.12	0	0.12	0.08	40			
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	5.34	5.45	2	5.34	4.4	19	0.26	0.25	4	0.26	0.18	36			
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	0.44	0.46	4	0.44	0.39	12	0.06	0.06	0	0.06	0.04	40			
Perfluorooctanoic acid (PFOA)	µg/L	0.01	0.87	0.83	5	0.87	0.74	16	0.07	0.08	13	0.07	0.05	33			
Perfluorononanoic acid (PFNA)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
Perfluorodecanoic acid (PFDA)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
PFAS - (n:2) Fluorotelomer Sulfonic Acids																	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
PFAS - Perfluoroalkyl Sulfonamides																	
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	0.02	0.02	0	0.02	<<<	0	<<<	<<<	0	<<<	<<<	0			
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0	<<<	<<<	0			
PFAS																	
Sum of PFHxS and PFOS	µg/L	0.01	21.7	21.2	2	21.7	18.3	17	7.37	7.61	3	7.37	7.47	1			
Sum of PFAS (WA DER List)	µg/L	0.01	31.8	31.4	1	31.8	26.95	17	8.08	8.32	3	8.08	8	1			
Sum of PFAS	µg/L	0.01	35.2	34.2	3	35.2	29.68	17	8.19	8.43	3	8.19	8.15	0			

Date Field ID Matrix Type Lab Report Number			08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD
			0960_SW208_231108	0960_QC124_231108		0960_MW164_231108	0960_QC125_231108							
			Water	Water		Water	Water							
			EP2315734	EP2315734		EP2315733	EP2315733							
			Unit	LOR										
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01			0			0	0.09	0.10	11	0.09	0.06	40
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01			0			0	0.10	0.10	0	0.10	0.09	11
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01			0			0	0.76	0.78	3	0.76	0.64	17
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01			0			0	0.04	0.04	0	0.04	0.03	29
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01			0			0	1.18	1.32	11	1.18	1.2	2
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01			0			0			0			0
PFAS - Perfluoroalkyl Carboxylic Acids														
Perfluorobutanoic acid (PFBA)	µg/L	0.05			0			0			0			0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01			0			0	0.06	0.05	18	0.06	0.04	40
Perfluorohexanoic acid (PFHxA)	µg/L	0.01			0			0	0.22	0.23	4	0.22	0.15	38
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01			0			0	0.03	0.03	0	0.03	0.03	0
Perfluorooctanoic acid (PFOA)	µg/L	0.01			0			0	0.03	0.03	0	0.03	0.02	40
Perfluorononanoic acid (PFNA)	µg/L	0.01			0			0			0			0
Perfluorodecanoic acid (PFDA)	µg/L	0.01			0			0			0			0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01			0			0			0			0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01			0			0			0			0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01			0			0			0			0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01			0			0			0			0
PFAS - (n:2) Fluorotelomer Sulfonic Acids														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01			0			0			0			0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05			0			0			0			0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01			0			0			0			0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01			0			0			0			0
PFAS - Perfluoroalkyl Sulfonamides														
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02			0			0			0			0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05			0			0			0			0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02			0			0			0			0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05			0			0			0			0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05			0			0			0			0
PFAS														
Sum of PFHxS and PFOS	µg/L	0.01			0			0	1.94	2.10	8	1.94	1.84	5
Sum of PFAS (WA DER List)	µg/L	0.01			0			0	2.37	2.54	7	2.37	2.14	10
Sum of PFAS	µg/L	0.01			0			0	2.51	2.68	7	2.51	2.29	9

Lab Report Number	Unit	LOR	Date	RPD	Date	RPD
			Field ID		Field ID	
			Matrix Type		Matrix Type	
			08 Nov 2023		08 Nov 2023	
			0960_SW304_231108		0960_SW304_231108	
			Water		Water	
			EP2315734		EP2315734	
			08 Nov 2023		08 Nov 2023	
			0960_QC127_231108		0960_QC127_231108	
			Water		Water	
			EP2315734		1043510	
PFAS - Perfluoroalkyl Sulfonic Acids						
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01		0		0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01		0		0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01		0		0
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01		0		0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01		0		0
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.01		0		0
PFAS - Perfluoroalkyl Carboxylic Acids						
Perfluorobutanoic acid (PFBA)	µg/L	0.05		0		0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01		0		0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01		0		0
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01		0		0
Perfluorooctanoic acid (PFOA)	µg/L	0.01		0		0
Perfluorononanoic acid (PFNA)	µg/L	0.01		0		0
Perfluorodecanoic acid (PFDA)	µg/L	0.01		0		0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01		0		0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01		0		0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01		0		0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01		0		0
PFAS - (n:2) Fluorotelomer Sulfonic Acids						
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01		0		0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.05		0		0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01		0		0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01		0		0
PFAS - Perfluoroalkyl Sulfonamides						
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		0		0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		0		0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02		0		0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.05		0		0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		0		0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02		0		0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		0		0
PFAS						
Sum of PFHxS and PFOS	µg/L	0.01		0		0
Sum of PFAS (WA DER List)	µg/L	0.01		0		0
Sum of PFAS	µg/L	0.01		0		0

Date Field ID Matrix Type Lab Report Number			08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD
			0960_SS192_231108	0960_QC118_231108		0960_SS192_231108	0960_QC218_231108		0960_SS192_231108	0960_QC215_231108				
			Soil	Soil		Soil	Soil		Soil	Soil				
			EP2315735	EP2315735		EP2315735	1043510		EP2315735	EP2315735				
	Unit	LOR												
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002			0			0			0			0
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002			0			0			0			0
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002			0			0	0.0015	0.0012	22	0.0015		0
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002			0			0			0			0
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002			0			0	0.0091	0.0070	26	0.0091	0.0069	27
Perfluorodecane sulfonic acid (PFDS)	mg/kg	0.0002			0			0	0.0003	0.0003	0	0.0003		0
PFAS - Perfluoroalkyl Carboxylic Acids														
Perfluorobutanoic acid (PFBA)	mg/kg	0.001			0			0			0			0
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002			0			0			0			0
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002			0			0			0			0
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002			0			0			0			0
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002			0			0			0			0
Perfluorononanoic acid (PFNA)	mg/kg	0.0002			0			0			0			0
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002			0			0			0			0
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002			0			0			0			0
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002			0			0			0			0
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002			0			0			0			0
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005			0			0			0			0
PFAS - (n:2) Fluorotelomer Sulfonic Acids														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005			0			0			0			0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	mg/kg	0.0005			0			0			0			0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005			0			0			0			0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005			0			0			0			0
PFAS - Perfluoroalkyl Sulfonamides														
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002			0			0			0			0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005			0			0			0			0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002			0			0			0			0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	mg/kg	0.0005			0			0			0			0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005			0			0			0			0
PFAS														
Sum of PFHxS and PFOS	mg/kg	0.0002			0			0	0.0106	0.0082	26	0.0106	0.0069	42
Sum of PFAS (WA DER List)	mg/kg	0.0002			0			0	0.0106	0.0082	26	0.0106		6
Sum of PFAS	mg/kg	0.0002			0			0	0.0109	0.0085	25	0.0109		0

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

**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each LOR multiplier range are: No Limit (1 - 10 x LOR); 50 (10 - 20 x LOR); 20 (> 20 x LOR))

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

Date Field ID Matrix Type Lab Report Number			08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD	08 Nov 2023		RPD
			0960_SS234_231108	0960_QC122_231108		0960_SS124_231108	0960_QC123_231108		0960_SS124_231108	0960_QC223_231108				
			Soil	Soil		Soil	Soil		Soil	Soil				
			EP2315739	EP2315739		EP2315739	1043510		EP2315737	EP2315737		EP2315737	1043510	
	Unit	LOR												
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002			0			0			0			0
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002			0			0			0			0
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002			0			0			0			0
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002			0			0			0			0
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	0.0135	0.0227	51	0.0135	0.02	39	0.0030	0.0182	143	0.0030	0.0063	71
Perfluorodecane sulfonic acid (PFDS)	mg/kg	0.0002		0.0002	0			0		0.0005	86			0
PFAS - Perfluoroalkyl Carboxylic Acids														
Perfluorobutanoic acid (PFBA)	mg/kg	0.001			0			0			0			0
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002			0			0			0			0
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002			0			0			0			0
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002			0			0			0			0
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002			0			0		0.0002	0			0
Perfluorononanoic acid (PFNA)	mg/kg	0.0002	0.0003	0.0003	0	0.0003		0		0.0004	67			0
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002	0.0002	0.0005	86	0.0002		0		0.0005	86			0
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002			0			0		0.0002	0			0
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002			0			0			0			0
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002			0			0			0			0
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005			0			0			0			0
PFAS - (n:2) Fluorotelomer Sulfonic Acids														
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005			0			0			0			0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	mg/kg	0.0005			0			0			0			0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005			0			0			0			0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005			0			0			0			0
PFAS - Perfluoroalkyl Sulfonamides														
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002			0			0			0			0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005			0			0			0			0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002			0			0			0			0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	mg/kg	0.0005			0			0			0			0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005			0			0			0			0
PFAS														
Sum of PFHxS and PFOS	mg/kg	0.0002	0.0135	0.0227	51	0.0135	0.02	39	0.0030	0.0182	143	0.0030	0.0063	71
Sum of PFAS (WA DER List)	mg/kg	0.0002	0.0135	0.0227	51	0.0135	0.02	39	0.0030	0.0184	144	0.0030		0
Sum of PFAS	mg/kg	0.0002	0.0140	0.0237	51	0.0140		0	0.0030	0.0200	148	0.0030		0

Lab Report Number	Unit	LOR	Date	RPD	RPD	RPD	RPD
			08 Nov 2023				
			0960_SS108_231108				
			Soil				
Field ID	Matrix Type	Lab Report Number	08 Nov 2023	08 Nov 2023	08 Nov 2023	08 Nov 2023	08 Nov 2023
0960_SS108_231108	Soil	EP2315739	0960_SS108_231108	0960_QC126_231108	0960_SS108_231108	0960_QC226_231108	0960_QC226_231108
Soil	Soil	EP2315739	Soil	Soil	Soil	Soil	Soil
EP2315739	EP2315739	EP2315739	EP2315739	EP2315739	EP2315739	EP2315739	EP2315739
PFAS - Perfluoroalkyl Sulfonic Acids							
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002			0		0
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002			0		0
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002			0		0
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002			0		0
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	0.0056	0.0048	15	0.0056	11
Perfluorodecane sulfonic acid (PFDS)	mg/kg	0.0002	0.0003		40	0.0003	0
PFAS - Perfluoroalkyl Carboxylic Acids							
Perfluorobutanoic acid (PFBA)	mg/kg	0.001			0		0
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002			0		0
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002			0		0
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002			0		0
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002			0		0
Perfluorononanoic acid (PFNA)	mg/kg	0.0002			0		0
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002			0		0
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002			0		0
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002			0		0
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002			0		0
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005			0		0
PFAS - (n:2) Fluorotelomer Sulfonic Acids							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005			0		0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	mg/kg	0.0005			0		0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005			0		0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005			0		0
PFAS - Perfluoroalkyl Sulfonamides							
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002			0		0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005			0		0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002			0		0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	mg/kg	0.0005			0		0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005			0		0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002			0		0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005			0		0
PFAS							
Sum of PFHxS and PFOS	mg/kg	0.0002	0.0056	0.0048	15	0.0056	11
Sum of PFAS (WA DER List)	mg/kg	0.0002	0.0056	0.0048	15	0.0056	0
Sum of PFAS	mg/kg	0.0002	0.0059	0.0048	21	0.0059	0

APPENDIX

C

LABORATORY CERTIFICATES



now





ALS Compass

SAMPLING *Intelligence*



Environmental Division
Perth

Work Order Reference
EP2315731



Telephone : +61-8-9106 1301

Custody Document for Submissions via ALS Compass App

Project: WA_0960_PFA50MP_23 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 59789 59786 59787 59788 59789 59790
59820 59791 # Samples: 59794 59792 59785

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time: 9/11/23

Date / Time:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass

**CHAIN OF CUSTODY**

COC#: 59784 ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

SAMPLE DETAILS							ANALYSIS REQUIRED			
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_MW175_4.0-4.5	Lab QC added	08/11/2023 08:33 AM	WATER	ALS: 5 Non ALS: 0	No		X		
002	0960_MW177_1.5-2.0		08/11/2023 11:11 AM	WATER	ALS: 3 Non ALS: 0	No		X		
003	0960_MW176_1.5-2.0		08/11/2023 12:20 PM	WATER	ALS: 3 Non ALS: 0	No		X		
004	0960_MW137_2.5-3.0		08/11/2023 01:10 PM	WATER	ALS: 3 Non ALS: 0	No		X		
005	0960_MW179_3.2-3.7		08/11/2023 02:00 PM	WATER	ALS: 3 Non ALS: 0	No		X		
006	0960_MW140_1.5-2.0		08/11/2023 03:24 PM	WATER	ALS: 3 Non ALS: 0	No		X		
007	0960_MW181_1.5-2.0	Lab QC added	08/11/2023 03:48 PM	WATER	ALS: 5 Non ALS: 0	No		X		

**CHAIN OF CUSTODY**

COC#: 59784

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

QUOTE NO: SY/139/19 B

SAMPLER MOBILE: [REDACTED]

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_QC301		08/11/2023 05:14 PM	WATER	ALS: 2 Non ALS: 0	No	X			
009	0960_QC401		08/11/2023 05:14 PM	WATER	ALS: 2 Non ALS: 0	No	X			
010	0960_QC302		08/11/2023 05:16 PM	WATER	ALS: 2 Non ALS: 0	No	X			
011	0960_QC402		08/11/2023 05:17 PM	WATER	ALS: 2 Non ALS: 0	No	X			
012	0960_QC303		08/11/2023 05:21 PM	WATER	ALS: 2 Non ALS: 0	No	X			
013	0960_QC403		08/11/2023 05:21 PM	WATER	ALS: 2 Non ALS: 0	No	X			
014	0960_QC304		08/11/2023 05:22 PM	WATER	ALS: 2 Non ALS: 0	No	X			



RECEIVED BY:

DATE TIME:

EMAIL INVOICES TO:

Biohazard info:

LABORATORY USE ONLY (Circle)

Yes No N/A

Yes No N/A

°C

Other comments:

ANALYSIS REQUIRED

**CHAIN OF CUSTODY**

COC#: 59784

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_MW175_4.0-4.5	Clear Plastic Bottle - Natural	125 mL	00070522075357	Green	No	
001	0960_MW175_4.0-4.5	HDPE (no PTFE)	20 mL	00351221020913	Grey	No	
001	0960_MW175_4.0-4.5	HDPE (no PTFE)	20 mL	00351221020447	Grey	No	
001	0960_MW175_4.0-4.5	HDPE (no PTFE)	20 mL	00351221020848	Grey	No	
001	0960_MW175_4.0-4.5	HDPE (no PTFE)	20 mL	00351221020777	Grey	No	
002	0960_MW177_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00071121128595	Green	No	
002	0960_MW177_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020680	Grey	No	
002	0960_MW177_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020986	Grey	No	
003	0960_MW176_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00071121128585	Green	No	
003	0960_MW176_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020594	Grey	No	
003	0960_MW176_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020919	Grey	No	
004	0960_MW137_2.5-3.0	HDPE (no PTFE)	20 mL	00351221020730	Grey	No	
004	0960_MW137_2.5-3.0	HDPE (no PTFE)	20 mL	00351221020677	Grey	No	
004	0960_MW137_2.5-3.0	Clear Plastic Bottle - Natural	125 mL	00071121128667	Green	No	
005	0960_MW179_3.2-3.7	HDPE (no PTFE)	20 mL	00351221020420	Grey	No	
005	0960_MW179_3.2-3.7	HDPE (no PTFE)	20 mL	00351221020845	Grey	No	
005	0960_MW179_3.2-3.7	Clear Plastic Bottle - Natural	125 mL	00070522075406	Green	No	
006	0960_MW140_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00071121128599	Green	No	
006	0960_MW140_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020705	Grey	No	
006	0960_MW140_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020721	Grey	No	
007	0960_MW181_1.5-2.0	HDPE (no PTFE)	20 mL	00350822007892	Grey	No	
007	0960_MW181_1.5-2.0	HDPE (no PTFE)	20 mL	00350822007913	Grey	No	
007	0960_MW181_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00070522068982	Green	No	
007	0960_MW181_1.5-2.0	HDPE (no PTFE)	20 mL	00350822064031	Grey	No	
007	0960_MW181_1.5-2.0	HDPE (no PTFE)	20 mL	00350822007819	Grey	No	
008	0960_QC301	HDPE (no PTFE)	20 mL	00351221020651	Grey	No	

**CHAIN OF CUSTODY**

COC#: 59784 ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

008	0960_QC301	HDPE (no PTFE)	20 mL	00351221020941	Grey	No	
009	0960_QC401	HDPE (no PTFE)	20 mL	00351221020660	Grey	No	
009	0960_QC401	HDPE (no PTFE)	20 mL	00351221020510	Grey	No	
010	0960_QC302	HDPE (no PTFE)	20 mL	00351221020603	Grey	No	
010	0960_QC302	HDPE (no PTFE)	20 mL	00351221020511	Grey	No	
011	0960_QC402	HDPE (no PTFE)	20 mL	00351221020893	Grey	No	
011	0960_QC402	HDPE (no PTFE)	20 mL	00350621035987	Grey	No	
012	0960_QC303	HDPE (no PTFE)	20 mL	00351221020789	Grey	No	
012	0960_QC303	HDPE (no PTFE)	20 mL	00350621035889	Grey	No	
013	0960_QC403	HDPE (no PTFE)	20 mL	00350821036681	Grey	No	
013	0960_QC403	HDPE (no PTFE)	20 mL	00352005019670	Grey	No	
014	0960_QC304	HDPE (no PTFE)	20 mL	00352005019447	Grey	No	
014	0960_QC304	HDPE (no PTFE)	20 mL	00350621036008	Grey	No	
015	0960_QC404	HDPE (no PTFE)	20 mL	00352005019910	Grey	No	
015	0960_QC404	HDPE (no PTFE)	20 mL	00350621036606	Grey	No	

Total Bottle Count: ALS: 41, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2315731**

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

Laboratory : **Environmental Division Perth**
Contact : **Customer Services EP**
Address : **26 Rigali Way Wangara WA Australia
6065**

E-mail : **[REDACTED]@stantec.com**
Telephone : **----**
Facsimile : **----**

E-mail : **ALSEnviro.Perth@alsglobal.com**
Telephone : **+61-8-9406 1301**
Facsimile : **+61-8-9406 1399**

Project : **WA_0960_PFASOMP_23**
Order number : **pfas-omp Learmonth**
C-O-C number : **59784**
Site : **Learmonth GW - SC**
Sampler : **[REDACTED] [REDACTED]**

Page : **1 of 3**
Quote number : **ES2022MWAUS0002 (SY/139/19 B)**
QC Level : **NEPM 2013 B3 & ALS QC Standard**

Dates

Date Samples Received : **10-Nov-2023 12:20**
Client Requested Due : **21-Nov-2023**
Date

Issue Date : **13-Nov-2023**
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **4**
Receipt Detail :

Security Seal : **Not Available**
Temperature : **17.6 - Ice present**
No. of samples received / analysed : **15 / 15**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EP2315731-001 : 08-Nov-2023 08:33 : 0960_MW175_4.0-4.5_231108 - Lab QC added
EP2315731-002 : 08-Nov-2023 11:11 : 0960_MW177_1.5-2.0_231108
EP2315731-003 : 08-Nov-2023 12:20 : 0960_MW176_1.5-2.0_231108
EP2315731-004 : 08-Nov-2023 13:10 : 0960_MW137_2.5-3.0_231108
EP2315731-005 : 08-Nov-2023 14:00 : 0960_MW179_3.2-3.7_231108
EP2315731-006 : 08-Nov-2023 15:24 : 0960_MW140_1.5-2.0_231108
EP2315731-007 : 08-Nov-2023 15:48 : 0960_MW181_1.5-2.0_231108 - Lab QC added

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 - NT-01 & 02 Ca, Mg, Na, K, Cl, SO ₄ , Alkalinity
EP2315731-001	08-Nov-2023 08:33	0960_MW175_4.0-4.5_2...	✓	✓
EP2315731-002	08-Nov-2023 11:11	0960_MW177_1.5-2.0_2...	✓	✓
EP2315731-003	08-Nov-2023 12:20	0960_MW176_1.5-2.0_2...	✓	✓
EP2315731-004	08-Nov-2023 13:10	0960_MW137_2.5-3.0_2...	✓	✓
EP2315731-005	08-Nov-2023 14:00	0960_MW179_3.2-3.7_2...	✓	✓
EP2315731-006	08-Nov-2023 15:24	0960_MW140_1.5-2.0_2...	✓	✓
EP2315731-007	08-Nov-2023 15:48	0960_MW181_1.5-2.0_2...	✓	✓
EP2315731-008	08-Nov-2023 17:14	0960_QC301_231108	✓	
EP2315731-009	08-Nov-2023 17:14	0960_QC401_231108	✓	
EP2315731-010	08-Nov-2023 17:16	0960_QC302_231108	✓	
EP2315731-011	08-Nov-2023 17:17	0960_QC402_231108	✓	
EP2315731-012	08-Nov-2023 17:21	0960_QC303_231108	✓	
EP2315731-013	08-Nov-2023 17:21	0960_QC403_231108	✓	
EP2315731-014	08-Nov-2023 17:22	0960_QC304_231108	✓	
EP2315731-015	08-Nov-2023 17:22	0960_QC404_231108	✓	

Proactive Holding Time Report

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



CERTIFICATE OF ANALYSIS

Work Order	: EP2315731	Page	: 1 of 11
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023 12:20
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 59784	Issue Date	: 21-Nov-2023 16:09
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 15		
No. of samples analysed	: 15		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Lab Technician	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- ED037P (Alkalinity) Sample EP2315731-7 was centrifuged prior to analysis due to possible sample matrix interference. The sample was observed to contain fine particulate that may consume additional titrant.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW175_4.0-4.5 _231108 Lab QC added	0960_MW177_1.5-2.0 _231108	0960_MW176_1.5-2.0 _231108	0960_MW137_2.5-3.0 _231108	0960_MW179_3.2-3.7 _231108
Sampling date / time				08-Nov-2023 08:33	08-Nov-2023 11:11	08-Nov-2023 12:20	08-Nov-2023 13:10	08-Nov-2023 14:00
Compound	CAS Number	LOR	Unit	EP2315731-001	EP2315731-002	EP2315731-003	EP2315731-004	EP2315731-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	564	186	286	261	211
Total Alkalinity as CaCO ₃	---	1	mg/L	564	186	286	261	211
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	122	4660	3220	3700	3650
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	1050	35000	18200	26700	27000
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	55	982	625	622	559
Magnesium	7439-95-4	1	mg/L	198	2560	1440	2080	1980
Sodium	7440-23-5	1	mg/L	561	20600	11300	17200	16000
Potassium	7440-09-7	1	mg/L	33	781	475	627	582
EN055: Ionic Balance								
☐ Total Anions	---	0.01	meq/L	43.4	1090	586	835	842
☐ Total Cations	---	0.01	meq/L	44.3	1180	653	966	902
☐ Ionic Balance	---	0.01	%	0.98	3.87	5.42	7.27	3.43
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



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0960_MW175_4.0-4.5 _231108 Lab QC added	0960_MW177_1.5-2.0 _231108	0960_MW176_1.5-2.0 _231108	0960_MW137_2.5-3.0 _231108	0960_MW179_3.2-3.7 _231108
08-Nov-2023 08:33	08-Nov-2023 11:11	08-Nov-2023 12:20	08-Nov-2023 13:10	08-Nov-2023 14:00
EP2315731-001	EP2315731-002	EP2315731-003	EP2315731-004	EP2315731-005
Result	Result	Result	Result	Result

EP231A: Perfluoroalkyl Sulfonic Acids - Continued

Compound	CAS Number	LOR	Unit	0960_MW175_4.0-4.5 _231108 Lab QC added	0960_MW177_1.5-2.0 _231108	0960_MW176_1.5-2.0 _231108	0960_MW137_2.5-3.0 _231108	0960_MW179_3.2-3.7 _231108
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02

EP231B: Perfluoroalkyl Carboxylic Acids

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

EP231C: Perfluoroalkyl Sulfonamides

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



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW175_4.0-4.5 _231108 Lab QC added	0960_MW177_1.5-2.0 _231108	0960_MW176_1.5-2.0 _231108	0960_MW137_2.5-3.0 _231108	0960_MW179_3.2-3.7 _231108
Sampling date / time				08-Nov-2023 08:33	08-Nov-2023 11:11	08-Nov-2023 12:20	08-Nov-2023 13:10	08-Nov-2023 14:00
Compound	CAS Number	LOR	Unit	EP2315731-001	EP2315731-002	EP2315731-003	EP2315731-004	EP2315731-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	98.0	101	103	90.0
13C8-PFOA	---	0.02	%	104	104	103	112	118



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW140_1.5-2.0_231108	0960_MW181_1.5-2.0_231108 Lab QC added	0960_QC301_231108	0960_QC401_231108	0960_QC302_231108
Sampling date / time				08-Nov-2023 15:24	08-Nov-2023 15:48	08-Nov-2023 17:14	08-Nov-2023 17:14	08-Nov-2023 17:16
Compound	CAS Number	LOR	Unit	EP2315731-006	EP2315731-007	EP2315731-008	EP2315731-009	EP2315731-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	248	203	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	248	203	----	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	4960	5280	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	39800	39300	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	869	1100	----	----	----
Magnesium	7439-95-4	1	mg/L	2620	2850	----	----	----
Sodium	7440-23-5	1	mg/L	21900	23400	----	----	----
Potassium	7440-09-7	1	mg/L	845	890	----	----	----
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	1230	1220	----	----	----
☐ Total Cations	----	0.01	meq/L	1230	1330	----	----	----
☐ Ionic Balance	----	0.01	%	0.09	4.21	----	----	----
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



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW140_1.5-2.0_231108	0960_MW181_1.5-2.0_231108 Lab QC added	0960_QC301_231108	0960_QC401_231108	0960_QC302_231108
Sampling date / time				08-Nov-2023 15:24	08-Nov-2023 15:48	08-Nov-2023 17:14	08-Nov-2023 17:14	08-Nov-2023 17:16
Compound	CAS Number	LOR	Unit	EP2315731-006	EP2315731-007	EP2315731-008	EP2315731-009	EP2315731-010
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
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



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW140_1.5-2.0_231108	0960_MW181_1.5-2.0_231108 Lab QC added	0960_QC301_231108	0960_QC401_231108	0960_QC302_231108
Sampling date / time				08-Nov-2023 15:24	08-Nov-2023 15:48	08-Nov-2023 17:14	08-Nov-2023 17:14	08-Nov-2023 17:16
Compound	CAS Number	LOR	Unit	EP2315731-006	EP2315731-007	EP2315731-008	EP2315731-009	EP2315731-010
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	%	104	101	97.4	93.8	99.8
13C8-PFOA	—	0.02	%	108	114	114	112	107



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_QC402_231108	0960_QC303_231108	0960_QC403_231108	0960_QC304_231108	0960_QC404_231108
Sampling date / time					08-Nov-2023 17:17	08-Nov-2023 17:21	08-Nov-2023 17:21	08-Nov-2023 17:22	08-Nov-2023 17:22
Compound	CAS Number	LOR	Unit	EP2315731-011	EP2315731-012	EP2315731-013	EP2315731-014	EP2315731-015	
				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	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_QC402_231108	0960_QC303_231108	0960_QC403_231108	0960_QC304_231108	0960_QC404_231108
Sampling date / time					08-Nov-2023 17:17	08-Nov-2023 17:21	08-Nov-2023 17:21	08-Nov-2023 17:22	08-Nov-2023 17:22
Compound	CAS Number	LOR	Unit	EP2315731-011	EP2315731-012	EP2315731-013	EP2315731-014	EP2315731-015	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<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	<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	%	105	95.9	90.1	101	98.1	
13C8-PFOA	---	0.02	%	114	107	110	115	112	



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315731	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 59784	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 15		
No. of samples analysed	: 15		



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

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Lab Technician	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5423588)									
EP2315731-003	0960_MW176_1.5-2.0_231 108	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	286	294	2.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	286	294	2.8	0% - 20%
EP2315732-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	744	742	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	744	742	0.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5421113)									
EP2315731-001	0960_MW175_4.0-4.5_231 108 Lab QC added	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	132	8.0	0% - 20%
EP2315741-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2750	2880	4.6	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5421114)									
EP2315731-001	0960_MW175_4.0-4.5_231 108 Lab QC added	ED045G: Chloride	16887-00-6	1	mg/L	1050	1040	1.0	0% - 20%
EP2315741-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	20900	20900	0.2	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5422865)									
EP2315731-001	0960_MW175_4.0-4.5_231 108 Lab QC added	ED093F: Calcium	7440-70-2	1	mg/L	55	63	13.3	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	198	201	1.2	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	561	565	0.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	33	34	0.0	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 5422865) - continued									
EP2315734-004	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	433	421	2.9	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1430	1380	4.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	11700	11200	4.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	427	414	3.1	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427305)									
EP2315731-001	0960_MW175_4.0-4.5_231 108 Lab QC added	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
EP2315732-008	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427307)									
EP2315732-001	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.92	0.93	0.0	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.13	0.14	8.5	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.10	0.11	11.5	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.12	0.13	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: 5427305)									
EP2315731-001	0960_MW175_4.0-4.5_231 108 Lab QC added	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 (PFTriDA)	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: 5427305) - continued									
EP2315732-008	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5427307)									
EP2315732-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	0.03	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.06	0.06	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.27	0.26	0.0	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.03	0.03	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427305)									
EP2315731-001	0960_MW175_4.0-4.5_231 108 Lab QC added	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
EP2315732-008	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427305) - continued									
EP2315732-008	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427307)									
EP2315732-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427305)									
EP2315731-001	0960_MW175_4.0-4.5_231 108 Lab QC added	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
EP2315732-008	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5427305) - continued									
EP2315732-008	Anonymous	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427307)									
EP2315732-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5427305)									
EP2315731-001	0960_MW175_4.0-4.5_231 108 Lab QC added	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
EP2315732-008	Anonymous	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
EP231P: PFAS Sums (QC Lot: 5427307)									
EP2315732-001	Anonymous	EP231X: Sum of PFAS	---	0.01	µg/L	1.66	1.69	1.8	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.05	1.07	1.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	---	0.01	µg/L	1.54	1.56	1.3	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5423588)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	<1	20 mg/L	115	85.1	126
				<1	200 mg/L	102	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421113)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.8	89.9	112
				<1	500 mg/L	96.2	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5421114)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	88.6	113
				<1	1000 mg/L	99.6	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5422865)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	105	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	106	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	102	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	108	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	96.5	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	88.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	92.2	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	99.1	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	100	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427307)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	107	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	110	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	99.0	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	106	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	96.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	91.7	53.0	142



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	107	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	111	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	105	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	102	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	112	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	114	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	134
EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	93.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	97.4	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427307)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	104	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	121	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	109	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	117	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	110	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	97.8	72.0	134
EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	102	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	99.8	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427305)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	117	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	121	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	85.7	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	91.0	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	92.5	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	106	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	121	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427307)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	133	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	119	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	92.5	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	105	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	110	62.2	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	98.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427305)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	109	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	97.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	97.3	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: 5427307)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	116	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	112	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	104	64.2	133
EP231P: PFAS Sums (QCLot: 5427305)								
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: 5427307)								
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**

Matrix Spike (MS) Report



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421113)							
EP2315731-001	0960_MW175_4.0-4.5_231108 Lab QC added	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	112	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5421114)							
EP2315731-001	0960_MW175_4.0-4.5_231108 Lab QC added	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305)							
EP2315731-007	0960_MW181_1.5-2.0_231108 Lab QC added	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	114	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	105	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	98.4	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	100	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	105	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	76.6	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427307)							
EP2315732-004	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	119	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	108	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	81.9	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	96.4	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	90.1	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	94.4	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305)							
EP2315731-007	0960_MW181_1.5-2.0_231108 Lab QC added	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	104	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	114	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	107	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	114	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	115	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	108	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	115	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	105	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	109	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.25 µg/L	82.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	108	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427307)							
EP2315732-004	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	109	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	112	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	96.2	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	99.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	110	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	98.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	107	71.0	134



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427307) - continued							
EP2315732-004	Anonymous	EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	100	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	102	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	93.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427305)							
EP2315731-007	0960_MW181_1.5-2.0_231108 Lab QC added	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	114	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	127	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	125	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	83.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	110	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	110	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427307)							
EP2315732-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	133	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	116	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	103	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	102	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427305)							
EP2315731-007	0960_MW181_1.5-2.0_231108 Lab QC added	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	109	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	104	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	105	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	75.4	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427307)							
EP2315732-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	104	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	108	64.0	140



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427307) - continued							
EP2315732-004	Anonymous	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	89.6	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	92.3	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315731	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth GW - SC	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 15
Order number	: pfas-omp Learmonth	No. of samples analysed	: 15

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.



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) 0960_MW175_4.0-4.5_231108 - Lab QC added, 0960_MW176_1.5-2.0_231108, 0960_MW179_3.2-3.7_231108, 0960_MW181_1.5-2.0_231108 - Lab QC added	0960_MW177_1.5-2.0_231108, 0960_MW137_2.5-3.0_231108, 0960_MW140_1.5-2.0_231108,	08-Nov-2023	---	---	---	20-Nov-2023	06-Dec-2023	✔
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) 0960_MW175_4.0-4.5_231108 - Lab QC added, 0960_MW176_1.5-2.0_231108, 0960_MW179_3.2-3.7_231108, 0960_MW181_1.5-2.0_231108 - Lab QC added	0960_MW177_1.5-2.0_231108, 0960_MW137_2.5-3.0_231108, 0960_MW140_1.5-2.0_231108,	08-Nov-2023	---	---	---	14-Nov-2023	15-Nov-2023	✔
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_QC301_231108, 0960_QC302_231108, 0960_QC303_231108, 0960_QC304_231108,	0960_QC401_231108, 0960_QC402_231108, 0960_QC403_231108, 0960_QC404_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW175_4.0-4.5_231108 - Lab QC added, 0960_MW176_1.5-2.0_231108, 0960_MW179_3.2-3.7_231108, 0960_MW181_1.5-2.0_231108 - Lab QC added	0960_MW177_1.5-2.0_231108, 0960_MW137_2.5-3.0_231108, 0960_MW140_1.5-2.0_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0960_QC301_231108, 0960_QC302_231108, 0960_QC303_231108, 0960_QC304_231108,	0960_QC401_231108, 0960_QC402_231108, 0960_QC403_231108, 0960_QC404_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW175_4.0-4.5_231108 - Lab QC added, 0960_MW176_1.5-2.0_231108, 0960_MW179_3.2-3.7_231108, 0960_MW181_1.5-2.0_231108 - Lab QC added	0960_MW177_1.5-2.0_231108, 0960_MW137_2.5-3.0_231108, 0960_MW140_1.5-2.0_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_QC301_231108, 0960_QC302_231108, 0960_QC303_231108, 0960_QC304_231108,	0960_QC401_231108, 0960_QC402_231108, 0960_QC403_231108, 0960_QC404_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW175_4.0-4.5_231108 - Lab QC added, 0960_MW176_1.5-2.0_231108, 0960_MW179_3.2-3.7_231108, 0960_MW181_1.5-2.0_231108 - Lab QC added	0960_MW177_1.5-2.0_231108, 0960_MW137_2.5-3.0_231108, 0960_MW140_1.5-2.0_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_QC301_231108, 0960_QC302_231108, 0960_QC303_231108, 0960_QC304_231108,	0960_QC401_231108, 0960_QC402_231108, 0960_QC403_231108, 0960_QC404_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW175_4.0-4.5_231108 - Lab QC added, 0960_MW176_1.5-2.0_231108, 0960_MW179_3.2-3.7_231108, 0960_MW181_1.5-2.0_231108 - Lab QC added	0960_MW177_1.5-2.0_231108, 0960_MW137_2.5-3.0_231108, 0960_MW140_1.5-2.0_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0960_QC301_231108, 0960_QC302_231108, 0960_QC303_231108, 0960_QC304_231108,	0960_QC401_231108, 0960_QC402_231108, 0960_QC403_231108, 0960_QC404_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW175_4.0-4.5_231108 - Lab QC added, 0960_MW176_1.5-2.0_231108, 0960_MW179_3.2-3.7_231108, 0960_MW181_1.5-2.0_231108 - Lab QC added	0960_MW177_1.5-2.0_231108, 0960_MW137_2.5-3.0_231108, 0960_MW140_1.5-2.0_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	40	7.50	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



ALS Compass

SAMPLING *Intelligence*



Environmental Division
Perth

Work Order Reference
EP2315732



Telephone: -- 61-8-9106 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PPASOMP-23 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 59789 59786 59787 59788 59784 59790
59820 59798 Samples: 59794 59792 59785

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time:

9/11/23

1220
10/11

Relinquished by:

Date / Time:

Received by:

Date / Time:



CHAIN OF CUSTODY

COC#: 59785

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth GW - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_MW144_3.0-3.5		08/11/2023 11:53 AM	WATER	ALS: 5 Non ALS: 0	No	X		
009	0960_MW178_2.0-2.5		08/11/2023 12:17 PM	WATER	ALS: 3 Non ALS: 0	No	X		
010	0960_MW134		08/11/2023 12:47 PM	WATER	ALS: 3 Non ALS: 0	No	X		
011	0960_MW135_2.5-3.0		08/11/2023 01:32 PM	WATER	ALS: 3 Non ALS: 0	No	X		
012	0960_MW141_3.0-3.5		08/11/2023 05:11 PM	WATER	ALS: 3 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

COC#: 59785 ALS Laboratory: EP Perth

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY139/19 B

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_MW168	Clear Plastic Bottle - Natural	125 mL	00071121128680	Green	No	
001	0960_MW168	HDPE (no PTFE)	20 mL	00351221020762	Grey	No	
001	0960_MW168	HDPE (no PTFE)	20 mL	00351221020935	Grey	No	
002	0960_MW113	Clear Plastic Bottle - Natural	125 mL	00071121128703	Green	No	
002	0960_MW113	HDPE (no PTFE)	20 mL	00351221020514	Grey	No	
002	0960_MW113	HDPE (no PTFE)	20 mL	00351221020527	Grey	No	
003	0960_QC120	HDPE (no PTFE)	20 mL	00351221020736	Grey	No	
003	0960_QC120	HDPE (no PTFE)	20 mL	00351221020583	Grey	No	
003	0960_QC120	Clear Plastic Bottle - Natural	125 mL	00070522075434	Green	No	
004	0960_MW112	HDPE (no PTFE)	20 mL	00350822019080	Grey	No	
004	0960_MW112	HDPE (no PTFE)	20 mL	00351221020635	Grey	No	
004	0960_MW112	HDPE (no PTFE)	20 mL	00351221020915	Grey	No	
004	0960_MW112	HDPE (no PTFE)	20 mL	00351221020679	Grey	No	
004	0960_MW112	Clear Plastic Bottle - Natural	125 mL	00071121128650	Green	No	
005	0960_MW127	Clear Plastic Bottle - Natural	125 mL	00070522075463	Green	No	
005	0960_MW127	HDPE (no PTFE)	20 mL	00351221020585	Grey	No	
005	0960_MW127	HDPE (no PTFE)	20 mL	00351221020619	Grey	No	
006	0960_MW122	HDPE (no PTFE)	20 mL	00351221020882	Grey	No	
006	0960_MW122	HDPE (no PTFE)	20 mL	00351221020426	Grey	No	
006	0960_MW122	Clear Plastic Bottle - Natural	125 mL	00071121128688	Green	No	
007	0960_MW143_3.0-3.5	Clear Plastic Bottle - Natural	125 mL	00070522075359	Green	No	
007	0960_MW143_3.0-3.5	HDPE (no PTFE)	20 mL	00351221020973	Grey	No	
007	0960_MW143_3.0-3.5	HDPE (no PTFE)	20 mL	00351221020978	Grey	No	
008	0960_MW144_3.0-3.5	HDPE (no PTFE)	20 mL	00351221020906	Grey	No	
008	0960_MW144_3.0-3.5	HDPE (no PTFE)	20 mL	00351221020434	Grey	No	
008	0960_MW144_3.0-3.5	Clear Plastic Bottle - Natural	125 mL	00070522075259	Green	No	



CHAIN OF CUSTODY

COC#: 59785

ALS Laboratory: EP Perth

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

Other comments:

008	0960_MW144_3.0-3.5	HDPE (no PTFE)	20 mL	00350822058879	Grey	No	
008	0960_MW144_3.0-3.5	HDPE (no PTFE)	20 mL	00350822058868	Grey	No	
009	0960_MW178_2.0-2.5	Clear Plastic Bottle - Natural	125 mL	00070522075502	Green	No	
009	0960_MW178_2.0-2.5	HDPE (no PTFE)	20 mL	00351221020815	Grey	No	
009	0960_MW178_2.0-2.5	HDPE (no PTFE)	20 mL	00351221020827	Grey	No	
010	0960_MW134	Clear Plastic Bottle - Natural	125 mL	00071121128665	Green	No	
010	0960_MW134	HDPE (no PTFE)	20 mL	00351221020756	Grey	No	
010	0960_MW134	HDPE (no PTFE)	20 mL	00351221020841	Grey	No	
011	0960_MW135_2.5-3.0	Clear Plastic Bottle - Natural	125 mL	00071121128587	Green	No	
011	0960_MW135_2.5-3.0	HDPE (no PTFE)	20 mL	00351221020494	Grey	No	
011	0960_MW135_2.5-3.0	HDPE (no PTFE)	20 mL	00351221020464	Grey	No	
012	0960_MW141_3.0-3.5	HDPE (no PTFE)	20 mL	00351221020785	Grey	No	
012	0960_MW141_3.0-3.5	HDPE (no PTFE)	20 mL	00351221020952	Grey	No	
012	0960_MW141_3.0-3.5	Clear Plastic Bottle - Natural	125 mL	00070522075391	Green	No	

Total Bottle Count: ALS: 40, Non ALS: 0



CHAIN OF CUSTODY

COC#: 59785

ALS Laboratory: EP Perth

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_MW168		08/11/2023 07:45 AM	WATER	ALS: 3 Non ALS: 0	No	X		
002	0960_MW113		08/11/2023 08:21 AM	WATER	ALS: 3 Non ALS: 0	No	X		
003	0960_QC120		08/11/2023 08:22 AM	WATER	ALS: 3 Non ALS: 0	No	X		
004	0960_MW112		08/11/2023 09:04 AM	WATER	ALS: 5 Non ALS: 0	No	X		
005	0960_MW127		08/11/2023 10:07 AM	WATER	ALS: 3 Non ALS: 0	No	X		
006	0960_MW122		08/11/2023 10:50 AM	WATER	ALS: 3 Non ALS: 0	No	X		
007	0960_MW143_3.0-3.5		08/11/2023 11:09 AM	WATER	ALS: 3 Non ALS: 0	No	X		



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2315732

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
Telephone :
Facsimile :

E-mail : ALSEnviro.Perth@alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_23
Order number : pfas-omp Learmonth
C-O-C number : 59785
Site : Learmonth GW - JS
Sampler :

Page : 1 of 2
Quote number : ES2022MWHAUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 10-Nov-2023 12:20
Client Requested Due : 21-Nov-2023
Date :

Issue Date : 13-Nov-2023
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 4
Receipt Detail :

Security Seal : Not Available
Temperature : 17.6 - Ice present
No. of samples received / analysed : 12 / 12

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EP2315732-007 : 08-Nov-2023 11:09 : 0960_MW143_3.0-3.5_231108
EP2315732-008 : 08-Nov-2023 11:53 : 0960_MW144_3.0-3.5_231108
EP2315732-009 : 08-Nov-2023 12:17 : 0960_MW178_2.0-2.5_231108
EP2315732-011 : 08-Nov-2023 13:32 : 0960_MW135_2.5-3.0_231108
EP2315732-012 : 08-Nov-2023 17:11 : 0960_MW141_3.0-3.5_231108

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 - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EP2315732-001	08-Nov-2023 07:45	0960_MW168_231108	✓	✓
EP2315732-002	08-Nov-2023 08:21	0960_MW113_231108	✓	✓
EP2315732-003	08-Nov-2023 08:22	0960_QC120_231108	✓	✓
EP2315732-004	08-Nov-2023 09:04	0960_MW112_231108	✓	✓
EP2315732-005	08-Nov-2023 10:07	0960_MW127_231108	✓	✓
EP2315732-006	08-Nov-2023 10:50	0960_MW122_231108	✓	✓
EP2315732-007	08-Nov-2023 11:09	0960_MW143_3.0-3.5_2...	✓	✓
EP2315732-008	08-Nov-2023 11:53	0960_MW144_3.0-3.5_2...	✓	✓
EP2315732-009	08-Nov-2023 12:17	0960_MW178_2.0-2.5_2...	✓	✓
EP2315732-010	08-Nov-2023 12:47	0960_MW134_231108	✓	✓
EP2315732-011	08-Nov-2023 13:32	0960_MW135_2.5-3.0_2...	✓	✓
EP2315732-012	08-Nov-2023 17:11	0960_MW141_3.0-3.5_2...	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

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



CERTIFICATE OF ANALYSIS

Work Order	: EP2315732	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023 12:20
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 13-Nov-2023
C-O-C number	: 59785	Issue Date	: 21-Nov-2023 22:34
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW168_231108	0960_MW113_231108	0960_QC120_231108	0960_MW112_231108	0960_MW127_231108
Sampling date / time				08-Nov-2023 07:45	08-Nov-2023 08:21	08-Nov-2023 08:22	08-Nov-2023 09:04	08-Nov-2023 10:07
Compound	CAS Number	LOR	Unit	EP2315732-001	EP2315732-002	EP2315732-003	EP2315732-004	EP2315732-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	704	428	429	744	152
Total Alkalinity as CaCO ₃	----	1	mg/L	704	428	429	744	152
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	622	298	288	1080	2380
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	3110	2990	3130	2860	24000
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	190	296	301	115	1310
Magnesium	7439-95-4	1	mg/L	176	194	197	123	1590
Sodium	7440-23-5	1	mg/L	2140	1790	1780	2180	14100
Potassium	7440-09-7	1	mg/L	71	47	46	73	357
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	115	99.1	103	118	730
☐ Total Cations	----	0.01	meq/L	119	110	110	112	819
☐ Ionic Balance	----	0.01	%	1.76	5.12	3.28	2.37	5.75
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.10	<0.02	<0.02	0.03	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.12	<0.02	<0.02	0.04	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.92	<0.01	<0.01	0.42	<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	0.13	<0.01	<0.01	0.56	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW168_231108	0960_MW113_231108	0960_QC120_231108	0960_MW112_231108	0960_MW127_231108
Sampling date / time				08-Nov-2023 07:45	08-Nov-2023 08:21	08-Nov-2023 08:22	08-Nov-2023 09:04	08-Nov-2023 10:07
Compound	CAS Number	LOR	Unit	EP2315732-001	EP2315732-002	EP2315732-003	EP2315732-004	EP2315732-005
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	---	0.01	µg/L	1.66	<0.01	<0.01	1.14	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.05	<0.01	<0.01	0.98	<0.01
Sum of PFAS (WA DER List)	---	0.01	µg/L	1.54	<0.01	<0.01	1.10	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	94.7	97.4	98.8	99.4	102
13C8-PFOA	---	0.02	%	110	108	110	114	106



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW122_231108	0960_MW143_3.0-3.5_231108	0960_MW144_3.0-3.5_231108	0960_MW178_2.0-2.5_231108	0960_MW134_231108
Sampling date / time				08-Nov-2023 10:50	08-Nov-2023 11:09	08-Nov-2023 11:53	08-Nov-2023 12:17	08-Nov-2023 12:47
Compound	CAS Number	LOR	Unit	EP2315732-006	EP2315732-007	EP2315732-008	EP2315732-009	EP2315732-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	370	150	181	124	196
Total Alkalinity as CaCO ₃	---	1	mg/L	370	150	181	124	196
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	2040	4310	2900	4860	3010
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	14200	29500	11300	31900	20700
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	618	1090	908	1220	677
Magnesium	7439-95-4	1	mg/L	942	2230	895	2450	1460
Sodium	7440-23-5	1	mg/L	9670	18500	7020	20700	13400
Potassium	7440-09-7	1	mg/L	352	705	319	773	526
EN055: Ionic Balance								
• Total Anions	---	0.01	meq/L	450	925	383	1000	650
• Total Cations	---	0.01	meq/L	538	1060	432	1180	750
• Ionic Balance	---	0.01	%	8.86	6.84	6.10	8.20	7.12
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



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW122_231108	0960_MW143_3.0-3.5_231108	0960_MW144_3.0-3.5_231108	0960_MW178_2.0-2.5_231108	0960_MW134_231108
Sampling date / time					08-Nov-2023 10:50	08-Nov-2023 11:09	08-Nov-2023 11:53	08-Nov-2023 12:17	08-Nov-2023 12:47
Compound	CAS Number	LOR	Unit	EP2315732-006	EP2315732-007	EP2315732-008	EP2315732-009	EP2315732-010	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	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	%	105	92.6	90.6	105	104	
13C8-PFOA	---	0.02	%	105	103	109	110	110	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW135_2.5-3.0_231108	0960_MW141_3.0-3.5_231108	----	----	----
Sampling date / time				08-Nov-2023 13:32	08-Nov-2023 17:11	----	----	----
Compound	CAS Number	LOR	Unit	EP2315732-011	EP2315732-012	-----	-----	-----
				Result	Result	—	—	—
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	241	293	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	241	293	----	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	1700	1790	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	10800	11700	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	404	463	----	----	----
Magnesium	7439-95-4	1	mg/L	836	937	----	----	----
Sodium	7440-23-5	1	mg/L	7010	7420	----	----	----
Potassium	7440-09-7	1	mg/L	262	280	----	----	----
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	345	373	----	----	----
∅ Total Cations	----	0.01	meq/L	400	430	----	----	----
∅ Ionic Balance	----	0.01	%	7.47	7.09	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW135_2.5-3.0_231108	0960_MW141_3.0-3.5_231108	----	----	----
				Sampling date / time	08-Nov-2023 13:32	08-Nov-2023 17:11	----	----	----
Compound	CAS Number	LOR	Unit	EP2315732-011	EP2315732-012	-----	-----	-----	
				Result	Result	—	—	—	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	95.9	99.6	----	----	----	
13C8-PFOA	----	0.02	%	111	107	----	----	----	



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315732	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 13-Nov-2023
C-O-C number	: 59785	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5423588)									
EP2315731-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	286	294	2.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	286	294	2.8	0% - 20%
EP2315732-004	0960_MW112_231108	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	744	742	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	744	742	0.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5421115)									
EP2315732-001	0960_MW168_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	622	603	3.0	0% - 20%
EP2315732-011	0960_MW135_2.5-3.0_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1700	1660	1.8	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5421116)									
EP2315732-001	0960_MW168_231108	ED045G: Chloride	16887-00-6	1	mg/L	3110	3130	0.6	0% - 20%
EP2315732-011	0960_MW135_2.5-3.0_231108	ED045G: Chloride	16887-00-6	1	mg/L	10800	11000	1.8	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5420832)									
EP2315732-001	0960_MW168_231108	ED093F: Calcium	7440-70-2	1	mg/L	190	186	2.1	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	176	170	3.8	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2140	2100	2.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	71	69	2.8	0% - 20%
EP2315732-011	0960_MW135_2.5-3.0_231108	ED093F: Calcium	7440-70-2	1	mg/L	404	456	12.1	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 (%)
ED093F: Dissolved Major Cations (QC Lot: 5420832) - continued									
EP2315732-011	0960_MW135_2.5-3.0_231108	ED093F: Magnesium	7439-95-4	1	mg/L	836	903	7.7	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	7010	7560	7.6	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	262	277	5.8	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427305)									
EP2315731-001	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<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
EP2315732-008	0960_MW144_3.0-3.5_231108	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427307)									
EP2315732-001	0960_MW168_231108	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.92	0.93	0.0	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.13	0.14	8.5	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.10	0.11	11.5	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.12	0.13	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: 5427305)									
EP2315731-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTriDA)	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: 5427305) - continued									
EP2315732-008	0960_MW144_3.0-3.5_231108	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5427307)									
EP2315732-001	0960_MW168_231108	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	0.03	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.06	0.06	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.27	0.26	0.0	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.03	0.03	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427305)									
EP2315731-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427305) - continued									
EP2315732-008	0960_MW144_3.0-3.5_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427307)									
EP2315732-001	0960_MW168_231108	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: 5427305)									
EP2315731-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315732-008	0960_MW144_3.0-3.5_231108	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



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: 5427305) - continued									
EP2315732-008	0960_MW144_3.0-3.5_231108	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427307)									
EP2315732-001	0960_MW168_231108	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: 5427305)									
EP2315731-001	Anonymous	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
EP2315732-008	0960_MW144_3.0-3.5_231108	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
EP231P: PFAS Sums (QC Lot: 5427307)									
EP2315732-001	0960_MW168_231108	EP231X: Sum of PFAS	----	0.01	µg/L	1.66	1.69	1.8	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.05	1.07	1.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	1.54	1.56	1.3	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5423588)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	115	85.1	126
				<1	200 mg/L	102	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421115)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	97.6	89.9	112
				<1	500 mg/L	98.7	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5421116)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	88.6	113
				<1	1000 mg/L	96.6	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5420832)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	106	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	104	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	105	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	108	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	96.5	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	88.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	92.2	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	99.1	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	100	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427307)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	107	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	110	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	99.0	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	106	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	96.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	91.7	53.0	142



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	107	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	111	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	105	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	102	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	112	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	114	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	134
EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	93.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	97.4	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427307)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	104	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	121	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	109	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	117	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	110	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	97.8	72.0	134
EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	102	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	99.8	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427305)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	117	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	121	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	85.7	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	91.0	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	92.5	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	106	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	121	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit					
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427307)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	133	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	119	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	92.5	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	105	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	110	62.2	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	98.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427305)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	109	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	97.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	97.3	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: 5427307)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	116	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	112	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	104	64.2	133
EP231P: PFAS Sums (QCLot: 5427305)								
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: 5427307)								
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**

Matrix Spike (MS) Report



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421115)							
EP2315732-001	0960_MW168_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5421116)							
EP2315732-001	0960_MW168_231108	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	114	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	105	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	98.4	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	100	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	105	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	76.6	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427307)							
EP2315732-004	0960_MW112_231108	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	119	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	108	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	81.9	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	96.4	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	90.1	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	94.4	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	104	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	114	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	107	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	114	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	115	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	108	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	115	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	105	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	109	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	82.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	108	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427307)							
EP2315732-004	0960_MW112_231108	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	109	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	112	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	96.2	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	99.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	110	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	98.8	69.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427307) - continued							
EP2315732-004	0960_MW112_231108	EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	107	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	100	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	102	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	93.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	114	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	127	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	125	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	83.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	110	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	110	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427307)							
EP2315732-004	0960_MW112_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	133	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	116	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	103	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	102	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	109	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	104	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	105	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	75.4	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427307)							
EP2315732-004	0960_MW112_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	104	63.0	143



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427307) - continued							
EP2315732-004	0960_MW112_231108	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	89.6	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	92.3	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315732	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth GW - JS	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 12
Order number	: pfas-omp Learmonth	No. of samples analysed	: 12

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2315732--001	0960_MW168_231108	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	EP2315732--001	0960_MW168_231108	Chloride	16887-00-6	Not Determined	—	MS recovery not determined, background level greater than or equal to 4x spike level.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMS/MS	EP231X	3	40	7.50	10.00	NEPM 2013 B3 & ALS QC Standard

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

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
0960_MW168_231108,	0960_MW113_231108,	08-Nov-2023	----	---	16-Nov-2023	22-Nov-2023	✓
0960_QC120_231108,	0960_MW112_231108,						
0960_MW127_231108,	0960_MW122_231108,						
0960_MW143_3.0-3.5_231108,	0960_MW144_3.0-3.5_231108,						
0960_MW178_2.0-2.5_231108,	0960_MW134_231108,						
0960_MW135_2.5-3.0_231108,	0960_MW141_3.0-3.5_231108						



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) 0960_MW168_231108, 0960_QC120_231108, 0960_MW127_231108, 0960_MW143_3.0-3.5_231108, 0960_MW178_2.0-2.5_231108, 0960_MW135_2.5-3.0_231108,	0960_MW113_231108, 0960_MW112_231108, 0960_MW122_231108, 0960_MW144_3.0-3.5_231108, 0960_MW134_231108, 0960_MW141_3.0-3.5_231108	08-Nov-2023	---	---	---	21-Nov-2023	06-Dec-2023	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) 0960_MW168_231108, 0960_QC120_231108, 0960_MW127_231108, 0960_MW143_3.0-3.5_231108, 0960_MW178_2.0-2.5_231108, 0960_MW135_2.5-3.0_231108,	0960_MW113_231108, 0960_MW112_231108, 0960_MW122_231108, 0960_MW144_3.0-3.5_231108, 0960_MW134_231108, 0960_MW141_3.0-3.5_231108	08-Nov-2023	---	---	---	21-Nov-2023	06-Dec-2023	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) 0960_MW168_231108, 0960_QC120_231108, 0960_MW127_231108, 0960_MW143_3.0-3.5_231108, 0960_MW178_2.0-2.5_231108, 0960_MW135_2.5-3.0_231108,	0960_MW113_231108, 0960_MW112_231108, 0960_MW122_231108, 0960_MW144_3.0-3.5_231108, 0960_MW134_231108, 0960_MW141_3.0-3.5_231108	08-Nov-2023	---	---	---	13-Nov-2023	15-Nov-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW168_231108, 0960_QC120_231108, 0960_MW127_231108,	0960_MW113_231108, 0960_MW112_231108, 0960_MW122_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓
HDPE (no PTFE) (EP231X) 0960_MW143_3.0-3.5_231108, 0960_MW178_2.0-2.5_231108, 0960_MW135_2.5-3.0_231108,	0960_MW144_3.0-3.5_231108, 0960_MW134_231108, 0960_MW141_3.0-3.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	17-Nov-2023	06-May-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0960_MW168_231108, 0960_QC120_231108, 0960_MW127_231108,	0960_MW113_231108, 0960_MW112_231108, 0960_MW122_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓
HDPE (no PTFE) (EP231X) 0960_MW143_3.0-3.5_231108, 0960_MW178_2.0-2.5_231108, 0960_MW135_2.5-3.0_231108,	0960_MW144_3.0-3.5_231108, 0960_MW134_231108, 0960_MW141_3.0-3.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	17-Nov-2023	06-May-2024	✓

Page : 4 of 6
 Work Order : EP2315732
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_23



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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_MW168_231108, 0960_QC120_231108, 0960_MW127_231108,	0960_MW113_231108, 0960_MW112_231108, 0960_MW122_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW143_3.0-3.5_231108, 0960_MW178_2.0-2.5_231108, 0960_MW135_2.5-3.0_231108,	0960_MW144_3.0-3.5_231108, 0960_MW134_231108, 0960_MW141_3.0-3.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW168_231108, 0960_QC120_231108, 0960_MW127_231108,	0960_MW113_231108, 0960_MW112_231108, 0960_MW122_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW143_3.0-3.5_231108, 0960_MW178_2.0-2.5_231108, 0960_MW135_2.5-3.0_231108,	0960_MW144_3.0-3.5_231108, 0960_MW134_231108, 0960_MW141_3.0-3.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0960_MW168_231108, 0960_QC120_231108, 0960_MW127_231108,	0960_MW113_231108, 0960_MW112_231108, 0960_MW122_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW143_3.0-3.5_231108, 0960_MW178_2.0-2.5_231108, 0960_MW135_2.5-3.0_231108,	0960_MW144_3.0-3.5_231108, 0960_MW134_231108, 0960_MW141_3.0-3.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	40	7.50	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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.



ALSCompass

SAMPLING *Intelligence*



Environmental Division
Perth

Work Order Reference
EP2315733



Telephone : - 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASDMP-23 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 59789-59786 59787 59788 59789 59790

Samples: 59794 59792 59785

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time: 9/11/23

Date / Time:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass



CHAIN OF CUSTODY

(ALS) COC#: 59786

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_MW021		08/11/2023 07:54 AM	WATER	ALS: 3 Non ALS: 0	No	X		
002	0960_QC116		08/11/2023 07:55 AM	WATER	ALS: 2 Non ALS: 0	No	Partial 1/2		
003	0960_MW018		08/11/2023 08:19 AM	WATER	ALS: 3 Non ALS: 0	No	X		
004	0960_QC116		08/11/2023 08:20 AM	WATER	ALS: 2 Non ALS: 0	No	Partial 1/2		
005	0960_MW211		08/11/2023 08:49 AM	WATER	ALS: 3 Non ALS: 0	No	X		
006	0960_QC121		08/11/2023 08:50 AM	WATER	ALS: 2 Non ALS: 0	No	Partial 1/2		
007	0960_MW164		08/11/2023 09:32 AM	WATER	ALS: 3 Non ALS: 0	No	X		



RECEIVED BY:

DATE TIME:

EMAIL INVOICES TO:

/ ES2022MWHAS0002

Other comments:

**CHAIN OF CUSTODY**

COC#: 59786

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
015	0960_MW167		08/11/2023 11:32 AM	WATER	ALS: 3 Non ALS: 0	No	X		
016	0960_MW115		08/11/2023 11:43 AM	WATER	ALS: 3 Non ALS: 0	No	X		
017	0960_MW146_7.0-7.5		08/11/2023 12:22 PM	WATER	ALS: 3 Non ALS: 0	No	X		
018	0960_MW145_5.0-5.5		08/11/2023 12:40 PM	WATER	ALS: 3 Non ALS: 0	No	X		
019	0960_MW180_3.5-4.0		08/11/2023 01:03 PM	WATER	ALS: 3 Non ALS: 0	No	X		
020	0960_MW147_5.0-5.5		08/11/2023 04:13 PM	WATER	ALS: 3 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

COC#: 59786

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO

EMAIL INVOICES TO

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	PARTIAL ANALYSIS GROUP NAME	MATRIX	SELECTED ANALYSIS NAME
002	0960_QC116	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (28 analytes)
004	0960_QC116	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (28 analytes)
006	0960_QC121	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (28 analytes)
008	0960_QC125	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (28 analytes)

**CHAIN OF CUSTODY**

(ALS) COC#: 59786

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_MW021	HDPE (no PTFE)	20 mL	00350821001863	Grey	No	
001	0960_MW021	HDPE (no PTFE)	20 mL	00350821001701	Grey	No	
001	0960_MW021	Clear Plastic Bottle - Natural	125 mL	00070522162821	Green	No	
002	0960_QC116	HDPE (no PTFE)	20 mL	00351221020622	Grey	No	
002	0960_QC116	HDPE (no PTFE)	20 mL	00351221020634	Grey	No	
003	0960_MW018	Clear Plastic Bottle - Natural	125 mL	00070522145000	Green	No	
003	0960_MW018	HDPE (no PTFE)	20 mL	00350821001720	Grey	No	
003	0960_MW018	HDPE (no PTFE)	20 mL	00350821001757	Grey	No	
004	0960_QC116	HDPE (no PTFE)	20 mL	00351221020903	Grey	No	
004	0960_QC116	HDPE (no PTFE)	20 mL	00351221020796	Grey	No	
005	0960_MW211	HDPE (no PTFE)	20 mL	00350822000408	Grey	No	
005	0960_MW211	HDPE (no PTFE)	20 mL	00350822000439	Grey	No	
005	0960_MW211	Clear Plastic Bottle - Natural	125 mL	00071121129744	Green	No	
006	0960_QC121	HDPE (no PTFE)	20 mL	00351221020606	Grey	No	
006	0960_QC121	HDPE (no PTFE)	20 mL	00351221020653	Grey	No	
007	0960_MW164	HDPE (no PTFE)	20 mL	00350821001696	Grey	No	
007	0960_MW164	HDPE (no PTFE)	20 mL	00350821001833	Grey	No	
007	0960_MW164	Clear Plastic Bottle - Natural	125 mL	00070522145091	Green	No	
008	0960_QC125	HDPE (no PTFE)	20 mL	00351221020859	Grey	No	
008	0960_QC125	HDPE (no PTFE)	20 mL	00351221020454	Grey	No	
009	0960_MW163	HDPE (no PTFE)	20 mL	00350822000489	Grey	No	
009	0960_MW163	HDPE (no PTFE)	20 mL	00350822000426	Grey	No	
009	0960_MW163	Clear Plastic Bottle - Natural	125 mL	00071121129662	Green	No	
010	0960_MW233	Clear Plastic Bottle - Natural	125 mL	00070522144962	Green	No	
010	0960_MW233	HDPE (no PTFE)	20 mL	00350821001709	Grey	No	
010	0960_MW233	HDPE (no PTFE)	20 mL	00350821001862	Grey	No	



CHAIN OF CUSTODY

ALS COC#: 59786

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

011	0960_MW162	Clear Plastic Bottle - Natural	125 mL	00070522145140	Green	No	
011	0960_MW162	HDPE (no PTFE)	20 mL	00350821001733	Grey	No	
011	0960_MW162	HDPE (no PTFE)	20 mL	00350821001930	Grey	No	
012	0960_MW114	HDPE (no PTFE)	20 mL	00350821001878	Grey	No	
012	0960_MW114	HDPE (no PTFE)	20 mL	00350821001770	Grey	No	
012	0960_MW114	Clear Plastic Bottle - Natural	125 mL	00070522162825	Green	No	
013	0960_MW165	HDPE (no PTFE)	20 mL	00350821001964	Grey	No	
013	0960_MW165	Clear Plastic Bottle - Natural	125 mL	00070522144876	Green	No	
013	0960_MW165	HDPE (no PTFE)	20 mL	00350821001693	Grey	No	
014	0960_MW166	HDPE (no PTFE)	20 mL	00350821001886	Grey	No	
014	0960_MW166	HDPE (no PTFE)	20 mL	00350821001886	Grey	No	
014	0960_MW166	Clear Plastic Bottle - Natural	125 mL	00070522145165	Green	No	
015	0960_MW167	HDPE (no PTFE)	20 mL	00350821001803	Grey	No	
015	0960_MW167	HDPE (no PTFE)	20 mL	00350821001759	Grey	No	
015	0960_MW167	Clear Plastic Bottle - Natural	125 mL	00070522145059	Green	No	
016	0960_MW115	HDPE (no PTFE)	20 mL	00350522042700	Grey	No	
016	0960_MW115	HDPE (no PTFE)	20 mL	00350522042821	Grey	No	
016	0960_MW115	Clear Plastic Bottle - Natural	125 mL	00070522145012	Green	No	
017	0960_MW146_7.0-7.5	HDPE (no PTFE)	20 mL	00350821001859	Grey	No	
017	0960_MW146_7.0-7.5	HDPE (no PTFE)	20 mL	00350821001847	Grey	No	
017	0960_MW146_7.0-7.5	Clear Plastic Bottle - Natural	125 mL	00070522162803	Green	No	
018	0960_MW145_5.0-5.5	HDPE (no PTFE)	20 mL	00350522043137	Grey	No	
018	0960_MW145_5.0-5.5	HDPE (no PTFE)	20 mL	00350522043034	Grey	No	
018	0960_MW145_5.0-5.5	Clear Plastic Bottle - Natural	125 mL	00070522162837	Green	No	
019	0960_MW180_3.5-4.0	HDPE (no PTFE)	20 mL	00350822000405	Grey	No	
019	0960_MW180_3.5-4.0	HDPE (no PTFE)	20 mL	00350822000475	Grey	No	
019	0960_MW180_3.5-4.0	Clear Plastic Bottle - Natural	125 mL	00071121129696	Green	No	



CHAIN OF CUSTODY

ALS COC#: 59786

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

020	0960_MW147_5.0-5.5	HDPE (no PTFE)	20 mL	00350822007960	Grey	No	
020	0960_MW147_5.0-5.5	HDPE (no PTFE)	20 mL	00350822007925	Grey	No	
020	0960_MW147_5.0-5.5	Clear Plastic Bottle - Natural	125 mL	00070522068804	Green	No	

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



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2315733**

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

Laboratory : **Environmental Division Perth**
Contact : **Customer Services EP**
Address : **26 Rigali Way Wangara WA Australia
6065**

E-mail : **[REDACTED]@stantec.com**
Telephone : **----**
Facsimile : **----**

E-mail : **ALSEnviro.Perth@alsglobal.com**
Telephone : **+61-8-9406 1301**
Facsimile : **+61-8-9406 1399**

Project : **WA_0960_PFASOMP_23**
Order number : **pfas-omp Learmonth**
C-O-C number : **59786**
Site : **Learmonth GW - CG**
Sampler : **[REDACTED] [REDACTED]**

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

Dates

Date Samples Received : **10-Nov-2023 12:20**
Client Requested Due : **21-Nov-2023**
Date

Issue Date : **13-Nov-2023**
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **4**
Receipt Detail :

Security Seal : **Not Available**
Temperature : **17.6 - Ice present**
No. of samples received / analysed : **20 / 20**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EP2315733-017 : 08-Nov-2023 12:22 : 0960_MW146_7.0-7.5_231108
EP2315733-018 : 08-Nov-2023 12:40 : 0960_MW145_5.0-5.5_231108
EP2315733-019 : 08-Nov-2023 13:03 : 0960_MW180_3.5-4.0_231108
EP2315733-020 : 08-Nov-2023 16:13 : 0960_MW147_5.0-5.5_231108

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 - NT-01 & 02 Ca, Mg, Na, K, Cl, SO ₄ , Alkalinity
EP2315733-001	08-Nov-2023 07:54	0960_MW021_231108	✓	✓
EP2315733-002	08-Nov-2023 07:55	0960_QC116_231108	✓	
EP2315733-003	08-Nov-2023 08:19	0960_MW018_231108	✓	✓
EP2315733-004	08-Nov-2023 08:20	0960_QC117_231108	✓	
EP2315733-005	08-Nov-2023 08:49	0960_MW211_231108	✓	✓
EP2315733-006	08-Nov-2023 08:50	0960_QC121_231108	✓	
EP2315733-007	08-Nov-2023 09:32	0960_MW164_231108	✓	✓
EP2315733-008	08-Nov-2023 09:33	0960_QC125_231108	✓	
EP2315733-009	08-Nov-2023 09:45	0960_MW163_231108	✓	✓
EP2315733-010	08-Nov-2023 10:02	0960_MW233_231108	✓	✓
EP2315733-011	08-Nov-2023 10:17	0960_MW162_231108	✓	✓
EP2315733-012	08-Nov-2023 10:54	0960_MW114_231108	✓	✓
EP2315733-013	08-Nov-2023 11:11	0960_MW165_231108	✓	✓
EP2315733-014	08-Nov-2023 11:20	0960_MW166_231108	✓	✓
EP2315733-015	08-Nov-2023 11:32	0960_MW167_231108	✓	✓
EP2315733-016	08-Nov-2023 11:43	0960_MW115_231108	✓	✓
EP2315733-017	08-Nov-2023 12:22	0960_MW146_7.0-7.5_2...	✓	✓
EP2315733-018	08-Nov-2023 12:40	0960_MW145_5.0-5.5_2...	✓	✓
EP2315733-019	08-Nov-2023 13:03	0960_MW180_3.5-4.0_2...	✓	✓
EP2315733-020	08-Nov-2023 16:13	0960_MW147_5.0-5.5_2...	✓	✓

Proactive Holding Time Report

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



CERTIFICATE OF ANALYSIS

Work Order	: EP2315733	Page	: 1 of 15
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023 12:20
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 13-Nov-2023
C-O-C number	: 59786	Issue Date	: 21-Nov-2023 16:12
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 20		
No. of samples analysed	: 20		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW021_231108	0960_QC116_231108	0960_MW018_231108	0960_QC117_231108	0960_MW211_231108
Sampling date / time				08-Nov-2023 07:54	08-Nov-2023 07:55	08-Nov-2023 08:19	08-Nov-2023 08:20	08-Nov-2023 08:49
Compound	CAS Number	LOR	Unit	EP2315733-001	EP2315733-002	EP2315733-003	EP2315733-004	EP2315733-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	<1	----	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	91	----	99	----	81
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	981	----	926	----	638
Total Alkalinity as CaCO ₃	----	1	mg/L	1070	----	1020	----	719
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	81	----	125	----	61
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	325	----	240	----	116
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	13	----	12	----	5
Magnesium	7439-95-4	1	mg/L	13	----	11	----	6
Sodium	7440-23-5	1	mg/L	724	----	640	----	423
Potassium	7440-09-7	1	mg/L	16	----	15	----	12
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	32.2	----	29.8	----	18.9
☐ Total Cations	----	0.01	meq/L	33.6	----	29.7	----	19.4
☐ Ionic Balance	----	0.01	%	2.11	----	0.04	----	1.41
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.13	0.18	0.07	0.08	0.10
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.15	0.17	0.08	0.10	0.08
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.98	1.06	0.93	0.97	0.66
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	0.03	0.04	0.04	0.03
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.68	0.85	0.51	0.56	6.71
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02

EP231D: (n:2) Fluorotelomer Sulfonic Acids



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW021_231108	0960_QC116_231108	0960_MW018_231108	0960_QC117_231108	0960_MW211_231108
Sampling date / time					08-Nov-2023 07:54	08-Nov-2023 07:55	08-Nov-2023 08:19	08-Nov-2023 08:20	08-Nov-2023 08:49
Compound	CAS Number	LOR	Unit	EP2315733-001	EP2315733-002	EP2315733-003	EP2315733-004	EP2315733-005	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	---	0.01	µg/L	2.34	2.70	9.50	8.27	8.19	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.66	1.91	1.44	1.53	7.37	
Sum of PFAS (WA DER List)	---	0.01	µg/L	2.17	2.50	9.38	8.13	8.08	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	93.7	93.1	95.5	97.4	101	
13C8-PFOA	---	0.02	%	108	102	105	105	108	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_QC121_231108	0960_MW164_231108	0960_QC125_231108	0960_MW163_231108	0960_MW233_231108
Sampling date / time				08-Nov-2023 08:50	08-Nov-2023 09:32	08-Nov-2023 09:33	08-Nov-2023 09:45	08-Nov-2023 10:02
Compound	CAS Number	LOR	Unit	EP2315733-006	EP2315733-007	EP2315733-008	EP2315733-009	EP2315733-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	----	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	140	----	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	859	----	432	389
Total Alkalinity as CaCO3	----	1	mg/L	----	1000	----	432	389
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	212	----	443	472
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	1240	----	2840	3150
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	18	----	182	182
Magnesium	7439-95-4	1	mg/L	----	45	----	171	205
Sodium	7440-23-5	1	mg/L	----	1300	----	1940	2120
Potassium	7440-09-7	1	mg/L	----	34	----	76	88
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	----	59.4	----	98.0	106
☐ Total Cations	----	0.01	meq/L	----	62.0	----	109	120
☐ Ionic Balance	----	0.01	%	----	2.18	----	5.55	6.15
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.10	0.09	0.10	0.10	1.44
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.08	0.10	0.10	0.13	3.48
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.65	0.76	0.78	1.12	26.5
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.03	0.04	0.04	0.06	2.10
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	6.96	1.18	1.32	0.42	8.41
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02

EP231D: (n:2) Fluorotelomer Sulfonic Acids



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_QC121_231108	0960_MW164_231108	0960_QC125_231108	0960_MW163_231108	0960_MW233_231108
Sampling date / time					08-Nov-2023 08:50	08-Nov-2023 09:32	08-Nov-2023 09:33	08-Nov-2023 09:45	08-Nov-2023 10:02
Compound	CAS Number	LOR	Unit	EP2315733-006	EP2315733-007	EP2315733-008	EP2315733-009	EP2315733-010	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	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	0.52	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	---	0.01	µg/L	8.43	2.51	2.68	2.25	49.5	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	7.61	1.94	2.10	1.54	34.9	
Sum of PFAS (WA DER List)	---	0.01	µg/L	8.32	2.37	2.54	2.06	43.9	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	100	80.2	98.0	98.6	93.2	
13C8-PFOA	---	0.02	%	111	91.7	98.6	103	106	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW162_231108	0960_MW114_231108	0960_MW165_231108	0960_MW166_231108	0960_MW167_231108
Sampling date / time				08-Nov-2023 10:17	08-Nov-2023 10:54	08-Nov-2023 11:11	08-Nov-2023 11:20	08-Nov-2023 11:32
Compound	CAS Number	LOR	Unit	EP2315733-011	EP2315733-012	EP2315733-013	EP2315733-014	EP2315733-015
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	78	86	29
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	478	433	703	861	929
Total Alkalinity as CaCO ₃	----	1	mg/L	478	433	781	946	958
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	363	204	31	94	361
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	3350	2220	242	363	924
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	233	180	12	10	41
Magnesium	7439-95-4	1	mg/L	231	129	10	9	36
Sodium	7440-23-5	1	mg/L	2200	1590	537	630	1130
Potassium	7440-09-7	1	mg/L	98	40	14	18	31
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	112	75.5	23.1	31.1	52.7
☐ Total Cations	----	0.01	meq/L	129	89.8	25.1	29.1	55.0
☐ Ionic Balance	----	0.01	%	7.17	8.63	4.28	3.31	2.07
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.42	<0.02	<0.02	0.04	0.03
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.51	<0.02	<0.02	0.04	0.05
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	3.36	<0.01	<0.01	0.26	0.57
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.05	<0.02	<0.02	<0.02	0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.32	<0.01	0.01	0.29	0.67
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW162_231108	0960_MW114_231108	0960_MW165_231108	0960_MW166_231108	0960_MW167_231108
Sampling date / time					08-Nov-2023 10:17	08-Nov-2023 10:54	08-Nov-2023 11:11	08-Nov-2023 11:20	08-Nov-2023 11:32
Compound	CAS Number	LOR	Unit	EP2315733-011	EP2315733-012	EP2315733-013	EP2315733-014	EP2315733-015	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.2	<0.1	<0.1	0.2	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.26	<0.02	<0.02	0.28	0.10	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.01	<0.02	<0.02	0.25	0.20	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.10	<0.02	<0.02	0.23	0.12	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.10	<0.01	<0.01	0.17	0.19	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	0.02	0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
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									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW162_231108	0960_MW114_231108	0960_MW165_231108	0960_MW166_231108	0960_MW167_231108
Sampling date / time				08-Nov-2023 10:17	08-Nov-2023 10:54	08-Nov-2023 11:11	08-Nov-2023 11:20	08-Nov-2023 11:32
Compound	CAS Number	LOR	Unit	EP2315733-011	EP2315733-012	EP2315733-013	EP2315733-014	EP2315733-015
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
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	6.33	<0.01	0.01	1.78	1.97
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	3.68	<0.01	0.01	0.55	1.24
Sum of PFAS (WA DER List)	---	0.01	µg/L	5.77	<0.01	0.01	1.72	1.88
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	104	110	88.6	90.4	94.5
13C8-PFOA	---	0.02	%	113	107	104	105	116



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW115_231108	0960_MW146_7.0-7.5_231108	0960_MW145_5.0-5.5_231108	0960_MW180_3.5-4.0_231108	0960_MW147_5.0-5.5_231108
Sampling date / time				08-Nov-2023 11:43	08-Nov-2023 12:22	08-Nov-2023 12:40	08-Nov-2023 13:03	08-Nov-2023 16:13
Compound	CAS Number	LOR	Unit	EP2315733-016	EP2315733-017	EP2315733-018	EP2315733-019	EP2315733-020
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	368	104	166	202	131
Total Alkalinity as CaCO ₃	---	1	mg/L	368	104	166	202	131
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	1680	4860	4280	4350	5110
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	11100	34000	32600	34800	37200
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	615	1070	955	868	1170
Magnesium	7439-95-4	1	mg/L	714	2360	2420	2430	2800
Sodium	7440-23-5	1	mg/L	6770	20700	20700	20300	23600
Potassium	7440-09-7	1	mg/L	199	760	760	747	868
EN055: Ionic Balance								
• Total Anions	---	0.01	meq/L	355	1060	1010	1080	1160
• Total Cations	---	0.01	meq/L	389	1170	1170	1140	1340
• Ionic Balance	---	0.01	%	4.51	4.71	7.10	3.11	7.18
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.25	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.23	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	1.46	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.40	<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

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW115_231108	0960_MW146_7.0-7.5_231108	0960_MW145_5.0-5.5_231108	0960_MW180_3.5-4.0_231108	0960_MW147_5.0-5.5_231108
Sampling date / time				08-Nov-2023 11:43	08-Nov-2023 12:22	08-Nov-2023 12:40	08-Nov-2023 13:03	08-Nov-2023 16:13	
Compound	CAS Number	LOR	Unit	EP2315733-016	EP2315733-017	EP2315733-018	EP2315733-019	EP2315733-020	
				Result	Result	Result	Result	Result	
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	0.09	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.47	<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	0.04	<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	
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									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW115_231108	0960_MW146_7.0-7.5_231108	0960_MW145_5.0-5.5_231108	0960_MW180_3.5-4.0_231108	0960_MW147_5.0-5.5_231108
Sampling date / time				08-Nov-2023 11:43	08-Nov-2023 12:22	08-Nov-2023 12:40	08-Nov-2023 13:03	08-Nov-2023 16:13	
Compound	CAS Number	LOR	Unit	EP2315733-016	EP2315733-017	EP2315733-018	EP2315733-019	EP2315733-020	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
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	3.00	<0.01	<0.01	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.86	<0.01	<0.01	<0.01	<0.01	
Sum of PFAS (WA DER List)	---	0.01	µg/L	2.73	<0.01	<0.01	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	111	104	106	102	97.3	
13C8-PFOA	---	0.02	%	102	112	114	104	109	



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315733	Page	: 1 of 20
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 13-Nov-2023
C-O-C number	: 59786	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]		
Site	: Learmonth GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 20		
No. of samples analysed	: 20		



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

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5426126)									
EP2315733-003	0960_MW018_231108	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	99	98	1.4	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	926	919	0.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3		1	mg/L	1020	1020	0.8	0% - 20%
EP2315733-016	0960_MW115_231108	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	368	366	0.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	368	366	0.7	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5421115)									
EP2315732-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	622	603	3.0	0% - 20%
EP2315732-011	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1700	1660	1.8	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5421117)									
EP2315733-013	0960_MW165_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	31	30	0.0	0% - 20%
EP2315734-003	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2670	2630	1.3	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5421116)									
EP2315732-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3110	3130	0.6	0% - 20%
EP2315732-011	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	10800	11000	1.8	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5421118)									
EP2315733-013	0960_MW165_231108	ED045G: Chloride	16887-00-6	1	mg/L	242	242	0.0	0% - 20%
EP2315734-003	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	19600	21200	7.8	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5420832)									
EP2315732-001	Anonymous	ED093F Calcium	7440-70-2	1	mg/L	190	186	2.1	0% - 20%

EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427308)



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: 5427308) - continued									
EP2315734-004	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2315738-004	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	4.01	3.87	3.4	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	2.16	2.10	2.9	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.28	1.17	9.6	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.95	0.94	0.0	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.32	0.30	7.3	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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: 5427305)									
EP2315731-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTriDA)	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
		EP2315732-008	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01
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



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: 5427305) - continued									
EP2315732-008	Anonymous	EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5427307)									
EP2315732-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	0.03	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.06	0.06	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.27	0.26	0.0	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.03	0.03	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5427308)									
EP2315734-004	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2315738-004	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.27	0.24	10.0	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.32	0.32	0.0	0% - 50%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.46	1.41	3.1	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.16	0.15	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



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: 5427308) - continued									
EP2315738-004	Anonymous	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.3	0.3	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427305)									
EP2315731-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315732-008	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427305) - continued									
EP2315732-008	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427307)									
EP2315732-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427308)									
EP2315734-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315738-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427308) - continued									
EP2315738-004	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427305)									
EP2315731-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315732-008	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427307)									
EP2315732-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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: 5427307) - continued									
EP2315732-001	Anonymous	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427308)									
EP2315734-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315738-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5427305)									
EP2315731-001	Anonymous	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
EP2315732-008	Anonymous	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
EP231P: PFAS Sums (QC Lot: 5427307)									

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 Work Order : EP2315733
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_23



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231P: PFAS Sums (QC Lot: 5427307) - continued									
EP2315732-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	1.66	1.69	1.8	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.05	1.07	1.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	1.54	1.56	1.3	0% - 20%
EP231P: PFAS Sums (QC Lot: 5427308)									
EP2315734-004	Anonymous	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
EP2315738-004	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	11.2	10.8	3.9	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	6.17	5.97	3.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	9.96	9.56	4.1	0% - 20%
EP231P: PFAS Sums (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5426126)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	<1	20 mg/L	116	85.1	126
				<1	200 mg/L	104	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421115)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	97.6	89.9	112
				<1	500 mg/L	98.7	89.9	112
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421117)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	105	89.9	112
				<1	500 mg/L	103	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5421116)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	88.6	113
				<1	1000 mg/L	96.6	88.6	113
ED045G: Chloride by Discrete Analyser (QCLot: 5421118)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	102	88.6	113
				<1	1000 mg/L	106	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5420832)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	106	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	104	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	105	84.6	108
ED093F: Dissolved Major Cations (QCLot: 5420833)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	108	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	108	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	107	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	108	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	96.5	71.0	127



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305) - continued								
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	88.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	92.2	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	99.1	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	100	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427307)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	107	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	110	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	99.0	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	106	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	96.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	91.7	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427308)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	94.2	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	101	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	94.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	104	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	92.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	97.5	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427316)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	116	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	104	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	97.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	99.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	95.9	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	107	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	111	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	105	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	102	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	112	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	114	69.0	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	93.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	97.4	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427307)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	104	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	121	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	109	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	117	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	110	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	97.8	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	102	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	99.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427308)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	100	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	101	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.6	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	107	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	96.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	105	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	110	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	115	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	106	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	108	69.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316) - continued								
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	107	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	97.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427305)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	117	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	121	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	85.7	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	91.0	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	92.5	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	106	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	121	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427307)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	133	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	119	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	92.5	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	105	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	110	62.2	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	98.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	100	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	76.2	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	77.3	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	91.7	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	93.4	62.2	138



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308) - continued								
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	92.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	93.6	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427316)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	130	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	118	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	110	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	110	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	89.9	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	106	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427305)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	109	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	97.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	97.3	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: 5427307)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	116	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	112	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	104	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427308)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	104	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	105	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	104	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	91.9	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	104	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	108	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	95.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	96.9	64.2	133

Matrix Spike (MS) Report

Sub-Matrix: WATER

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421115)							
EP2315732-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421117)							
EP2315733-013	0960_MW165_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	120	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5421116)							
EP2315732-001	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5421118)							



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 5421118) - continued							
EP2315733-013	0960_MW165_231108	ED045G: Chloride	16887-00-6	200 mg/L	114	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	114	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	105	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	98.4	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	100	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	105	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	76.6	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427307)							
EP2315732-004	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	119	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	108	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	81.9	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	96.4	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	90.1	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	94.4	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427308)							
EP2315734-012	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	92.2	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	91.2	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	85.3	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	93.0	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	97.0	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	93.0	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	112	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	108	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	94.4	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	101	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	91.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	80.1	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	104	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	114	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	107	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	114	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	115	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	108	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	115	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	105	69.0	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305) - continued							
EP2315731-007	Anonymous	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	109	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	82.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	108	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427307)							
EP2315732-004	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	109	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	112	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	96.2	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	99.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	110	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	98.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	107	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	100	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	102	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	93.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	102	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427308)							
EP2315734-012	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	92.7	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	97.7	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	94.4	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	100	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	90.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.0	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	94.6	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	98.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	87.6	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	111	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	102	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	110	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	98.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.6	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	96.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	106	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	110	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.4	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	97.8	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	89.0	65.0	144		



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316) - continued							
EP2315738-015	Anonymous	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	110	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	114	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	127	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	125	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	83.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	110	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	110	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427307)							
EP2315732-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	133	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	116	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	103	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	102	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308)							
EP2315734-012	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	107	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	93.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	88.0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	92.8	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	97.6	65.0	136



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308) - continued							
EP2315734-012	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	113	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	125	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	111	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	119	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	92.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	106	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	106	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	92.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	109	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	104	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	105	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	75.4	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427307)							
EP2315732-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	104	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	108	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	89.6	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	92.3	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427308)							
EP2315734-012	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	94.9	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	95.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	90.8	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	92.3	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	106	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	112	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	99.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	91.7	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315733	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth GW - CG	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]	No. of samples received	: 20
Order number	: pfas-omp Learmonth	No. of samples analysed	: 20

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2315732--001	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	EP2315732--001	Anonymous	Chloride	16887-00-6	Not Determined	—	MS recovery not determined, background level greater than or equal to 4x spike level.

Matrix: WATER

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMS/MS	EP231X	6	75	8.00	10.00	NEPM 2013 B3 & ALS QC Standard

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

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

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

Matrix: WATER

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		08-Nov-2023	---	---	---	21-Nov-2023	22-Nov-2023	✓
0960_MW021_231108,	0960_MW018_231108,							
0960_MW211_231108,	0960_MW164_231108,							
0960_MW163_231108,	0960_MW233_231108,							
0960_MW162_231108,	0960_MW114_231108,							
0960_MW165_231108,	0960_MW166_231108,							
0960_MW167_231108,	0960_MW115_231108,							
0960_MW146_7.0-7.5_231108,	0960_MW145_5.0-5.5_231108,							
0960_MW180_3.5-4.0_231108,	0960_MW147_5.0-5.5_231108							

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)	08-Nov-2023	---	---	---	21-Nov-2023	06-Dec-2023	✓
0960_MW021_231108,	0960_MW018_231108,						
0960_MW211_231108,	0960_MW164_231108,						
0960_MW163_231108,	0960_MW233_231108,						
0960_MW162_231108,	0960_MW114_231108,						
0960_MW165_231108,	0960_MW166_231108,						
0960_MW167_231108,	0960_MW115_231108,						
0960_MW146_7.0-7.5_231108,	0960_MW145_5.0-5.5_231108,						
0960_MW180_3.5-4.0_231108,	0960_MW147_5.0-5.5_231108						
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)	08-Nov-2023	---	---	---	21-Nov-2023	06-Dec-2023	✓
0960_MW021_231108,	0960_MW018_231108,						
0960_MW211_231108,	0960_MW164_231108,						
0960_MW163_231108,	0960_MW233_231108,						
0960_MW162_231108,	0960_MW114_231108,						
0960_MW165_231108,	0960_MW166_231108,						
0960_MW167_231108,	0960_MW115_231108,						
0960_MW146_7.0-7.5_231108,	0960_MW145_5.0-5.5_231108,						
0960_MW180_3.5-4.0_231108,	0960_MW147_5.0-5.5_231108						
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)	08-Nov-2023	---	---	---	13-Nov-2023	15-Nov-2023	✓
0960_MW021_231108,	0960_MW018_231108,						
0960_MW211_231108,	0960_MW164_231108,						
0960_MW163_231108,	0960_MW233_231108,						
0960_MW162_231108,	0960_MW114_231108,						
0960_MW165_231108,	0960_MW166_231108,						
0960_MW167_231108,	0960_MW115_231108,						
0960_MW146_7.0-7.5_231108,	0960_MW145_5.0-5.5_231108,						
0960_MW180_3.5-4.0_231108,	0960_MW147_5.0-5.5_231108						



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW021_231108, 0960_QC116_231108, 0960_MW018_231108, 0960_QC117_231108, 0960_MW164_231108, 0960_QC125_231108, 0960_MW163_231108, 0960_MW233_231108, 0960_MW162_231108, 0960_MW114_231108, 0960_MW165_231108, 0960_MW115_231108, 0960_MW146_7.0-7.5_231108, 0960_MW180_3.5-4.0_231108, 0960_MW147_5.0-5.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔	
HDPE (no PTFE) (EP231X) 0960_MW211_231108, 0960_QC121_231108, 0960_MW166_231108, 0960_MW167_231108, 0960_MW145_5.0-5.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0960_MW021_231108, 0960_QC116_231108, 0960_MW018_231108, 0960_QC117_231108, 0960_MW164_231108, 0960_QC125_231108, 0960_MW163_231108, 0960_MW233_231108, 0960_MW162_231108, 0960_MW114_231108, 0960_MW165_231108, 0960_MW115_231108, 0960_MW146_7.0-7.5_231108, 0960_MW180_3.5-4.0_231108, 0960_MW147_5.0-5.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔	
HDPE (no PTFE) (EP231X) 0960_MW211_231108, 0960_QC121_231108, 0960_MW166_231108, 0960_MW167_231108, 0960_MW145_5.0-5.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_MW021_231108, 0960_QC116_231108, 0960_MW018_231108, 0960_QC117_231108, 0960_MW164_231108, 0960_QC125_231108, 0960_MW163_231108, 0960_MW233_231108, 0960_MW162_231108, 0960_MW114_231108, 0960_MW165_231108, 0960_MW115_231108, 0960_MW146_7.0-7.5_231108, 0960_MW180_3.5-4.0_231108, 0960_MW147_5.0-5.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔	
HDPE (no PTFE) (EP231X) 0960_MW211_231108, 0960_QC121_231108, 0960_MW166_231108, 0960_MW167_231108, 0960_MW145_5.0-5.5_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔	



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW021_231108, 0960_MW018_231108, 0960_MW164_231108, 0960_MW163_231108, 0960_MW162_231108, 0960_MW165_231108, 0960_MW146_7.0-7.5_231108, 0960_MW147_5.0-5.5_231108	0960_QC116_231108, 0960_QC117_231108, 0960_QC125_231108, 0960_MW233_231108, 0960_MW114_231108, 0960_MW115_231108, 0960_MW180_3.5-4.0_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW211_231108, 0960_MW166_231108, 0960_MW145_5.0-5.5_231108	0960_QC121_231108, 0960_MW167_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0960_MW021_231108, 0960_MW018_231108, 0960_MW164_231108, 0960_MW163_231108, 0960_MW162_231108, 0960_MW165_231108, 0960_MW146_7.0-7.5_231108, 0960_MW147_5.0-5.5_231108	0960_QC116_231108, 0960_QC117_231108, 0960_QC125_231108, 0960_MW233_231108, 0960_MW114_231108, 0960_MW115_231108, 0960_MW180_3.5-4.0_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW211_231108, 0960_MW166_231108, 0960_MW145_5.0-5.5_231108	0960_QC121_231108, 0960_MW167_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	6	75	8.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	75	5.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	75	5.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	75	5.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



ALS Compass

SAMPLING *Intelligence*



Environmental Division
Perth
Work Order Reference
EP2315734



Telephone : - 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA_0960_PFA50MP_23 Client: STANTEC

Project Manager

ALS Compass COC Reference: 59789 59786 59787 59788 59784 59790
59820 59798 Samples: 59794 59792 59785

Phone:

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time: 9/11/23

Date / Time:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass



CHAIN OF CUSTODY

COC#: 59787

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_OTH132		08/11/2023 07:55 AM	WATER	ALS: 3 Non ALS: 0	No	X		
002	0960_OTH134		08/11/2023 08:05 AM	WATER	ALS: 3 Non ALS: 0	No	X		
003	0960_OTH129		08/11/2023 09:02 AM	WATER	ALS: 3 Non ALS: 0	No	X		
004	0960_SW208	Lab QC added	08/11/2023 09:23 AM	WATER	ALS: 5 Non ALS: 0	No	X		
005	0960_QC124		08/11/2023 09:24 AM	WATER	ALS: 3 Non ALS: 0	No	X		
006	0960_OTH103		08/11/2023 09:36 AM	WATER	ALS: 3 Non ALS: 0	No	X		
007	0960_SW305		08/11/2023 10:07 AM	WATER	ALS: 3 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59787

ALS Laboratory: EP Perth

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_SW304		08/11/2023 10:33 AM	WATER	ALS: 3 Non ALS: 0	No	X		
009	0960_QC127		08/11/2023 10:34 AM	WATER	ALS: 3 Non ALS: 0	No	X		
010	0960_SW303		08/11/2023 10:58 AM	WATER	ALS: 3 Non ALS: 0	No	X		
011	0960_SW001		08/11/2023 11:42 AM	WATER	ALS: 3 Non ALS: 0	No	X		
012	0960_SW300	Lab QC added	08/11/2023 12:04 PM	WATER	ALS: 5 Non ALS: 0	No	X		
013	0960_SW211		08/11/2023 12:38 PM	WATER	ALS: 3 Non ALS: 0	No	X		
014	0960_SW302		08/11/2023 01:33 PM	WATER	ALS: 3 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59787

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WIA OMP Water Sufe WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
015	0960_SW209		08/11/2023 01:46 PM	WATER	ALS: 3 Non ALS: 0	No	X		



CHAIN OF CUSTODY

ALS COC#: 59787

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

CONTACT PH: [REDACTED]

QUOTE NO: SY/139/19 B

SAMPLER MOBILE: [REDACTED]

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_OTH132	Clear Plastic Bottle - Natural	125 mL	00070522075440	Green	No	
001	0960_OTH132	HDPE (no PTFE)	20 mL	00351221020824	Grey	No	
001	0960_OTH132	HDPE (no PTFE)	20 mL	00351221020551	Grey	No	
002	0960_OTH134	Clear Plastic Bottle - Natural	125 mL	00071121128716	Green	No	
002	0960_OTH134	HDPE (no PTFE)	20 mL	00351221020974	Grey	No	
002	0960_OTH134	HDPE (no PTFE)	20 mL	00351221020480	Grey	No	
003	0960_OTH129	Clear Plastic Bottle - Natural	125 mL	00071121128656	Green	No	
003	0960_OTH129	HDPE (no PTFE)	20 mL	00351221020897	Grey	No	
003	0960_OTH129	HDPE (no PTFE)	20 mL	00351221020443	Grey	No	
004	0960_SW208	Clear Plastic Bottle - Natural	125 mL	00071121128664	Green	No	
004	0960_SW208	HDPE (no PTFE)	20 mL	00351221020961	Grey	No	
004	0960_SW208	HDPE (no PTFE)	20 mL	00351221020744	Grey	No	
004	0960_SW208	HDPE (no PTFE)	20 mL	00351221020912	Grey	No	
005	0960_QC124	HDPE (no PTFE)	20 mL	00351221020441	Grey	No	
005	0960_QC124	Clear Plastic Bottle - Natural	125 mL	00351221020892	Grey	No	
005	0960_QC124	HDPE (no PTFE)	20 mL	00070522075456	Green	No	
006	0960_OTH103	Clear Plastic Bottle - Natural	125 mL	00351221020950	Grey	No	
006	0960_OTH103	HDPE (no PTFE)	20 mL	00070522075384	Green	No	
006	0960_OTH103	HDPE (no PTFE)	20 mL	00351221020497	Grey	No	
007	0960_SW305	Clear Plastic Bottle - Natural	125 mL	00351221020707	Grey	No	
007	0960_SW305	HDPE (no PTFE)	20 mL	00071121128710	Green	No	
007	0960_SW305	HDPE (no PTFE)	20 mL	00351221020818	Grey	No	
008	0960_SW304	HDPE (no PTFE)	20 mL	00351221020650	Grey	No	
008	0960_SW304	HDPE (no PTFE)	20 mL	00351221020757	Grey	No	
008	0960_SW304	Clear Plastic Bottle - Natural	125 mL	00351221020943	Grey	No	
008	0960_SW304	HDPE (no PTFE)	20 mL	00071121128551	Green	No	



CHAIN OF CUSTODY

COC#: 59787

ALS Laboratory: EP Perth

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

009	0960_QC127	Clear Plastic Bottle - Natural	125 mL	00071121128687	Green	No	
009	0960_QC127	HDPE (no PTFE)	20 mL	00351221020766	Grey	No	
009	0960_QC127	HDPE (no PTFE)	20 mL	00351221020745	Grey	No	
010	0960_SW303	Clear Plastic Bottle - Natural	125 mL	00071121128578	Green	No	
010	0960_SW303	HDPE (no PTFE)	20 mL	00351221020620	Grey	No	
010	0960_SW303	HDPE (no PTFE)	20 mL	00351221020697	Grey	No	
011	0960_SW001	Clear Plastic Bottle - Natural	125 mL	00071121128643	Green	No	
011	0960_SW001	HDPE (no PTFE)	20 mL	00351221020856	Grey	No	
011	0960_SW001	HDPE (no PTFE)	20 mL	00351221020416	Grey	No	
012	0960_SW300	Clear Plastic Bottle - Natural	125 mL	00070522075488	Green	No	
012	0960_SW300	HDPE (no PTFE)	20 mL	00351221020776	Grey	No	
012	0960_SW300	HDPE (no PTFE)	20 mL	00351221020857	Grey	No	
012	0960_SW300	HDPE (no PTFE)	20 mL	00351221020927	Grey	No	
012	0960_SW300	HDPE (no PTFE)	20 mL	00351221020782	Grey	No	
013	0960_SW211	Clear Plastic Bottle - Natural	125 mL	00070522075403	Green	No	
013	0960_SW211	HDPE (no PTFE)	20 mL	00351221020520	Grey	No	
013	0960_SW211	HDPE (no PTFE)	20 mL	00351221020471	Grey	No	
014	0960_SW302	HDPE (no PTFE)	20 mL	00351221020821	Grey	No	
014	0960_SW302	HDPE (no PTFE)	20 mL	00351221020808	Grey	No	
014	0960_SW302	Clear Plastic Bottle - Natural	125 mL	00071121128567	Green	No	
015	0960_SW209	HDPE (no PTFE)	20 mL	00351221020676	Grey	No	
015	0960_SW209	HDPE (no PTFE)	20 mL	00351221020633	Grey	No	
015	0960_SW209	Clear Plastic Bottle - Natural	125 mL	00071121128569	Green	No	

Total Bottle Count: ALS: 49, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2315734**

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

Laboratory : **Environmental Division Perth**
Contact : **Customer Services EP**
Address : **26 Rigali Way Wangara WA Australia
6065**

E-mail : **[REDACTED]@stantec.com**
Telephone : **----**
Facsimile : **----**

E-mail : **ALSEnviro.Perth@alsglobal.com**
Telephone : **+61-8-9406 1301**
Facsimile : **+61-8-9406 1399**

Project : **WA_0960_PFASOMP_23**
Order number : **pfas-omp Learmonth**
C-O-C number : **59787**
Site : **Learmonth SW/OTH - SC**
Sampler : **[REDACTED]**

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

Dates

Date Samples Received : **10-Nov-2023 12:20**
Client Requested Due Date : **21-Nov-2023**

Issue Date : **13-Nov-2023**
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **4**
Receipt Detail :

Security Seal : **Not Available**
Temperature : **17.6 - Ice present**
No. of samples received / analysed : **15 / 15**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EP2315734-004 : 08-Nov-2023 09:23 : 0960_SW208_231108 - Lab QC added

EP2315734-012 : 08-Nov-2023 12:04 : 0960_SW300_231108 - Lab QC added

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 - NT-01 & 02 Ca, Mg, Na, K, Cl, SO ₄ , Alkalinity
EP2315734-001	08-Nov-2023 07:55	0960_OTH132_231108	✓	✓
EP2315734-002	08-Nov-2023 08:05	0960_OTH134_231108	✓	✓
EP2315734-003	08-Nov-2023 09:02	0960_OTH129_231108	✓	✓
EP2315734-004	08-Nov-2023 09:23	0960_SW208_231108 L...	✓	✓
EP2315734-005	08-Nov-2023 09:24	0960_QC124_231108	✓	✓
EP2315734-006	08-Nov-2023 09:36	0960_OTH103_231108	✓	✓
EP2315734-007	08-Nov-2023 10:07	0960_SW305_231108	✓	✓
EP2315734-008	08-Nov-2023 10:33	0960_SW304_231108	✓	✓
EP2315734-009	08-Nov-2023 10:34	0960_QC127_231108	✓	✓
EP2315734-010	08-Nov-2023 10:58	0960_SW303_231108	✓	✓
EP2315734-011	08-Nov-2023 11:42	0960_SW001_231108	✓	✓
EP2315734-012	08-Nov-2023 12:04	0960_SW300_231108 L...	✓	✓
EP2315734-013	08-Nov-2023 12:38	0960_SW211_231108	✓	✓
EP2315734-014	08-Nov-2023 13:33	0960_SW302_231108	✓	✓
EP2315734-015	08-Nov-2023 13:46	0960_SW209_231108	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

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



CERTIFICATE OF ANALYSIS

Work Order : EP2315734
Client : STANTEC AUSTRALIA PTY LTD
Contact : [REDACTED]
Address : GROUND FLOOR 226 ADELAIDE TERRACE
PERTH 6000
Telephone : ----
Project : WA_0960_PFASOMP_23
Order number : pfas-omp Learmonth
C-O-C number : 59787
Sampler : [REDACTED]
Site : Learmonth SW/OTH - SC
Quote number : SY/139/19 B
No. of samples received : 15
No. of samples analysed : 15

Page : 1 of 12
Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : +61-8-9406 1301
Date Samples Received : 10-Nov-2023 12:20
Date Analysis Commenced : 14-Nov-2023
Issue Date : 21-Nov-2023 16:13



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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Lab Technician	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH132_23110 8	0960_OTH134_23110 8	0960_OTH129_23110 8	0960_SW208_231108 Lab QC added	0960_QC124_231108
Sampling date / time				08-Nov-2023 07:55	08-Nov-2023 08:05	08-Nov-2023 09:02	08-Nov-2023 09:23	08-Nov-2023 09:24
Compound	CAS Number	LOR	Unit	EP2315734-001	EP2315734-002	EP2315734-003	EP2315734-004	EP2315734-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	140	126	139	135	134
Total Alkalinity as CaCO ₃	---	1	mg/L	140	126	139	135	134
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	2720	2550	2670	2540	2650
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	20200	18900	19600	18800	18500
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	475	444	449	433	449
Magnesium	7439-95-4	1	mg/L	1560	1470	1500	1430	1480
Sodium	7440-23-5	1	mg/L	12700	12200	12200	11700	12000
Potassium	7440-09-7	1	mg/L	463	434	446	427	442
EN055: Ionic Balance								
• Total Anions	---	0.01	meq/L	629	589	611	586	580
• Total Cations	---	0.01	meq/L	716	685	688	659	677
• Ionic Balance	---	0.01	%	6.47	7.55	5.90	5.88	7.78
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

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_OTH132_23110 8	0960_OTH134_23110 8	0960_OTH129_23110 8	0960_SW208_231108 Lab QC added	0960_QC124_231108
Sampling date / time				08-Nov-2023 07:55	08-Nov-2023 08:05	08-Nov-2023 09:02	08-Nov-2023 09:23	08-Nov-2023 09:24	
Compound	CAS Number	LOR	Unit	EP2315734-001	EP2315734-002	EP2315734-003	EP2315734-004	EP2315734-005	
				Result	Result	Result	Result	Result	
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	
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									



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH132_23110 8	0960_OTH134_23110 8	0960_OTH129_23110 8	0960_SW208_231108 Lab QC added	0960_QC124_231108
Sampling date / time				08-Nov-2023 07:55	08-Nov-2023 08:05	08-Nov-2023 09:02	08-Nov-2023 09:23	08-Nov-2023 09:24
Compound	CAS Number	LOR	Unit	EP2315734-001	EP2315734-002	EP2315734-003	EP2315734-004	EP2315734-005
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - continued								
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	0.06	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	---	0.01	µg/L	0.06	<0.01	<0.01	<0.01	<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	0.06	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	101	99.1	102	105	103
13C8-PFOA	---	0.02	%	106	102	108	104	109



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH103_23110 8	0960_SW305_231108	0960_SW304_231108	0960_QC127_231108	0960_SW303_231108
Sampling date / time				08-Nov-2023 09:36	08-Nov-2023 10:07	08-Nov-2023 10:33	08-Nov-2023 10:34	08-Nov-2023 10:58
Compound	CAS Number	LOR	Unit	EP2315734-006	EP2315734-007	EP2315734-008	EP2315734-009	EP2315734-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	161	324	169	168	238
Total Alkalinity as CaCO ₃	---	1	mg/L	161	324	169	168	238
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	3110	3370	4220	4230	3610
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	21700	24900	29400	29900	27000
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	502	589	705	711	605
Magnesium	7439-95-4	1	mg/L	1630	1790	2190	2200	1840
Sodium	7440-23-5	1	mg/L	13400	14500	18000	17700	15200
Potassium	7440-09-7	1	mg/L	485	532	663	654	557
EN055: Ionic Balance								
∅ Total Anions	---	0.01	meq/L	680	779	920	935	842
∅ Total Cations	---	0.01	meq/L	754	821	1020	1000	857
∅ Ionic Balance	---	0.01	%	5.18	2.62	4.89	3.52	0.91
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



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH103_23110 8	0960_SW305_231108	0960_SW304_231108	0960_QC127_231108	0960_SW303_231108
Sampling date / time				08-Nov-2023 09:36	08-Nov-2023 10:07	08-Nov-2023 10:33	08-Nov-2023 10:34	08-Nov-2023 10:58
Compound	CAS Number	LOR	Unit	EP2315734-006	EP2315734-007	EP2315734-008	EP2315734-009	EP2315734-010
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	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	%	105	90.1	93.6	106	100
13C8-PFOA	----	0.02	%	106	107	110	109	106



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW001_231108	0960_SW300_231108 Lab QC added	0960_SW211_231108	0960_SW302_231108	0960_SW209_231108
Sampling date / time				08-Nov-2023 11:42	08-Nov-2023 12:04	08-Nov-2023 12:38	08-Nov-2023 13:33	08-Nov-2023 13:46
Compound	CAS Number	LOR	Unit	EP2315734-011	EP2315734-012	EP2315734-013	EP2315734-014	EP2315734-015
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	248	126	131	205	263
Total Alkalinity as CaCO ₃	---	1	mg/L	248	126	131	205	263
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	5300	6450	6550	5030	3650
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	36200	42300	42300	35300	26200
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1170	1430	1430	1040	659
Magnesium	7439-95-4	1	mg/L	2790	3110	3190	2530	1920
Sodium	7440-23-5	1	mg/L	21600	25200	25600	20200	15500
Potassium	7440-09-7	1	mg/L	861	990	1030	816	570
EN055: Ionic Balance								
∅ Total Anions	---	0.01	meq/L	1140	1330	1330	1100	820
∅ Total Cations	---	0.01	meq/L	1250	1450	1470	1160	880
∅ Ionic Balance	---	0.01	%	4.74	4.27	5.04	2.43	3.49
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	0.03	<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



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW001_231108	0960_SW300_231108 Lab QC added	0960_SW211_231108	0960_SW302_231108	0960_SW209_231108
Sampling date / time				08-Nov-2023 11:42	08-Nov-2023 12:04	08-Nov-2023 12:38	08-Nov-2023 13:33	08-Nov-2023 13:46
Compound	CAS Number	LOR	Unit	EP2315734-011	EP2315734-012	EP2315734-013	EP2315734-014	EP2315734-015
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.03	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.03	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.03	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	96.7	101	97.6	109	103
13C8-PFOA	----	0.02	%	107	102	106	105	102



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315734	Page	: 1 of 17
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 59787	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]		
Site	: Learmonth SW/OTH - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 15		
No. of samples analysed	: 15		



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

This 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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Lab Technician	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA

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 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.

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 (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5426146)									
EP2315734-002	0960_OTH134_231108	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	126	128	1.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3		1	mg/L	126	128	1.3	0% - 20%
EP2315734-012	0960_SW300_231108 Lab QC added	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	5	138	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	126	123	2.1	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	126	128	2.2	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5421117)									
EP2315733-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	31	30	0.0	0% - 20%
EP2315734-003	0960_OTH129_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2670	2630	1.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5427268)									
EP2315734-013	0960_SW211_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	6550	6420	2.1	0% - 20%
EP2315738-009	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1970	1630	19.1	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5421118)									
EP2315733-013	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	242	242	0.0	0% - 20%
EP2315734-003	0960_OTH129_231108	ED045G: Chloride	16887-00-6	1	mg/L	19600	21200	7.8	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5427269)									
EP2315734-013	0960_SW211_231108	ED045G: Chloride	16887-00-6	1	mg/L	42300	41600	1.7	0% - 20%
EP2315738-009	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	14800	15500	4.6	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5422865)									



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 5422865) - continued									
EP2315731-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	55	63	13.3	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	198	201	1.2	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	561	565	0.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	33	34	0.0	0% - 20%
EP2315734-004	0960_SW208_231108 Lab QC added	ED093F: Calcium	7440-70-2	1	mg/L	433	421	2.9	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1430	1380	4.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	11700	11200	4.8	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	427	414	3.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5422866)									
EP2315734-014	0960_SW302_231108	ED093F: Calcium	7440-70-2	1	mg/L	1040	1080	3.5	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2530	2510	0.8	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	20200	20100	0.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	816	797	2.3	0% - 20%
EP2315984-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	24	24	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	13	13	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	120	122	1.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427305)									
EP2315731-001	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<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
EP2315732-008	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427308)									
EP2315734-004	0960_SW208_231108 Lab QC added	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427308) - continued									
EP2315734-004	0960_SW208_231108 Lab QC added	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2315738-004	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	4.01	3.87	3.4	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	2.16	2.10	2.9	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.28	1.17	9.6	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.95	0.94	0.0	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.32	0.30	7.3	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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: 5427305)									
EP2315731-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2315732-008	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit



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: 5427308)									
EP2315734-004	0960_SW208_231108 Lab QC added	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit		
EP2315738-004	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.27	0.24	10.0	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.32	0.32	0.0	0% - 50%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.46	1.41	3.1	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.16	0.15	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.3	0.3	0.0	No Limit		
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit		
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427305)									
EP2315731-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427305) - continued									
EP2315731-001	Anonymous	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
EP2315732-008	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427308)									
EP2315734-004	0960_SW208_231108 Lab QC added	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
EP2315738-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427308) - continued									
EP2315738-004	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427305)									
EP2315731-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315732-008	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5427305) - continued									
EP2315732-008	Anonymous	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427308)									
EP2315734-004	0960_SW208_231108 Lab QC added	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
EP2315738-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5427305)									
EP2315731-001	Anonymous	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
EP2315732-008	Anonymous	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
EP231P: PFAS Sums (QC Lot: 5427308)									
EP2315734-004	0960_SW208_231108 Lab QC added	EP231X: Sum of PFAS	---	0.01	µg/L	<0.01	<0.01	0.0	No Limit

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 Work Order : EP2315734
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_23



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231P: PFAS Sums (QC Lot: 5427308) - continued									
EP2315734-004	0960_SW208_231108 Lab QC added	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
EP2315738-004	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	11.2	10.8	3.9	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	6.17	5.97	3.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	9.96	9.56	4.1	0% - 20%
EP231P: PFAS Sums (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Sum of PFAS	---	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5426146)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	<1	20 mg/L	122	85.1	126
				<1	200 mg/L	110	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421117)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	105	89.9	112
				<1	500 mg/L	103	89.9	112
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5427268)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100	89.9	112
				<1	500 mg/L	98.7	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5421118)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	102	88.6	113
				<1	1000 mg/L	106	88.6	113
ED045G: Chloride by Discrete Analyser (QCLot: 5427269)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	97.7	88.6	113
				<1	1000 mg/L	99.0	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5422865)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	105	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	107	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	106	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	102	84.6	108
ED093F: Dissolved Major Cations (QCLot: 5422866)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.5	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	108	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	108	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	108	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	96.5	71.0	127



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305) - continued								
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	88.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	92.2	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	99.1	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	100	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427308)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	94.2	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	101	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	94.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	104	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	92.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	97.5	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427316)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	116	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	104	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	97.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	99.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	95.9	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	107	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	111	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	105	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	102	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	112	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	114	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	93.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	97.4	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427308)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	105	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	100	72.0	129



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427308) - continued								
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	101	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.6	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	107	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	96.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	105	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	110	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	115	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	106	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	108	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	107	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	97.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427305)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	117	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	121	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	85.7	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	91.0	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	92.5	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	106	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	121	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	100	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	76.2	68.0	141



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	77.3	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	91.7	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	93.4	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	92.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	93.6	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427316)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	130	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	118	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	110	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	110	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	89.9	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	106	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427305)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	109	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	97.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	97.3	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: 5427308)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	104	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	105	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	104	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	91.9	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	104	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	108	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	95.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	96.9	64.2	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231P: PFAS Sums (QCLot: 5427305)								
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: 5427308)								
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: 5427316)								
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**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421117)							
EP2315733-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	120	70.4	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5427268)							
EP2315734-013	0960_SW211_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5421118)							
EP2315733-013	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	114	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 5427269)							
EP2315734-013	0960_SW211_231108	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	114	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	105	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	98.4	68.0	129



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427305) - continued							
EP2315731-007	Anonymous	EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	100	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	105	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	76.6	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427308)							
EP2315734-012	0960_SW300_231108 Lab QC added	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	92.2	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	91.2	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	85.3	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	93.0	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	97.0	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	93.0	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	112	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	108	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	94.4	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	101	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	91.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	80.1	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	104	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	114	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	107	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	114	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	115	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	108	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	115	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	105	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	109	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	82.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	108	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427308)							
EP2315734-012	0960_SW300_231108 Lab QC added	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	92.7	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	97.7	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	94.4	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	100	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	90.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.0	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	94.6	69.0	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427308) - continued							
EP2315734-012	0960_SW300_231108 Lab QC added	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	98.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	87.6	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	111	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	102	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	110	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	98.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.6	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	96.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	106	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	110	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.4	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	97.8	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	89.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	110	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	114	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	127	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	125	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	83.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	110	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	110	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308)							
EP2315734-012	0960_SW300_231108 Lab QC added	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	107	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	93.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	88.0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	92.8	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	97.6	65.0	136



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308) - continued							
EP2315734-012	0960_SW300_231108 Lab QC added	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	113	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	125	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	111	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	119	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	92.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	106	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	106	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	92.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427305)							
EP2315731-007	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	109	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	104	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	105	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	75.4	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427308)							
EP2315734-012	0960_SW300_231108 Lab QC added	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	94.9	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	95.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	90.8	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	92.3	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	106	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	112	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	99.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	91.7	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315734	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth SW/OTH - SC	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 15
Order number	: pfas-omp Learmonth	No. of samples analysed	: 15

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.

Page : 2 of 7
 Work Order : EP2315734
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_23



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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2315734--013	0960_SW211_231108	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	EP2315734--013	0960_SW211_231108	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	5	55	9.09	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		08-Nov-2023	---	---	---	17-Nov-2023	22-Nov-2023	✓
0960_OTH132_231108,	0960_OTH134_231108,							
0960_OTH129_231108,	0960_SW208_231108 - Lab QC added,							
0960_QC124_231108,	0960_OTH103_231108,							
0960_SW305_231108,	0960_SW304_231108,							
0960_QC127_231108,	0960_SW303_231108,							
0960_SW001_231108,	0960_SW211_231108, 0960_SW300_231108 -							
Lab QC added,								
0960_SW302_231108,								
0960_SW209_231108								



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) 0960_SW211_231108, 0960_SW209_231108	0960_SW302_231108,	08-Nov-2023	---	---	---	20-Nov-2023	06-Dec-2023	✓
Clear Plastic Bottle - Natural (ED041G) 0960_OTH132_231108, 0960_OTH129_231108, 0960_QC124_231108, 0960_SW305_231108, 0960_QC127_231108, 0960_SW001_231108,	0960_OTH134_231108, 0960_SW208_231108 - Lab QC added, 0960_OTH103_231108, 0960_SW304_231108, 0960_SW303_231108, 0960_SW300_231108 - Lab QC added	08-Nov-2023	---	---	---	21-Nov-2023	06-Dec-2023	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) 0960_SW211_231108, 0960_SW209_231108	0960_SW302_231108,	08-Nov-2023	---	---	---	20-Nov-2023	06-Dec-2023	✓
Clear Plastic Bottle - Natural (ED045G) 0960_OTH132_231108, 0960_OTH129_231108, 0960_QC124_231108, 0960_SW305_231108, 0960_QC127_231108, 0960_SW001_231108,	0960_OTH134_231108, 0960_SW208_231108 - Lab QC added, 0960_OTH103_231108, 0960_SW304_231108, 0960_SW303_231108, 0960_SW300_231108 - Lab QC added	08-Nov-2023	---	---	---	21-Nov-2023	06-Dec-2023	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) 0960_OTH132_231108, 0960_OTH129_231108, 0960_QC124_231108, 0960_SW305_231108, 0960_QC127_231108, 0960_SW001_231108, Lab QC added, 0960_SW302_231108, 0960_SW209_231108	0960_OTH134_231108, 0960_SW208_231108 - Lab QC added, 0960_OTH103_231108, 0960_SW304_231108, 0960_SW303_231108, 0960_SW211_231108, 0960_SW300_231108 - Lab QC added,	08-Nov-2023	---	---	---	14-Nov-2023	15-Nov-2023	✓



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_OTH132_231108, 0960_OTH129_231108, 0960_QC124_231108, 0960_SW304_231108, 0960_SW001_231108, 0960_SW211_231108, 0960_SW209_231108	0960_OTH134_231108, 0960_SW208_231108 - Lab QC added, 0960_SW305_231108, 0960_QC127_231108, 0960_SW300_231108 - Lab QC added, 0960_SW302_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_OTH103_231108,	0960_SW303_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0960_OTH132_231108, 0960_OTH129_231108, 0960_QC124_231108, 0960_SW304_231108, 0960_SW001_231108, 0960_SW211_231108, 0960_SW209_231108	0960_OTH134_231108, 0960_SW208_231108 - Lab QC added, 0960_SW305_231108, 0960_QC127_231108, 0960_SW300_231108 - Lab QC added, 0960_SW302_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_OTH103_231108,	0960_SW303_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_OTH132_231108, 0960_OTH129_231108, 0960_QC124_231108, 0960_SW304_231108, 0960_SW001_231108, 0960_SW211_231108, 0960_SW209_231108	0960_OTH134_231108, 0960_SW208_231108 - Lab QC added, 0960_SW305_231108, 0960_QC127_231108, 0960_SW300_231108 - Lab QC added, 0960_SW302_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
HDPE (no PTFE) (EP231X) 0960_OTH103_231108,	0960_SW303_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	17-Nov-2023	06-May-2024	✔



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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_OTH132_231108, 0960_OTH129_231108, 0960_QC124_231108, 0960_SW304_231108, 0960_SW001_231108, 0960_SW211_231108, 0960_SW209_231108	0960_OTH134_231108, 0960_SW208_231108 - Lab QC added, 0960_SW305_231108, 0960_QC127_231108, 0960_SW300_231108 - Lab QC added, 0960_SW302_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓
HDPE (no PTFE) (EP231X) 0960_OTH103_231108,	0960_SW303_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	17-Nov-2023	06-May-2024	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0960_OTH132_231108, 0960_OTH129_231108, 0960_QC124_231108, 0960_SW304_231108, 0960_SW001_231108, 0960_SW211_231108, 0960_SW209_231108	0960_OTH134_231108, 0960_SW208_231108 - Lab QC added, 0960_SW305_231108, 0960_QC127_231108, 0960_SW300_231108 - Lab QC added, 0960_SW302_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓
HDPE (no PTFE) (EP231X) 0960_OTH103_231108,	0960_SW303_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	17-Nov-2023	06-May-2024	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	5	55	9.09	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	55	5.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	55	5.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	55	5.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2315735



Telephone : --61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASOMP-23 Client: STANTEC
ALS Compass COC Reference: 59789 59786 59787 59788 59784 59790
Samples: 59794 59792 59785

Project Manager

Phone:

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time:

Date / Time: 9/11/23

Relinquished by:

Date / Time:

Received by:

Date / Time:



CHAIN OF CUSTODY

COC#: 59788

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth SD - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SD190		08/11/2023 08:20 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_QC115		08/11/2023 07:44 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
003	0960_SS192		08/11/2023 08:15 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
004	0960_QC118		08/11/2023 08:17 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
005	0960_SS193		08/11/2023 08:23 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
006	0960_SD208		08/11/2023 09:25 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
007	0960_SD305		08/11/2023 10:10 AM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59788

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SD - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_SD304		08/11/2023 10:33 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
009	0960_SD303		08/11/2023 10:58 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
010	0960_SD301		08/11/2023 11:41 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
011	0960_SD300		08/11/2023 12:06 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
012	0960_SD211		08/11/2023 12:38 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
013	0960_SD302		08/11/2023 01:33 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
014	0960_SD209		08/11/2023 01:48 PM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59788 ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD
PROJECT: WA_0960_PFSOMP_23
SITE: Learmonth SD - SC
ORDER NO: pfas-omp Learmonth
PROJECT MANAGER: [REDACTED]
PRIMARY SAMPLER: [REDACTED]
EMAIL REPORTS TO: [REDACTED]
EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

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

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
015	0960_SS298		08/11/2023 02:56 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
016	0960_SS301		08/11/2023 03:13 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
017	0960_SD205		08/11/2023 04:17 PM	SOIL	ALS: 1 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

COC#: 59788

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth SD - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SD190	HDPE Soil Jar	200 mL	00621122027910	Grey	No	
002	0960_QC115	HDPE Soil Jar	200 mL	00621122003328	Grey	No	
003	0960_SS192	HDPE Soil Jar	200 mL	00621222067105	Grey	No	
004	0960_QC118	HDPE Soil Jar	200 mL	00621122027899	Grey	No	
005	0960_SS193	HDPE Soil Jar	200 mL	00621122027881	Grey	No	
006	0960_SD208	HDPE Soil Jar	200 mL	00621222053669	Grey	No	
007	0960_SD305	HDPE Soil Jar	200 mL	00621122027863	Grey	No	
008	0960_SD304	HDPE Soil Jar	200 mL	00621122003859	Grey	No	
009	0960_SD303	HDPE Soil Jar	200 mL	00621222053580	Grey	No	
010	0960_SD301	HDPE Soil Jar	200 mL	00621122027887	Grey	No	
011	0960_SD300	HDPE Soil Jar	200 mL	00621122003296	Grey	No	
012	0960_SD211	HDPE Soil Jar	200 mL	00621122027852	Grey	No	
013	0960_SD302	HDPE Soil Jar	200 mL	00621122027879	Grey	No	
014	0960_SD209	HDPE Soil Jar	200 mL	00620322054923	Grey	No	
015	0960_SS298	HDPE Soil Jar	200 mL	00621122003324	Grey	No	
016	0960_SS301	HDPE Soil Jar	200 mL	00621122003345	Grey	No	
017	0960_SD205	HDPE Soil Jar	200 mL	00621122003340	Grey	No	

Total Bottle Count: ALS: 17, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2315735**

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

Laboratory : **Environmental Division Perth**
Contact : **Customer Services EP**
Address : **26 Rigali Way Wangara WA Australia
6065**

E-mail : **[REDACTED]@stantec.com**
Telephone : **----**
Facsimile : **----**

E-mail : **ALSEnviro.Perth@alsglobal.com**
Telephone : **+61-8-9406 1301**
Facsimile : **+61-8-9406 1399**

Project : **WA_0960_PFASOMP_23**
Order number : **pfas-omp Learmonth**
C-O-C number : **59788**
Site : **Learmonth SD - SC**
Sampler : **[REDACTED]**

Page : **1 of 2**
Quote number : **ES2022MWAUS0002 (SY/139/19 B)**
QC Level : **NEPM 2013 B3 & ALS QC Standard**

Dates

Date Samples Received : **10-Nov-2023 12:20**
Client Requested Due Date : **21-Nov-2023**

Issue Date : **13-Nov-2023**
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **4**
Receipt Detail :

Security Seal : **Not Available**
Temperature : **17.6 - Ice present**
No. of samples received / analysed : **17 / 17**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

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

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EP2315735-001	08-Nov-2023 08:20	0960_SD190_231108	✓	✓
EP2315735-002	08-Nov-2023 07:44	0960_QC115_231108	✓	✓
EP2315735-003	08-Nov-2023 08:15	0960_SS192_231108	✓	✓
EP2315735-004	08-Nov-2023 08:17	0960_QC118_231108	✓	✓
EP2315735-005	08-Nov-2023 08:23	0960_SS193_231108	✓	✓
EP2315735-006	08-Nov-2023 09:25	0960_SD208_231108	✓	✓
EP2315735-007	08-Nov-2023 10:10	0960_SD305_231108	✓	✓
EP2315735-008	08-Nov-2023 10:33	0960_SD304_231108	✓	✓
EP2315735-009	08-Nov-2023 10:58	0960_SD303_231108	✓	✓
EP2315735-010	08-Nov-2023 11:41	0960_SD301_231108	✓	✓
EP2315735-011	08-Nov-2023 12:06	0960_SD300_231108	✓	✓
EP2315735-012	08-Nov-2023 12:38	0960_SD211_231108	✓	✓
EP2315735-013	08-Nov-2023 13:33	0960_SD302_231108	✓	✓
EP2315735-014	08-Nov-2023 13:48	0960_SD209_231108	✓	✓
EP2315735-015	08-Nov-2023 14:56	0960_SS298_231108	✓	✓
EP2315735-016	08-Nov-2023 15:13	0960_SS301_231108	✓	✓
EP2315735-017	08-Nov-2023 16:17	0960_SD205_231108	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

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



CERTIFICATE OF ANALYSIS

Work Order	: EP2315735	Page	: 1 of 11
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023 12:20
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 13-Nov-2023
C-O-C number	: 59788	Issue Date	: 21-Nov-2023 12:30
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 17		
No. of samples analysed	: 17		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

- 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

				0960_SD190_231108	0960_QC115_231108	0960_SS192_231108	0960_QC118_231108	0960_SS193_231108
Sampling date / time				08-Nov-2023 08:20	08-Nov-2023 07:44	08-Nov-2023 08:15	08-Nov-2023 08:17	08-Nov-2023 08:23
Compound	CAS Number	LOR	Unit	EP2315735-001	EP2315735-002	EP2315735-003	EP2315735-004	EP2315735-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	11.2	13.2	6.6	26.0	30.2
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	0.0015	0.0012	<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	0.0091	0.0070	<0.0002	<0.0002	0.0005
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0003	0.0003	<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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SD190_231108	0960_QC115_231108	0960_SS192_231108	0960_QC118_231108	0960_SS193_231108
Sampling date / time					08-Nov-2023 08:20	08-Nov-2023 07:44	08-Nov-2023 08:15	08-Nov-2023 08:17	08-Nov-2023 08:23
Compound	CAS Number	LOR	Unit	EP2315735-001	EP2315735-002	EP2315735-003	EP2315735-004	EP2315735-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0109	0.0085	<0.0002	<0.0002	0.0005	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0106	0.0082	<0.0002	<0.0002	0.0005	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0106	0.0082	<0.0002	<0.0002	0.0005	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	93.5	91.0	92.0	87.5	89.5	
13C8-PFOA	---	0.0002	%	89.5	104	99.5	101	102	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SD208_231108	0960_SD305_231108	0960_SD304_231108	0960_SD303_231108	0960_SD301_231108
Sampling date / time				08-Nov-2023 09:25	08-Nov-2023 10:10	08-Nov-2023 10:33	08-Nov-2023 10:58	08-Nov-2023 11:41
Compound	CAS Number	LOR	Unit	EP2315735-006	EP2315735-007	EP2315735-008	EP2315735-009	EP2315735-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	23.3	57.3	24.0	27.1	37.8
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	0.0006
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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SD208_231108	0960_SD305_231108	0960_SD304_231108	0960_SD303_231108	0960_SD301_231108
Sampling date / time					08-Nov-2023 09:25	08-Nov-2023 10:10	08-Nov-2023 10:33	08-Nov-2023 10:58	08-Nov-2023 11:41
Compound	CAS Number	LOR	Unit	EP2315735-006	EP2315735-007	EP2315735-008	EP2315735-009	EP2315735-010	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	93.5	94.5	84.5	92.0	97.0	
13C8-PFOA	---	0.0002	%	104	105	87.5	101	111	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SD300_231108	0960_SD211_231108	0960_SD302_231108	0960_SD209_231108	0960_SS298_231108
Sampling date / time				08-Nov-2023 12:06	08-Nov-2023 12:38	08-Nov-2023 13:33	08-Nov-2023 13:48	08-Nov-2023 14:56
Compound	CAS Number	LOR	Unit	EP2315735-011	EP2315735-012	EP2315735-013	EP2315735-014	EP2315735-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	28.9	30.3	23.9	20.0	0.5
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	0.0008	0.0012	<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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SD300_231108	0960_SD211_231108	0960_SD302_231108	0960_SD209_231108	0960_SS298_231108
Sampling date / time					08-Nov-2023 12:06	08-Nov-2023 12:38	08-Nov-2023 13:33	08-Nov-2023 13:48	08-Nov-2023 14:56
Compound	CAS Number	LOR	Unit	EP2315735-011	EP2315735-012	EP2315735-013	EP2315735-014	EP2315735-015	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0008	0.0012	<0.0002	<0.0002	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0008	0.0012	<0.0002	<0.0002	<0.0002	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0008	0.0012	<0.0002	<0.0002	<0.0002	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	85.5	106	100	95.0	89.5	
13C8-PFOA	---	0.0002	%	91.5	118	114	106	100	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

0960_SS301_231108	0960_SD205_231108	----	----	----
08-Nov-2023 15:13	08-Nov-2023 16:17	----	----	----
EP2315735-016	EP2315735-017	-----	-----	-----
Result	Result	—	—	—
25.6	19.5	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.001	<0.001	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0002	<0.0002	----	----	----
<0.0005	<0.0005	----	----	----
<0.0002	<0.0002	----	----	----



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS301_231108	0960_SD205_231108	----	----	----
Sampling date / time				08-Nov-2023 15:13	08-Nov-2023 16:17	----	----	----
Compound	CAS Number	LOR	Unit	EP2315735-016	EP2315735-017	-----	-----	-----
				Result	Result	---	---	---
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	---	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
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	%	83.0	86.0	----	----	----
13C8-PFOA	---	0.0002	%	99.5	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



QUALITY CONTROL REPORT

Work Order	: EP2315735	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 13-Nov-2023
C-O-C number	: 59788	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 17		
No. of samples analysed	: 17		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 5430077)									
EP2315735-001	0960_SD190_231108	EA055: Moisture Content	----	0.1	%	11.2	11.3	0.0	0% - 20%
EP2315735-011	0960_SD300_231108	EA055: Moisture Content	----	0.1	%	28.9	30.9	6.6	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5420865)									
EP2315662-004	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
EP2315863-035	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
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5420866)									
EP2315735-002	0960_QC115_231108	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	0.0012	0.0014	14.9	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 0070	0 0084	18.4	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0003	0.0003	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5420866) - continued									
EP2315735-012	0960_SD211_231108	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	0.0012	0.0010	26.0	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: 5420865)									
EP2315662-004	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 (PFTriDA)	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
EP2315863-035	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 (PFTriDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5420866)									
EP2315735-002	0960_QC115_231108	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



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: 5420866) - continued									
EP2315735-002	0960_QC115_231108	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
EP2315735-012	0960_SD211_231108	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: 5420865)							
EP2315662-004	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
EP2315863-035	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



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5420865) - continued									
EP2315863-035	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5420866)									
EP2315735-002	0960_QC115_231108	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
EP2315735-012	0960_SD211_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5420865)									
EP2315662-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit



Sub-Matrix: 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: 5420865) - continued									
EP2315863-035	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5420866)									
EP2315735-002	0960_QC115_231108	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
EP2315735-012	0960_SD211_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5420865)									
EP2315662-004	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2315863-035	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5420866)									
EP2315735-002	0960_QC115_231108	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0085	0.0101	17.2	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0082	0.0098	17.8	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0082	0.0098	17.8	0% - 20%
EP2315735-012	0960_SD211_231108	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0012	0.0010	18.2	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 (%)
EP231P: PFAS Sums (QC Lot: 5420866) - continued									
EP2315735-012	0960_SD211_231108	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0012	0.0010	18.2	No Limit
		EP231X: Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0012	0.0010	18.2	No Limit



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420865)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	107	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.2	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	94.1	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	105	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	112	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	111	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420866)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	102	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	98.7	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	105	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	93.5	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	97.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420865)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	121	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.6	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.6	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	69.0	135
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	101	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	113	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420866)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	106	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.2	71.0	131



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420866) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.8	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	69.0	135
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	106	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420865)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	115	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	110	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	95.7	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	101	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.6	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420866)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	97.1	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.0	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	106	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	116	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.0	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.0	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420865)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	106	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	105	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	107	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	98.8	54.8	124



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420866)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	97.4	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	104	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	92.9	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	88.3	54.8	124
EP231P: PFAS Sums (QCLot: 5420865)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231P: PFAS Sums (QCLot: 5420866)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420865)							
EP2315735-001	0960_SD190_231108	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	117	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	108	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	120	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	116	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	117	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420866)							
EP2315735-003	0960_SS192_231108	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	104	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	107	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	87.3	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	97.9	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	90.6	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	107	59.0	134



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420865)							
EP2315735-001	0960_SD190_231108	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	111	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	97.2	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	106	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	106	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	96.7	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	108	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	99.7	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	104	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	102	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	97.6	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	96.8	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420866)							
EP2315735-003	0960_SS192_231108	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	110	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	109	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	101	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	103	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	100	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	113	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	102	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	104	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	104	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	101	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	104	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420865)							
EP2315735-001	0960_SD190_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	97.6	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	111	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	89.3	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	100	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	87.7	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	101	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	98.8	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420866)							
EP2315735-003	0960_SS192_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	127	48.0	128



Sub-Matrix: **SOIL**

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: 5420866) - continued							
EP2315735-003	0960_SS192_231108	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	98.0	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	86.7	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	94.1	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	116	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	109	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	118	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420865)							
EP2315735-001	0960_SD190_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	101	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	101	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	112	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	111	60.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420866)							
EP2315735-003	0960_SS192_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	108	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	116	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	97.1	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	104	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315735	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth SD - SC	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]	No. of samples received	: 17
Order number	: pfas-omp Learmonth	No. of samples analysed	: 17

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							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2315735--001	0960_SD190_231108	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055) 0960_SD190_231108, 0960_SS192_231108, 0960_SS193_231108, 0960_SD305_231108, 0960_SD303_231108, 0960_SD300_231108, 0960_SD302_231108, 0960_SS298_231108, 0960_SD205_231108	0960_QC115_231108, 0960_QC118_231108, 0960_SD208_231108, 0960_SD304_231108, 0960_SD301_231108, 0960_SD211_231108, 0960_SD209_231108, 0960_SS301_231108,	08-Nov-2023	---	---	---	20-Nov-2023	22-Nov-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SD190_231108		08-Nov-2023	13-Nov-2023	06-May-2024	✓	13-Nov-2023	23-Dec-2023	✓
HDPE Soil Jar (EP231X) 0960_QC115_231108, 0960_QC118_231108, 0960_SD208_231108, 0960_SD304_231108, 0960_SD301_231108, 0960_SD211_231108, 0960_SD209_231108, 0960_SS301_231108,	0960_SS192_231108, 0960_SS193_231108, 0960_SD305_231108, 0960_SD303_231108, 0960_SD300_231108, 0960_SD302_231108, 0960_SS298_231108, 0960_SD205_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X) 0960_SD190_231108	08-Nov-2023	13-Nov-2023	06-May-2024	✓	13-Nov-2023	23-Dec-2023	✓
HDPE Soil Jar (EP231X) 0960_QC115_231108, 0960_QC118_231108, 0960_SD208_231108, 0960_SD304_231108, 0960_SD301_231108, 0960_SD211_231108, 0960_SD209_231108, 0960_SS301_231108, 0960_SS192_231108, 0960_SS193_231108, 0960_SD305_231108, 0960_SD303_231108, 0960_SD300_231108, 0960_SD302_231108, 0960_SS298_231108, 0960_SD205_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X) 0960_SD190_231108	08-Nov-2023	13-Nov-2023	06-May-2024	✓	13-Nov-2023	23-Dec-2023	✓
HDPE Soil Jar (EP231X) 0960_QC115_231108, 0960_QC118_231108, 0960_SD208_231108, 0960_SD304_231108, 0960_SD301_231108, 0960_SD211_231108, 0960_SD209_231108, 0960_SS301_231108, 0960_SS192_231108, 0960_SS193_231108, 0960_SD305_231108, 0960_SD303_231108, 0960_SD300_231108, 0960_SD302_231108, 0960_SS298_231108, 0960_SD205_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X) 0960_SD190_231108	08-Nov-2023	13-Nov-2023	06-May-2024	✓	13-Nov-2023	23-Dec-2023	✓
HDPE Soil Jar (EP231X) 0960_QC115_231108, 0960_QC118_231108, 0960_SD208_231108, 0960_SD304_231108, 0960_SD301_231108, 0960_SD211_231108, 0960_SD209_231108, 0960_SS301_231108, 0960_SS192_231108, 0960_SS193_231108, 0960_SD305_231108, 0960_SD303_231108, 0960_SD300_231108, 0960_SD302_231108, 0960_SS298_231108, 0960_SD205_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓



Matrix: SOIL

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X) 0960_SD190_231108	08-Nov-2023	13-Nov-2023	06-May-2024	✔	13-Nov-2023	23-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_QC115_231108, 0960_QC118_231108, 0960_SD208_231108, 0960_SD304_231108, 0960_SD301_231108, 0960_SD211_231108, 0960_SD209_231108, 0960_SS301_231108, 0960_SS192_231108, 0960_SS193_231108, 0960_SD305_231108, 0960_SD303_231108, 0960_SD300_231108, 0960_SD302_231108, 0960_SS298_231108, 0960_SD205_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	26-Dec-2023	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
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.



ALS Compass

SAMPLING *Intelligence*



Environmental Division
Perth
Work Order Reference
EP2315736



Telephone: -- 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA_0960_PFA50MP-23 Client: STANTEC

Project Manager:

59789 59786 59787 59788 59784 59790

Phone:

ALS Compass COC Reference: 59820 59798 Samples: 59794 59702 59785

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time: 9/11/23

Date / Time:

1220

Relinquished by:

Received by:

Date / Time:

Date / Time:



CHAIN OF CUSTODY

COC#: 59789

ALS Laboratory: EP Perth

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SD - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SS121		08/11/2023 10:39 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_SS123		08/11/2023 10:47 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
003	0960_SD200		08/11/2023 12:13 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
004	0960_SS292		08/11/2023 01:40 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
005	0960_SS291		08/11/2023 01:40 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
006	0960_SS227		08/11/2023 01:42 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
007	0960_SS293		08/11/2023 01:42 PM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59789

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWAHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFAASOMP_23

SITE: Learmonth SD - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWAHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_SS198		08/11/2023 01:49 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
009	0960_SD210		08/11/2023 01:53 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
010	0960_SD207		08/11/2023 02:16 PM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

ALS

COC#: 59789

ALS Laboratory: EP Perth

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SD - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SS121	HDPE Soil Jar	200 mL	00621122027848	Grey	No	
002	0960_SS123	HDPE Soil Jar	200 mL	00621122027873	Grey	No	
003	0960_SD200	HDPE Soil Jar	200 mL	00621122027848	Grey	No	
004	0960_SS292	HDPE Soil Jar	200 mL	00621122027921	Grey	No	
005	0960_SS291	HDPE Soil Jar	200 mL	00621122003325	Grey	No	
006	0960_SS227	HDPE Soil Jar	200 mL	00621122003272	Grey	No	
007	0960_SS293	HDPE Soil Jar	200 mL	00621122003385	Grey	No	
008	0960_SS198	HDPE Soil Jar	200 mL	00621122027883	Grey	No	
009	0960_SD210	HDPE Soil Jar	200 mL	00621122003397	Grey	No	
010	0960_SD207	HDPE Soil Jar	200 mL	00621122003396	Grey	No	

Total Bottle Count: ALS: 10, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2315736**

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

Laboratory : **Environmental Division Perth**
Contact : **Customer Services EP**
Address : **26 Rigali Way Wangara WA Australia
6065**

E-mail : **[REDACTED]@stantec.com**
Telephone : **----**
Facsimile : **----**

E-mail : **ALSEnviro.Perth@alsglobal.com**
Telephone : **+61-8-9406 1301**
Facsimile : **+61-8-9406 1399**

Project : **WA_0960_PFASOMP_23**
Order number : **pfas-omp Learmonth**
C-O-C number : **59789**
Site : **Learmonth SD - CG**
Sampler : **[REDACTED] [REDACTED]**

Page : **1 of 2**
Quote number : **ES2022MWHAUS0002 (SY/139/19 B)**
QC Level : **NEPM 2013 B3 & ALS QC Standard**

Dates

Date Samples Received : **10-Nov-2023 12:20**
Client Requested Due : **21-Nov-2023**
Date

Issue Date : **13-Nov-2023**
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **4**
Receipt Detail :

Security Seal : **Not Available**
Temperature : **17.6 - Ice present**
No. of samples received / analysed : **10 / 10**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

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

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EP2315736-001	08-Nov-2023 10:39	0960_SS121_231108	✓	✓
EP2315736-002	08-Nov-2023 10:47	0960_SS123_231108	✓	✓
EP2315736-003	08-Nov-2023 12:13	0960_SD200_231108	✓	✓
EP2315736-004	08-Nov-2023 13:40	0960_SS292_231108	✓	✓
EP2315736-005	08-Nov-2023 13:40	0960_SS291_231108	✓	✓
EP2315736-006	08-Nov-2023 13:42	0960_SS227_231108	✓	✓
EP2315736-007	08-Nov-2023 13:42	0960_SS293_231108	✓	✓
EP2315736-008	08-Nov-2023 13:49	0960_SS198_231108	✓	✓
EP2315736-009	08-Nov-2023 13:53	0960_SD210_231108	✓	✓
EP2315736-010	08-Nov-2023 14:16	0960_SD207_231108	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

- A4 - AU Tax Invoice (INV)

Email [REDACTED]@cardno.com.au

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]@esdat.com.au

- *AU Certificate of Analysis - NATA (COA)

Email [REDACTED]@stantec.com

- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)

Email [REDACTED]@stantec.com

- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)

Email [REDACTED]@stantec.com

- A4 - AU Sample Receipt Notification - Environmental HT (SRN)

Email [REDACTED]@stantec.com

- Chain of Custody (CoC) (COC)

Email [REDACTED]@stantec.com

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]@stantec.com

- EDI Format - XTab (XTAB)

Email [REDACTED]@stantec.com



CERTIFICATE OF ANALYSIS

Work Order	: EP2315736	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023 12:20
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 16-Nov-2023
C-O-C number	: 59789	Issue Date	: 21-Nov-2023 12:32
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 10		
No. of samples analysed	: 10		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

- 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

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SS121_231108	0960_SS123_231108	0960_SD200_231108	0960_SS292_231108	0960_SS291_231108
Sampling date / time				08-Nov-2023 10:39	08-Nov-2023 10:47	08-Nov-2023 12:13	08-Nov-2023 13:40	08-Nov-2023 13:40
Compound	CAS Number	LOR	Unit	EP2315736-001	EP2315736-002	EP2315736-003	EP2315736-004	EP2315736-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	0.6	0.8	6.4	1.9	1.0
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	0.0003	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	0.0183	0.0436	<0.0002	0.0025	0.0013
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0011	0.0021	<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	0.0005	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS121_231108	0960_SS123_231108	0960_SD200_231108	0960_SS292_231108	0960_SS291_231108
Sampling date / time					08-Nov-2023 10:39	08-Nov-2023 10:47	08-Nov-2023 12:13	08-Nov-2023 13:40	08-Nov-2023 13:40
Compound	CAS Number	LOR	Unit	EP2315736-001	EP2315736-002	EP2315736-003	EP2315736-004	EP2315736-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0202	0.0459	<0.0002	0.0025	0.0013	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0186	0.0438	<0.0002	0.0025	0.0013	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0186	0.0438	<0.0002	0.0025	0.0013	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	94.5	92.0	86.5	96.0	104	
13C8-PFOA	---	0.0002	%	102	100	101	108	108	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SS227_231108	0960_SS293_231108	0960_SS198_231108	0960_SD210_231108	0960_SD207_231108
Sampling date / time				08-Nov-2023 13:42	08-Nov-2023 13:42	08-Nov-2023 13:49	08-Nov-2023 13:53	08-Nov-2023 14:16
Compound	CAS Number	LOR	Unit	EP2315736-006	EP2315736-007	EP2315736-008	EP2315736-009	EP2315736-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	0.6	2.5	1.5	9.6	19.2
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	0.0008	0.0016	0.0003	0.0006	<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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS227_231108	0960_SS293_231108	0960_SS198_231108	0960_SD210_231108	0960_SD207_231108
Sampling date / time					08-Nov-2023 13:42	08-Nov-2023 13:42	08-Nov-2023 13:49	08-Nov-2023 13:53	08-Nov-2023 14:16
Compound	CAS Number	LOR	Unit	EP2315736-006	EP2315736-007	EP2315736-008	EP2315736-009	EP2315736-010	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0008	0.0016	0.0003	0.0006	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0008	0.0016	0.0003	0.0006	<0.0002	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0008	0.0016	0.0003	0.0006	<0.0002	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	92.5	91.5	95.5	87.0	85.5	
13C8-PFOA	---	0.0002	%	104	102	110	104	102	



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315736	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 16-Nov-2023
C-O-C number	: 59789	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]		
Site	: Learmonth SD - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 10		
No. of samples analysed	: 10		



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

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 5430086)									
EP2315736-001	0960_SS121_231108	EA055: Moisture Content	----	0.1	%	0.6	0.6	0.0	No Limit
EP2315737-001	Anonymous	EA055: Moisture Content	----	0.1	%	5.7	5.6	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5420866)									
EP2315735-002	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	0.0012	0.0014	14.9	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	0.0070	0.0084	18.4	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0003	0.0003	0.0	No Limit
EP2315735-012	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	0.0012	0.0010	26.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5420867)									
EP2315736-005	0960_SS291_231108	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 0013	0 0012	10 9	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	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 (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5420867) - continued									
EP2315737-005	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	0.0005	0.0005	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: 5420866)									
EP2315735-002	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	<0.0002	<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
EP2315735-012	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
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5420867)									
EP2315736-005	0960_SS291_231108	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



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: 5420867) - continued											
EP2315736-005	0960_SS291_231108	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		
EP2315737-005	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: 5420866)									
		EP2315735-002	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		
EP2315735-012	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		



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5420866) - continued									
EP2315735-012	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5420867)									
EP2315736-005	0960_SS291_231108	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
EP2315737-005	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5420866)									
EP2315735-002	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



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: 5420866) - continued									
EP2315735-012	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5420867)									
EP2315736-005	0960_SS291_231108	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
EP2315737-005	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
EP231P: PFAS Sums (QC Lot: 5420866)									
EP2315735-002	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0085	0.0101	17.2	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0082	0.0098	17.8	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0082	0.0098	17.8	0% - 20%
EP2315735-012	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0012	0.0010	18.2	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0012	0.0010	18.2	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0012	0.0010	18.2	No Limit
EP231P: PFAS Sums (QC Lot: 5420867)									
EP2315736-005	0960_SS291_231108	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
EP2315737-005	Anonymous	EP231X: Sum of PFAS	----	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 (%)
EP231P: PFAS Sums (QC Lot: 5420867) - continued									
EP2315737-005	Anonymous	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	---	0.0002	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**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420866)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	102	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	98.7	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	105	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	93.5	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	97.9	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420867)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	105	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.0	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	99.6	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	106	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	101	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	106	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420866)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	106	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.2	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.8	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	69.0	135
EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	106	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420867)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	108	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.8	71.0	131



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420867) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	112	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	113	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	111	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	108	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420866)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	97.1	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.0	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	106	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	116	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.0	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.0	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420867)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	119	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	101	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	97.6	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	91.5	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	93.1	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.4	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.0	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420866)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	97.4	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	104	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	92.9	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	88.3	54.8	124

Matrix Spike (MS) Report

Sub-Matrix: SOIL

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420866)							
EP2315735-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	104	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	107	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	87.3	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	97.9	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	90.6	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	107	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420867)							
EP2315736-006	0960_SS227_231108	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	114	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	107	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	98.0	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	104	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	110	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	102	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420866)							



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420866) - continued							
EP2315735-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	110	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	109	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	101	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	103	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	100	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	113	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	102	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	104	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	104	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	101	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	104	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420867)							
EP2315736-006	0960_SS227_231108	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	108	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	118	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	105	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	102	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	108	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	103	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	113	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	110	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	106	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	96.8	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	98.0	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420866)							
EP2315735-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	127	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	98.0	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	86.7	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	94.1	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	116	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	109	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	118	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420867)							
EP2315736-006	0960_SS227_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	128	48.0	128



Sub-Matrix: **SOIL**

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: 5420867) - continued							
EP2315736-006	0960_SS227_231108	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	88.9	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	114	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	95.7	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	106	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	87.6	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	124	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420866)							
EP2315735-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	108	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	116	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	97.1	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	104	60.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420867)							
EP2315736-006	0960_SS227_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	112	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	99.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	104	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	87.4	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315736	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth SD - CG	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]	No. of samples received	: 10
Order number	: pfas-omp Learmonth	No. of samples analysed	: 10

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

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

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

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

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055)								
0960_SS121_231108,	0960_SS123_231108,	08-Nov-2023	---	---	---	20-Nov-2023	22-Nov-2023	✓
0960_SD200_231108,	0960_SS292_231108,							
0960_SS291_231108,	0960_SS227_231108,							
0960_SS293_231108,	0960_SS198_231108,							
0960_SD210_231108,	0960_SD207_231108							
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0960 SS121 231108,	0960 SS123 231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
0960 SD200 231108,	0960 SS292 231108,							
0960 SS291 231108,	0960 SS227 231108,							
0960 SS293 231108,	0960 SS198 231108,							
0960 SD210 231108,	0960 SD207 231108							
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X)								
0960_SS121_231108,	0960_SS123_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
0960_SD200_231108,	0960_SS292_231108,							
0960_SS291_231108,	0960_SS227_231108,							
0960_SS293_231108,	0960_SS198_231108,							
0960_SD210_231108,	0960_SD207_231108							
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X)								
0960_SS121_231108,	0960_SS123_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
0960_SD200_231108,	0960_SS292_231108,							
0960_SS291_231108,	0960_SS227_231108,							
0960_SS293_231108,	0960_SS198_231108,							
0960_SD210_231108,	0960_SD207_231108							

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X)		08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
0960_SS121_231108,	0960_SS123_231108,							
0960_SD200_231108,	0960_SS292_231108,							
0960_SS291_231108,	0960_SS227_231108,							
0960_SS293_231108,	0960_SS198_231108,							
0960_SD210_231108,	0960_SD207_231108							
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X)		08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
0960_SS121_231108,	0960_SS123_231108,							
0960_SD200_231108,	0960_SS292_231108,							
0960_SS291_231108,	0960_SS227_231108,							
0960_SS293_231108,	0960_SS198_231108,							
0960_SD210_231108,	0960_SD207_231108							



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	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
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.



ALS Compass

SAMPLING *Intelligence*



Environmental Division
Perth

Work Order Reference
EP2315737



Telephone : - (01-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PPASOMP-23 Client: STANTEC

Project Manager:

ALS Compass COC Reference: 59789 59786 59787 59788 59784 59790
59820 59798 Samples: 59794 59792 59785

Phone:

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time: 9/11/23

Date / Time:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass



CHAIN OF CUSTODY

COC#: 59790

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth SD - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SS122		08/11/2023 08:04 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_SS124		08/11/2023 09:17 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
003	0960_QC123		08/11/2023 09:18 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
004	0960_SS125		08/11/2023 09:30 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
005	0960_SD199		08/11/2023 10:31 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
006	0960_SS189		08/11/2023 12:48 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
007	0960_SS288		08/11/2023 01:38 PM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59790

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth SD - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SS122	HDPE Soil Jar	200 mL	00621122003358	Grey	No	
002	0960_SS124	HDPE Soil Jar	200 mL	00620322054878	Grey	No	
003	0960_QC123	HDPE Soil Jar	200 mL	00621222053883	Grey	No	
004	0960_SS125	HDPE Soil Jar	200 mL	00621122027880	Grey	No	
005	0960_SD198	HDPE Soil Jar	200 mL	00621222053891	Grey	No	
006	0960_SS189	HDPE Soil Jar	200 mL	00620322054847	Grey	No	
007	0960_SS288	HDPE Soil Jar	200 mL	00621222067067	Grey	No	

Total Bottle Count: ALS: 7, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2315737

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
Telephone :
Facsimile :

E-mail : ALSEnviro.Perth@alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_23
Order number : pfas-omp Learmonth
C-O-C number : 59790
Site : Learmonth SD - JS
Sampler :

Page : 1 of 2
Quote number : ES2022MWHAUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 10-Nov-2023 12:20
Client Requested Due : 21-Nov-2023
Date :

Issue Date : 13-Nov-2023
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 4
Receipt Detail :

Security Seal : Not Available
Temperature : 17.6 - Ice present
No. of samples received / analysed : 7 / 7

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2315737	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023 12:20
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 16-Nov-2023
C-O-C number	: 59790	Issue Date	: 21-Nov-2023 12:04
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 7		
No. of samples analysed	: 7		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

- 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

				0960_SS122_231108	0960_SS124_231108	0960_QC123_231108	0960_SS125_231108	0960_SD199_231108
Sampling date / time				08-Nov-2023 08:04	08-Nov-2023 09:17	08-Nov-2023 09:18	08-Nov-2023 09:30	08-Nov-2023 10:31
Compound	CAS Number	LOR	Unit	EP2315737-001	EP2315737-002	EP2315737-003	EP2315737-004	EP2315737-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	5.7	2.6	1.6	27.3	3.1
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	0.0114	0.0030	0.0182	0.0041	0.0005
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0005	0.0004	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<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	0.0004	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0005	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS122_231108	0960_SS124_231108	0960_QC123_231108	0960_SS125_231108	0960_SD199_231108
Sampling date / time					08-Nov-2023 08:04	08-Nov-2023 09:17	08-Nov-2023 09:18	08-Nov-2023 09:30	08-Nov-2023 10:31
Compound	CAS Number	LOR	Unit	EP2315737-001	EP2315737-002	EP2315737-003	EP2315737-004	EP2315737-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0114	0.0030	0.0200	0.0045	0.0005	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0114	0.0030	0.0182	0.0041	0.0005	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0114	0.0030	0.0184	0.0041	0.0005	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	100	93.5	98.5	99.0	100	
13C8-PFOA	---	0.0002	%	105	98.5	108	112	115	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS189_231108	0960_SS288_231108	----	----	----
Sampling date / time				08-Nov-2023 12:48	08-Nov-2023 13:38	----	----	----
Compound	CAS Number	LOR	Unit	EP2315737-006	EP2315737-007	-----	-----	-----
				Result	Result	---	---	---
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	8.2	3.6	----	----	----
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	0.0043	0.0026	----	----	----
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	<0.0002	<0.0002	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS189_231108	0960_SS288_231108	----	----	----
Sampling date / time					08-Nov-2023 12:48	08-Nov-2023 13:38	----	----	----
Compound	CAS Number	LOR	Unit		EP2315737-006	EP2315737-007	-----	-----	-----
				Result	Result	---	---	---	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg		0.0045	0.0026	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0043	0.0026	----	----	----
Sum of PFAS (WA DER List)	---	0.0002	mg/kg		0.0043	0.0026	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%		92.5	97.5	----	----	----
13C8-PFOA	---	0.0002	%		102	110	----	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315737	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 16-Nov-2023
C-O-C number	: 59790	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 7		
No. of samples analysed	: 7		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 5430086)									
EP2315736-001	Anonymous	EA055: Moisture Content	----	0.1	%	0.6	0.6	0.0	No Limit
EP2315737-001	0960_SS122_231108	EA055: Moisture Content	----	0.1	%	5.7	5.6	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5420867)									
EP2315736-005	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	0.0013	0.0012	10.9	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2315737-005	0960_SD199_231108	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	0.0005	0.0005	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: 5420867)									
EP2315736-005	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



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: 5420867) - continued									
EP2315736-005	Anonymous	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
EP2315737-005	0960_SD199_231108	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: 5420867)							
EP2315736-005	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
EP2315737-005	0960_SD199_231108	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



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5420867) - continued									
EP2315737-005	0960_SD199_231108	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5420867)									
EP2315736-005	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
EP2315737-005	0960_SD199_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5420867)									
EP2315736-005	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
EP2315737-005	0960_SD199_231108	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit

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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
		LCS	Low	High
Result				
<0.0002	0.0011 mg/kg	105	72.0	128
<0.0002	0.00125 mg/kg	96.0	73.0	123
<0.0002	0.00118 mg/kg	99.6	67.0	130
<0.0002	0.00119 mg/kg	106	70.0	132
<0.0002	0.00116 mg/kg	101	68.0	136
<0.0002	0.0012 mg/kg	106	59.0	134
<0.001	0.00625 mg/kg	108	71.0	135
<0.0002	0.00125 mg/kg	114	69.0	132
<0.0002	0.00125 mg/kg	110	70.0	132
<0.0002	0.00125 mg/kg	98.8	71.0	131
<0.0002	0.00125 mg/kg	110	69.0	133
<0.0002	0.00125 mg/kg	112	72.0	129
<0.0002	0.00125 mg/kg	113	69.0	133
<0.0002	0.00125 mg/kg	111	64.0	136
<0.0002	0.00125 mg/kg	105	69.0	135
<0.0002	0.00125 mg/kg	106	66.0	139
<0.0005	0.00125 mg/kg	108	69.0	133
<0.0002	0.00125 mg/kg	119	67.0	137
<0.0005	0.00312 mg/kg	101	59.6	143
<0.0005	0.00312 mg/kg	97.6	62.8	140
<0.0005	0.00312 mg/kg	91.5	61.5	139
<0.0005	0.00312 mg/kg	93.1	61.9	139
<0.0002	0.00125 mg/kg	96.4	63.0	144
<0.0002	0.00125 mg/kg	92.0	61.0	139

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420867) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	117	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	102	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	108	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	97.5	54.8	124
EP231P: PFAS Sums (QCLot: 5420867)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	---	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	---	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	---	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420867)							
EP2315736-006	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	114	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	107	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	98.0	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	104	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	110	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	102	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420867)							
EP2315736-006	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	108	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	118	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	105	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	102	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	108	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	103	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	113	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	110	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	106	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	96.8	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	98.0	69.0	133
		EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420867)					



Sub-Matrix: **SOIL**

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: 5420867) - continued							
EP2315736-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	128	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	88.9	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	114	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	95.7	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	106	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	87.6	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	124	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420867)							
EP2315736-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	112	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	99.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	104	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	87.4	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315737	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth SD - JS	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 7
Order number	: pfas-omp Learmonth	No. of samples analysed	: 7

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **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) 0960_SS122_231108, 0960_QC123_231108, 0960_SD199_231108, 0960_SS288_231108	0960_SS124_231108, 0960_SS125_231108, 0960_SS189_231108,	08-Nov-2023	---	---	---	20-Nov-2023	22-Nov-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SS122_231108, 0960_QC123_231108, 0960_SD199_231108, 0960_SS288_231108	0960_SS124_231108, 0960_SS125_231108, 0960_SS189_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) 0960_SS122_231108, 0960_QC123_231108, 0960_SD199_231108, 0960_SS288_231108	0960_SS124_231108, 0960_SS125_231108, 0960_SS189_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) 0960_SS122_231108, 0960_QC123_231108, 0960_SD199_231108, 0960_SS288_231108	0960_SS124_231108, 0960_SS125_231108, 0960_SS189_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SS122_231108, 0960_QC123_231108, 0960_SD199_231108, 0960_SS288_231108	0960_SS124_231108, 0960_SS125_231108, 0960_SS189_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	26-Dec-2023	✓



Matrix: SOIL

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X)								
0960_SS122_231108,	0960_SS124_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	26-Dec-2023	✔
0960_QC123_231108,	0960_SS125_231108,							
0960_SD199_231108,	0960_SS189_231108,							
0960_SS288_231108								



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	17	11.76	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.



ALScompass

SAMPLING Intelligence

Custody Document for Submissions via ALS Compass App

Environmental Division
Perth

Work Order Reference

EP2315738



Telephone : - 61-9-9106 1301

Project: WA-0960-PEASOMP-23 Client: STANTEC Project Manager: [REDACTED]

Phone:

54789-59786 59787 59788 59789 59790

Sampler:

ALS Compass COC Reference: 59780 59781 59782 59783 59784 59785 59786 59787 59788 59789 59790

Phone:

Turnaround Requirements: Standard

Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time: 9/11/23

Date / Time:

Date / Time:

Relinquished by:

Received by:

Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - MB

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A

Yes No N/A

°C

RECEIVED BY:

RECEIVED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsate WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_MW151		08/11/2023 06:16 AM	WATER	ALS: 3 Non ALS: 0	No		X		
002	0960_MW236		08/11/2023 08:30 AM	WATER	ALS: 3 Non ALS: 0	No		X		
003	0960_QC119		08/11/2023 08:30 AM	WATER	ALS: 2 Non ALS: 0	No	X			
004	0960_MW148D		08/11/2023 08:50 AM	WATER	ALS: 5 Non ALS: 0	No		X		Extra pfas bottles for lab qc
005	0960_MW148S		08/11/2023 08:54 AM	WATER	ALS: 3 Non ALS: 0	No		X		
006	0960_MW104		08/11/2023 09:27 AM	WATER	ALS: 3 Non ALS: 0	No		X		
007	0960_MW124		08/11/2023 09:46 AM	WATER	ALS: 3 Non ALS: 0	No		X		

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - MIB

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

CONTACT PH: [REDACTED]

QUOTE NO: SY/139/19 B

TURNAROUND REQUIREMENTS: 5 Days

Biohazard Info: [REDACTED]

LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free Ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

RECEIVED BY:

RECEIVED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

SAMPLE DETAILS				ANALYSIS REQUIRED			
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	ADDITIONAL INFORMATION
015	0960_MW139		08/11/2023 03:44 PM	WATER	ALS: 5 Non ALS: 0	No	Extra plus bottles for lab qc
				Rinsate WATER	X		
				WA CMP Water Suite WATER			
				ALTERNATIVE ANALYSIS			

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD
PROJECT: WA_0960_PFA5OMP_23
SITE: Learmonth GW - MB

ORDER NO: pfas-omp Learmonth
PROJECT MANAGER: [REDACTED]
PRIMARY SAMPLER: [REDACTED]
EMAIL REPORTS TO: [REDACTED]
EMAIL INVOICES TO: [REDACTED]

CONTACT PH: [REDACTED]
QUOTE NO: SY7139/19 B

Biohazard info:

SAMPLER MOBILE: [REDACTED]
/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS : 5 Days

LABORATORY USE ONLY (Circle)

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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_MW151	HDPE (no PTFE)	20 mL	00351221020597	Grey	No	
001	0960_MW151	HDPE (no PTFE)	20 mL	00351221020498	Grey	No	
001	0960_MW151	Clear Plastic Bottle - Natural	125 mL	00070522075465	Green	No	
002	0960_MW238	HDPE (no PTFE)	20 mL	00351221020701	Grey	No	
002	0960_MW238	HDPE (no PTFE)	20 mL	00351221020429	Grey	No	
002	0960_MW238	Clear Plastic Bottle - Natural	125 mL	00070522075366	Green	No	
003	0960_QC119	HDPE (no PTFE)	20 mL	00351221020388	Grey	No	
003	0960_QC119	HDPE (no PTFE)	20 mL	00351221020487	Grey	No	
004	0960_MW148D	Clear Plastic Bottle - Natural	125 mL	00070522075430	Green	No	
004	0960_MW148D	HDPE (no PTFE)	20 mL	00351221020575	Grey	No	
004	0960_MW148D	HDPE (no PTFE)	20 mL	00351221020930	Grey	No	
004	0960_MW148D	HDPE (no PTFE)	20 mL	00351221020627	Grey	No	
005	0960_MW148S	HDPE (no PTFE)	20 mL	00351221020662	Grey	No	
005	0960_MW148S	Clear Plastic Bottle - Natural	125 mL	00070522075545	Green	No	
005	0960_MW148S	HDPE (no PTFE)	20 mL	00351221020674	Grey	No	
006	0960_MW104	HDPE (no PTFE)	20 mL	00351221020623	Grey	No	
006	0960_MW104	Clear Plastic Bottle - Natural	125 mL	00070522075470	Green	No	
006	0960_MW104	HDPE (no PTFE)	20 mL	00351221020468	Grey	No	
007	0960_MW124	HDPE (no PTFE)	20 mL	00351221020440	Grey	No	
007	0960_MW124	Clear Plastic Bottle - Natural	125 mL	00070522075461	Green	No	
007	0960_MW124	HDPE (no PTFE)	20 mL	00351221020406	Grey	No	
008	0960_MW102	HDPE (no PTFE)	20 mL	00351221020909	Grey	No	
008	0960_MW102	Clear Plastic Bottle - Natural	125 mL	00070522075411	Green	No	
008	0960_MW102	HDPE (no PTFE)	20 mL	00351221020699	Grey	No	
008	0960_MW102	HDPE (no PTFE)	20 mL	00351221020807	Grey	No	
008	0960_MW102	HDPE (no PTFE)	20 mL	00351221020718	Grey	No	

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD
PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth GW - MB

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MMWHAUS0002

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comments:

Yes No N/A
Yes No N/A
°C

RELINQUISHED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

RECEIVED BY:
DATE TIME:

008	0960_MW102	HDPE (no PTFE)	20 mL	00351221020552	Grey	No
009	0960_MW105	HDPE (no PTFE)	20 mL	00351221020664	Grey	No
009	0960_MW105	HDPE (no PTFE)	20 mL	00351221020422	Grey	No
010	0960_MW159	Clear Plastic Bottle - Natural	125 mL	00071121128562	Green	No
010	0960_MW159	HDPE (no PTFE)	20 mL	00351221020485	Grey	No
010	0960_MW159	HDPE (no PTFE)	20 mL	00351221020672	Grey	No
011	0960_MW103	Clear Plastic Bottle - Natural	125 mL	00070522075422	Green	No
011	0960_MW103	Clear Plastic Bottle - Natural	125 mL	00070522075466	Green	No
011	0960_MW103	HDPE (no PTFE)	20 mL	00351221020864	Grey	No
012	0960_MW126	HDPE (no PTFE)	20 mL	00351221020867	Grey	No
012	0960_MW126	HDPE (no PTFE)	20 mL	00351221020877	Grey	No
012	0960_MW126	HDPE (no PTFE)	20 mL	00351221020802	Grey	No
013	0960_MW170	Clear Plastic Bottle - Natural	125 mL	00070522075389	Green	No
013	0960_MW170	HDPE (no PTFE)	20 mL	00351221020966	Grey	No
013	0960_MW170	HDPE (no PTFE)	20 mL	00351221020720	Grey	No
014	0960_MW172	Clear Plastic Bottle - Natural	125 mL	00070522075449	Green	No
014	0960_MW172	HDPE (no PTFE)	20 mL	00351221020641	Grey	No
014	0960_MW172	HDPE (no PTFE)	20 mL	00351221020704	Grey	No
015	0960_MW139	Clear Plastic Bottle - Natural	125 mL	00071121128728	Green	No
015	0960_MW139	HDPE (no PTFE)	20 mL	00351221020414	Grey	No
015	0960_MW139	HDPE (no PTFE)	20 mL	00351221020728	Grey	No
015	0960_MW139	HDPE (no PTFE)	20 mL	00351221020649	Grey	No
015	0960_MW139	HDPE (no PTFE)	20 mL	00351221020775	Grey	No
015	0960_MW139	Clear Plastic Bottle - Natural	125 mL	00070522075373	Green	No

Total Bottle Count: ALS: 50, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2315738**

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

Laboratory : **Environmental Division Perth**
Contact : **Customer Services EP**
Address : **26 Rigali Way Wangara WA Australia
6065**

E-mail : **[REDACTED]@stantec.com**
Telephone : **[REDACTED]**
Facsimile : **[REDACTED]**

E-mail : **ALSEnviro.Perth@alsglobal.com**
Telephone : **+61-8-9406 1301**
Facsimile : **+61-8-9406 1399**

Project : **WA_0960_PFASOMP_23**
Order number : **pfas-omp Learmonth**
C-O-C number : **59792**
Site : **Learmonth GW - MB**
Sampler : **[REDACTED]**

Page : **1 of 2**
Quote number : **ES2022MWHHAUS0002 (SY/139/19 B)**
QC Level : **NEPM 2013 B3 & ALS QC Standard**

Dates

Date Samples Received : **10-Nov-2023 12:20**
Date : **13-Nov-2023**
Client Requested Due : **21-Nov-2023**
Date : **21-Nov-2023**

Issue Date : **13-Nov-2023**
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **4**
Receipt Detail : **:**

Security Seal : **Not Available**
Temperature : **17.6 - Ice present**
No. of samples received / analysed : **15 / 15**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

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

Summary of Sample(s) and Requested Analysis

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

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

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EP2315738-001	08-Nov-2023 08:16	0960_MW151_231108	✓	✓
EP2315738-002	08-Nov-2023 08:30	0960_MW238_231108	✓	✓
EP2315738-003	08-Nov-2023 08:30	0960_QC119_231108	✓	
EP2315738-004	08-Nov-2023 08:50	0960_MW148D_231108	✓	✓
EP2315738-005	08-Nov-2023 08:54	0960_MW148S_231108	✓	✓
EP2315738-006	08-Nov-2023 09:27	0960_MW104_231108	✓	✓
EP2315738-007	08-Nov-2023 09:46	0960_MW124_231108	✓	✓
EP2315738-008	08-Nov-2023 10:27	0960_MW102_231108	✓	✓
EP2315738-009	08-Nov-2023 11:00	0960_MW105_231108	✓	✓
EP2315738-010	08-Nov-2023 12:36	0960_MW159_231108	✓	✓
EP2315738-011	08-Nov-2023 13:02	0960_MW103_231108	✓	✓
EP2315738-012	08-Nov-2023 15:27	0960_MW126_231108	✓	✓
EP2315738-013	08-Nov-2023 15:28	0960_MW170_231108	✓	✓
EP2315738-014	08-Nov-2023 15:29	0960_MW172_231108	✓	✓
EP2315738-015	08-Nov-2023 15:44	0960_MW139_231108	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

- A4 - AU Tax Invoice (INV)

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

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

Email

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stantec.com



CERTIFICATE OF ANALYSIS

Work Order : EP2315738
Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE TERRACE
PERTH 6000
Telephone :
Project : WA_0960_PFASOMP_23
Order number : pfas-omp Learmonth
C-O-C number : 59792
Sampler :
Site : Learmonth GW - MB
Quote number : SY/139/19 B
No. of samples received : 15
No. of samples analysed : 15

Page : 1 of 12
Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : +61-8-9406 1301
Date Samples Received : 10-Nov-2023 12:20
Date Analysis Commenced : 13-Nov-2023
Issue Date : 21-Nov-2023 22:35



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
	Inorganics Supervisor	Perth Inorganics, Wangara, WA
	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID		0960_MW151_231108		0960_MW238_231108		0960_QC119_231108		0960_MW148D_231108		0960_MW148S_231108	
Compound	CAS Number	Sampling date / time		LOR	Unit	08-Nov-2023 08:16		08-Nov-2023 08:30		08-Nov-2023 08:30		08-Nov-2023 08:50		08-Nov-2023 08:54	
						EP2315738-001	Result	EP2315738-002	Result	EP2315738-003	Result	EP2315738-004	Result	EP2315738-005	Result
ED037P: Alkalinity by PC Titrator															
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1		<1		<1		----		<1		<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1		2		2		----		<1		<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		838		796		796		----		160		394
Total Alkalinity as CaCO3	----	1	mg/L		838		798		798		----		160		394
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA															
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		507		835		835		----		3390		1860
ED045G: Chloride by Discrete Analyser															
Chloride	16887-00-6	1	mg/L		3510		940		940		----		26800		15400
ED093F: Dissolved Major Cations															
Calcium	7440-70-2	1	mg/L		407		99		99		----		1030		796
Magnesium	7439-95-4	1	mg/L		197		45		45		----		1700		1040
Sodium	7440-23-5	1	mg/L		2590		1370		1370		----		16500		9670
Potassium	7440-09-7	1	mg/L		100		53		53		----		490		281
EN055: Ionic Balance															
ø Total Anions	----	0.01	meq/L		126		59.8		59.8		----		830		481
ø Total Cations	----	0.01	meq/L		152		69.6		69.6		----		922		553
ø Ionic Balance	----	0.01	%		9.14		7.53		7.53		----		5.24		6.97
EP231A: Perfluoroalkyl Sulfonic Acids															
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		3.10		1.54		1.54		1.61		1.28		8.93
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		4.82		1.91		1.91		1.58		0.95		7.30
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		30.6		10.9		10.9		11.1		4.01		29.2
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		4.18		1.48		1.48		1.17		0.32		3.98
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		23.8		10.8		10.8		10.1		2.16		25.7
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02		<0.02		<0.02		<0.02		<0.02		<0.02



Analytical Results

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID		0960_MW148S_231108		0960_MW148D_231108		0960_MW148S_231108	
				Sampling date / time							
				LOR		Unit					
Compound				CAS Number							
							Result		Result		Result
EP231B: Perfluoroalkyl Carboxylic Acids											
Perfluorobutanoic acid (PFBA)				375-22-4	0.1	µg/L	1.1	0.7	0.7	0.3	2.2
Perfluoropentanoic acid (PFPeA)				2706-90-3	0.02	µg/L	1.76	1.21	1.15	0.32	2.31
Perfluorohexanoic acid (PFHxA)				307-24-4	0.02	µg/L	11.0	5.34	5.45	1.46	11.5
Perfluoroheptanoic acid (PFHpA)				375-85-9	0.02	µg/L	0.79	0.44	0.46	0.16	1.16
Perfluorooctanoic acid (PFOA)				335-67-1	0.01	µg/L	2.17	0.87	0.83	0.27	1.89
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 (PFTriDA)				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
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											



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)		Sample ID							
		Sampling date / time							
Compound	CAS Number	LOR	Unit	0960_MW151_231108	0960_MW238_231108	0960_QC119_231108	0960_MW148D_231108	0960_MW148S_231108	
				EP2315738-001	EP2315738-002	EP2315738-003	EP2315738-004	EP2315738-005	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
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	83.3	35.2	34.2	11.2	94.2	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	54.4	21.7	21.2	6.17	54.9	
Sum of PFAS (WA DER List)	---	0.01	µg/L	74.3	31.8	31.4	9.96	82.9	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	102	102	93.7	98.4	102	
13C8-PFOA	---	0.02	%	107	112	110	108	110	

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID		0960_MW104_231108		0960_MW124_231108		0960_MW102_231108		0960_MW105_231108		0960_MW159_231108	
				Sampling date / time				08-Nov-2023 09:27		08-Nov-2023 09:46		08-Nov-2023 10:27		08-Nov-2023 11:00	
				Unit				EP2315738-006		EP2315738-007		EP2315738-008		EP2315738-009	
Compound				CAS Number	LOR			Result		Result		Result		Result	
ED037P: Alkalinity by PC Titrator															
Hydroxide Alkalinity as CaCO3				DMO-210-001	1	mg/L		<1		<1		<1		<1	
Carbonate Alkalinity as CaCO3				3812-32-6	1	mg/L		<1		<1		<1		<1	
Bicarbonate Alkalinity as CaCO3				71-52-3	1	mg/L		213		173		144		465	
Total Alkalinity as CaCO3				----	1	mg/L		213		173		144		465	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA															
Sulfate as SO4 - Turbidimetric				14808-79-8	1	mg/L		3910		4350		3460		1970	
ED045G: Chloride by Discrete Analyser															
Chloride				16887-00-6	1	mg/L		27000		29200		33400		14800	
ED093F: Dissolved Major Cations															
Calcium				7440-70-2	1	mg/L		866		1000		1620		867	
Magnesium				7439-95-4	1	mg/L		2200		2280		2130		1140	
Sodium				7440-23-5	1	mg/L		18200		19300		19100		9250	
Potassium				7440-09-7	1	mg/L		671		712		432		313	
EN055: Ionic Balance															
ø Total Anions				----	0.01	meq/L		847		918		1020		468	
ø Total Cations				----	0.01	meq/L		1030		1100		1100		547	
ø Ionic Balance				----	0.01	%		9.88		8.82		3.82		7.84	
EP231A: Perfluoroalkyl Sulfonic Acids															
Perfluorobutane sulfonic acid (PFBS)				375-73-5	0.02	µg/L		<0.02		<0.02		<0.02		0.17	
Perfluoropentane sulfonic acid (PFPeS)				2706-91-4	0.02	µg/L		<0.02		<0.02		<0.02		0.22	
Perfluorohexane sulfonic acid (PFHxS)				355-46-4	0.01	µg/L		0.02		<0.01		<0.01		1.00	
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		0.05	
Perfluorodecane sulfonic acid (PFDS)				335-77-3	0.02	µg/L		<0.02		<0.02		<0.02		<0.02	



Analytical Results

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	
		Sampling date / time			
Compound	CAS Number	LOR	Unit		
				0960_MW104_231108	0960_MW104_231108
				08-Nov-2023 09:27	08-Nov-2023 09:27
				EP2315738-006	EP2315738-006
				Result	Result
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	0.04
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.21
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 (PFTriDA)	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
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					



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)		Sample ID		0960_MW104_231108	0960_MW124_231108	0960_MW102_231108	0960_MW105_231108	0960_MW159_231108
		Sampling date / time		08-Nov-2023 09:27	08-Nov-2023 09:46	08-Nov-2023 10:27	08-Nov-2023 11:00	08-Nov-2023 12:36
Compound	CAS Number	LOR	Unit	EP2315738-006	EP2315738-007	EP2315738-008	EP2315738-009	EP2315738-010
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	---	0.01	µg/L	0.02	<0.01	<0.01	1.70	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	<0.01	<0.01	1.05	<0.01
Sum of PFAS (WA DER List)	---	0.01	µg/L	0.02	<0.01	<0.01	1.48	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	94.6	103	94.3	97.4	101
13C8-PFOA	---	0.02	%	102	110	101	102	101



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID													
Compound	CAS Number	LOR	Sampling date / time	Unit	0960_MW103_231108		0960_MW126_231108		0960_MW170_231108		0960_MW172_231108		0960_MW139_231108			
						08-Nov-2023 13:02		08-Nov-2023 15:27		08-Nov-2023 15:28		08-Nov-2023 15:29		08-Nov-2023 15:44		
					Result	EP2315738-011	Result	EP2315738-012	Result	EP2315738-013	Result	EP2315738-014	Result	EP2315738-015		
ED037P: Alkalinity by PC Titrator																
Hydroxide Alkalinity as CaCO3	DMO-210-001	1		mg/L	<1		<1		<1		<1		<1		<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1		mg/L	<1		<1		<1		<1		<1		<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1		mg/L	356		209		318		377		239		239	
Total Alkalinity as CaCO3	----	1		mg/L	356		209		318		377		239		239	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA																
Sulfate as SO4 - Turbidimetric	14808-79-8	1		mg/L	2540		2290		1530		2510		3780		3780	
ED045G: Chloride by Discrete Analyser																
Chloride	16887-00-6	1		mg/L	26500		22800		12300		10000		22100		22100	
ED093F: Dissolved Major Cations																
Calcium	7440-70-2	1		mg/L	1530		998		892		442		822		822	
Magnesium	7439-95-4	1		mg/L	1930		1570		758		530		1890		1890	
Sodium	7440-23-5	1		mg/L	14600		13700		7540		6990		14500		14500	
Potassium	7440-09-7	1		mg/L	447		430		127		150		545		545	
EN055: Ionic Balance																
ø Total Anions	----	0.01		meq/L	808		695		385		342		707		707	
ø Total Cations	----	0.01		meq/L	882		786		438		374		841		841	
ø Ionic Balance	----	0.01		%	4.39		6.14		6.43		4.43		8.68		8.68	
EP231A: Perfluoroalkyl Sulfonic Acids																
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02		µg/L	0.21		<0.02		0.06		0.76		<0.02		<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02		µg/L	0.09		<0.02		0.06		1.07		<0.02		<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01		µg/L	0.31		<0.01		0.49		7.43		<0.01		<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02		µg/L	<0.02		<0.02		<0.02		0.27		<0.02		<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01		µg/L	<0.01		<0.01		<0.01		2.13		<0.01		<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02		µg/L	<0.02		<0.02		<0.02		<0.02		<0.02		<0.02	



Analytical Results

Sub-Matrix: GROUNDWATER
(Matrix: WATER)

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID		0960_MW103_231108		0960_MW126_231108		0960_MW170_231108		0960_MW172_231108		0960_MW139_231108	
				Sampling date / time		08-Nov-2023 13:02		08-Nov-2023 15:27		08-Nov-2023 15:28		08-Nov-2023 15:29		08-Nov-2023 15:44	
				LOR		EP2315738-011		EP2315738-012		EP2315738-013		EP2315738-014		EP2315738-015	
Compound				CAS Number	Unit	Result		Result		Result		Result		Result	
EP231B: Perfluoroalkyl Carboxylic Acids															
Perfluorobutanoic acid (PFBA)				375-22-4	µg/L	<0.1		<0.1		<0.1		0.3		<0.1	
Perfluoropentanoic acid (PFPeA)				2706-90-3	µg/L	0.02		<0.02		0.02		0.55		<0.02	
Perfluorohexanoic acid (PFHxA)				307-24-4	µg/L	0.10		<0.02		0.07		2.52		<0.02	
Perfluoroheptanoic acid (PFHpA)				375-85-9	µg/L	<0.02		<0.02		<0.02		0.30		<0.02	
Perfluorooctanoic acid (PFOA)				335-67-1	µg/L	<0.01		<0.01		<0.01		0.42		<0.01	
Perfluorononanoic acid (PFNA)				375-95-1	µg/L	0.02		0.02		0.02		0.02		0.02	
Perfluorodecanoic acid (PFDA)				335-76-2	µg/L	<0.02		<0.02		<0.02		<0.02		<0.02	
Perfluoroundecanoic acid (PFUnDA)				2058-94-8	µg/L	<0.02		<0.02		<0.02		<0.02		<0.02	
Perfluorododecanoic acid (PFDoDA)				307-55-1	µg/L	<0.02		<0.02		<0.02		<0.02		<0.02	
Perfluorotridecanoic acid (PFTriDA)				72629-94-8	µg/L	<0.02		<0.02		<0.02		<0.02		<0.02	
Perfluorotetradecanoic acid (PFTeDA)				376-06-7	µg/L	<0.05		<0.05		<0.05		<0.05		<0.05	
EP231C: Perfluoroalkyl Sulfonamides															
Perfluorooctane sulfonamide (FOSA)				754-91-6	µg/L	<0.02		<0.02		<0.02		<0.02		<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)				31506-32-8	µg/L	<0.05		<0.05		<0.05		<0.05		<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)				4151-50-2	µg/L	<0.05		<0.05		<0.05		<0.05		<0.05	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)				24448-09-7	µg/L	<0.05		<0.05		<0.05		<0.05		<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)				1691-99-2	µg/L	<0.05		<0.05		<0.05		<0.05		<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)				2355-31-9	µg/L	<0.02		<0.02		<0.02		<0.02		<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)				2991-50-6	µg/L	<0.02		<0.02		<0.02		<0.02		<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids															



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)		Sample ID		0960_MW103_231108	0960_MW126_231108	0960_MW170_231108	0960_MW172_231108	0960_MW139_231108
		Sampling date / time		08-Nov-2023 13:02	08-Nov-2023 15:27	08-Nov-2023 15:28	08-Nov-2023 15:29	08-Nov-2023 15:44
		LOR		EP2315738-011	EP2315738-012	EP2315738-013	EP2315738-014	EP2315738-015
		CAS Number						
		Unit		Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
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	0.73	<0.01	0.70	15.8	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.31	<0.01	0.49	9.56	<0.01
Sum of PFAS (WA DER List)	---	0.01	µg/L	0.64	<0.01	0.64	14.4	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	103	98.5	92.4	87.5	100
13C8-PFOA	---	0.02	%	102	108	102	110	104



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315738	Page	: 1 of 13
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 13-Nov-2023
C-O-C number	: 59792	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]		
Site	: Learmonth GW - MB		
Quote number	: SY/139/19 B		
No. of samples received	: 15		
No. of samples analysed	: 15		



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

This 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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

Key :

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

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

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5426146)									
EP2315734-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	126	128	1.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	126	128	1.3	0% - 20%
EP2315734-012	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	5	138	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	126	123	2.1	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	126	128	2.2	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5438048)									
EP2315738-008	0960_MW102_231108	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	144	144	0.0	0% - 20%
		ED037 P Total Alkalinity as CaCO3	----	1	mg/L	144	144	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5427268)									
EP2315734-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	6550	6420	2.1	0% - 20%
EP2315738 009	0960 MW105 231108	ED041G: Sulfate as SO4 - Turbidimetric	14808 79 8	1	mg/L	1970	1630	19 1	0% 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5427269)									
EP2315734-013	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	42300	41600	1.7	0% - 20%
EP2315738-009	0960_MW105_231108	ED045G: Chloride	16887-00-6	1	mg/L	14800	15500	4.6	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5420833)									
EP2315733-013	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	12	8	44.8	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	10	7	35.3	0% - 50%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 5420833) - continued									
EP2315738-013	Anonymous	ED093F: Sodium	7440-23-5	1	mg/L	537	512	4.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	14	13	0.0	0% - 50%
EP2315738-004	0960_MW148D_231108	ED093F: Calcium	7440-70-2	1	mg/L	1030	1040	1.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1700	1770	4.2	0% - 20%
		ED093F Sodium	7440-23-5	1	mg/L	16500	17300	4.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	490	506	3.3	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5420842)									
EP2315738-010	0960_MW159_231108	ED093F: Calcium	7440-70-2	1	mg/L	462	496	7.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	628	673	6.9	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	5830	6280	7.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	193	206	6.6	0% - 20%
EP2315862-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	46	45	0.0	0% - 20%
		ED093F: Magnesium	7439 95 4	1	mg/L	197	203	2.9	0% 20%
		ED093F: Sodium	7440-23-5	1	mg/L	969	999	3.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	28	28	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427308)									
EP2315734-004	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	4.01	3.87	3.4	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	2.16	2.10	2.9	0% - 20%
EP2315738-004	0960_MW148D_231108	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.28	1.17	9.6	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.95	0.94	0.0	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.32	0.30	7.3	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427316)									
EP2315738-008	0960_MW102_231108	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: 5427308)									
EP2315734-004	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit



Sub-Matrix: WATER

Sub-Matrix: WATER					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)		
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5427308) - continued											
EP2315734-004	Anonymous	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		
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.27	0.24	10.0	0% - 20%		
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.32	0.32	0.0	0% - 50%		
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.46	1.41	3.1	0% - 20%		
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.16	0.15	0.0	No Limit		
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit		
EP2315738-004	0960_MW148D_231108	EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit		
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit		
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit		
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit		
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit		
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.3	0.3	0.0	No Limit		
		EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5427316)									
		EP2315738-008	0960_MW102_231108	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	0.3	0.3	0.0	No Limit		
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427308)											
EP2315734-004	Anonymous			EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
				EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: **WATER**

Sub-Matrix: WATER			Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427308) - continued									
EP2315734-004	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (ElFOSAA)	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 (ElFOSA)	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 (ElFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315738-004	0960_MW148D_231108	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 (ElFOSAA)	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 (ElFOSA)	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 (ElFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5427316)									
EP2315738-008	0960_MW102_231108	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 (ElFOSAA)	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 (ElFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427308)	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (ElFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315734-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5427308) - continued									
EP2315734-004	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2315738-004	0960_MW148D_231108	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427316)							
EP2315738-008	0960_MW102_231108	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: 5427308)									
EP2315734-004	Anonymous	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
EP2315738-004	0960_MW148D_231108	EP231X: Sum of PFAS	----	0.01	µg/L	11.2	10.8	3.9	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	6.17	5.97	3.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	9.96	9.56	4.1	0% - 20%
EP231P: PFAS Sums (QC Lot: 5427316)									
EP2315738-008	0960_MW102_231108	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report				Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)				
ED037P: Alkalinity by PC Titrator (QCLot: 5426146)											
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	----	----	----				
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----				
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----				
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	122	85.1				
				<1	200 mg/L	110	90.5				
ED037P: Alkalinity by PC Titrator (QCLot: 5438048)											
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	----	----	----				
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----				
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----				
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	92.7	85.1				
				<1	200 mg/L	96.1	90.5				
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5427268)											
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100	89.9				
				<1	500 mg/L	98.7	89.9				
ED045G: Chloride by Discrete Analyser (QCLot: 5427269)											
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	97.7	88.6				
				<1	1000 mg/L	99.0	88.6				
ED093F: Dissolved Major Cations (QCLot: 5420833)											
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	108	86.5				
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	108	88.4				
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	107	91.4				
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	84.6				
ED093F: Dissolved Major Cations (QCLot: 5420842)											
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	102	86.5				
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	104	88.4				
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	104	91.4				
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	84.6				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427308)											
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	94.2	72.0				
							130				



Sub-Matrix: **WATER**

Sub-Matrix: WATER					Method Blank (MB) Report					Laboratory Control Spike (LCS) Report				
Method: Compound		CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Acceptable Limits (%)					
							LCS	Low	High					
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427308) - continued														
EP231X: Perfluoropentane sulfonic acid (PFPeS)		2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	101		71.0	127				
EP231X: Perfluorohexane sulfonic acid (PFHxS)		355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	94.6		68.0	131				
EP231X: Perfluoroheptane sulfonic acid (PFHpS)		375-92-8	0.02	µg/L	<0.02	0.238 µg/L	104		69.0	134				
EP231X: Perfluorooctane sulfonic acid (PFOS)		1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	92.4		65.0	140				
EP231X: Perfluorodecane sulfonic acid (PFDS)		335-77-3	0.02	µg/L	<0.02	0.241 µg/L	97.5		53.0	142				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427313)														
EP231X: Perfluorobutane sulfonic acid (PFBS)		375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	108		72.0	130				
EP231X: Perfluoropentane sulfonic acid (PFPeS)		2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	115		71.0	127				
EP231X: Perfluorohexane sulfonic acid (PFHxS)		355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	102		68.0	131				
EP231X: Perfluoroheptane sulfonic acid (PFHpS)		375-92-8	0.02	µg/L	<0.02	0.238 µg/L	111		69.0	134				
EP231X: Perfluorooctane sulfonic acid (PFOS)		1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	99.8		65.0	140				
EP231X: Perfluorodecane sulfonic acid (PFDS)		335-77-3	0.02	µg/L	<0.02	0.241 µg/L	91.9		53.0	142				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427316)														
EP231X: Perfluorobutane sulfonic acid (PFBS)		375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	116		72.0	130				
EP231X: Perfluoropentane sulfonic acid (PFPeS)		2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	104		71.0	127				
EP231X: Perfluorohexane sulfonic acid (PFHxS)		355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	97.1		68.0	131				
EP231X: Perfluoroheptane sulfonic acid (PFHpS)		375-92-8	0.02	µg/L	<0.02	0.238 µg/L	99.8		69.0	134				
EP231X: Perfluorooctane sulfonic acid (PFOS)		1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	95.9		65.0	140				
EP231X: Perfluorodecane sulfonic acid (PFDS)		335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.8		53.0	142				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427308)														
EP231X: Perfluorobutanoic acid (PFBA)		375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103		73.0	129				
EP231X: Perfluoropentanoic acid (PFPeA)		2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	105		72.0	129				
EP231X: Perfluorohexanoic acid (PFHxA)		307-24-4	0.02	µg/L	<0.02	0.25 µg/L	100		72.0	129				
EP231X: Perfluoroheptanoic acid (PFHpA)		375-85-9	0.02	µg/L	<0.02	0.25 µg/L	108		72.0	130				
EP231X: Perfluorooctanoic acid (PFOA)		335-67-1	0.01	µg/L	<0.01	0.25 µg/L	101		71.0	133				
EP231X: Perfluorononanoic acid (PFNA)		375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.6		69.0	130				
EP231X: Perfluorodecanoic acid (PFDA)		335-76-2	0.02	µg/L	<0.02	0.25 µg/L	107		71.0	129				
EP231X: Perfluoroundecanoic acid (PFUnDA)		2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.0		69.0	133				
EP231X: Perfluorododecanoic acid (PFDoDA)		307-55-1	0.02	µg/L	<0.02	0.25 µg/L	96.4		72.0	134				
EP231X: Perfluorotridecanoic acid (PFTTDA)		72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.2		65.0	144				
EP231X: Perfluorotetradecanoic acid (PFTeDA)		376-06-7	0.05	µg/L	<0.05	0.25 µg/L	105		71.0	132				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427313)														
EP231X: Perfluorobutanoic acid (PFBA)		375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103		73.0	129				
EP231X: Perfluoropentanoic acid (PFPeA)		2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	118		72.0	129				



Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report		Laboratory Control Spike (LCS) Report			
				Result		Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
					Unit		LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427313) - continued									
EP231X: Perfluorohexanoic acid (PFHxA)	CAS Number	LOR	Unit			0.25 µg/L	98.4	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	307-24-4	0.02	µg/L	<0.02		0.25 µg/L	101	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	375-85-9	0.02	µg/L	<0.01		0.25 µg/L	105	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	335-67-1	0.01	µg/L	<0.02		0.25 µg/L	100	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	375-95-1	0.02	µg/L	<0.02		0.25 µg/L	113	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	335-76-2	0.02	µg/L	<0.02		0.25 µg/L	100	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	2058-94-8	0.02	µg/L	<0.02		0.25 µg/L	115	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	307-55-1	0.02	µg/L	<0.02		0.25 µg/L	115	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	72629-94-8	0.02	µg/L	<0.05		0.25 µg/L	109	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1		1.25 µg/L	110	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02		0.25 µg/L	115	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02		0.25 µg/L	106	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02		0.25 µg/L	101	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01		0.25 µg/L	99.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02		0.25 µg/L	108	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02		0.25 µg/L	107	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02		0.25 µg/L	97.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02		0.25 µg/L	101	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02		0.25 µg/L	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05		0.25 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02		0.25 µg/L	100	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05		0.625 µg/L	76.2	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05		0.625 µg/L	77.3	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05		0.625 µg/L	91.7	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05		0.625 µg/L	93.4	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02		0.25 µg/L	92.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02		0.25 µg/L	93.6	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427313)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02		0.25 µg/L	108	67.0	137



Sub-Matrix: **WATER**

Sub-Matrix: WATER					Laboratory Control Spike (LCS) Report			
Method: Compound		CAS Number	LOR	Unit	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
							Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427313) - continued								
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)		31506-32-8	0.05	µg/L	0.625 µg/L	126	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)		4151-50-2	0.05	µg/L	0.625 µg/L	128	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)		24448-09-7	0.05	µg/L	0.625 µg/L	120	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)		1691-99-2	0.05	µg/L	0.625 µg/L	95.4	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)		2355-31-9	0.02	µg/L	0.25 µg/L	102	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)		2991-50-6	0.02	µg/L	0.25 µg/L	97.2	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427316)								
EP231X: Perfluorooctane sulfonamide (FOSA)		754-91-6	0.02	µg/L	0.25 µg/L	130	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)		31506-32-8	0.05	µg/L	0.625 µg/L	118	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)		4151-50-2	0.05	µg/L	0.625 µg/L	110	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)		24448-09-7	0.05	µg/L	0.625 µg/L	110	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)		1691-99-2	0.05	µg/L	0.625 µg/L	89.9	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)		2355-31-9	0.02	µg/L	0.25 µg/L	106	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)		2991-50-6	0.02	µg/L	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427308)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)		757124-72-4	0.05	µg/L	0.2343 µg/L	104	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)		27619-97-2	0.05	µg/L	0.2378 µg/L	105	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)		39108-34-4	0.05	µg/L	0.24 µg/L	104	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)		120226-60-0	0.05	µg/L	0.241 µg/L	91.9	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427313)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)		757124-72-4	0.05	µg/L	0.2343 µg/L	97.3	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)		27619-97-2	0.05	µg/L	0.2378 µg/L	106	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)		39108-34-4	0.05	µg/L	0.24 µg/L	96.4	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)		120226-60-0	0.05	µg/L	0.241 µg/L	95.8	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)		757124-72-4	0.05	µg/L	0.2343 µg/L	104	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)		27619-97-2	0.05	µg/L	0.2378 µg/L	108	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)		39108-34-4	0.05	µg/L	0.24 µg/L	95.0	67.0	138



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Work Order : EP2315738
Client : STANTEC-AUSTRALIA PTY LTD
Project : WA_0960_PFA5OMP_23

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)
EP231D: (n=2) Fluorotelomer Sulfonic Acids (QCLot: 5427316) - continued							
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	96.9	64.2
EP231P: PFAS Sums (QCLot: 5427308)							
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: 5427313)							
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: 5427316)							
EP231X: Sum of PFAS		0.01	µg/L	<0.01			
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01			
EP231X: Sum of PFAS (WA DER List)		0.01	µg/L	<0.01			

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER						
			Matrix Spike (MS) Report			
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike Concentration	SpikeRecovery(%)	Acceptable Limits (%)
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5427268)						
EP2315734-013	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4 130
ED045G: Chloride by Discrete Analyser (QCLot: 5427269)						
EP2315734-013	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0 130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427308)						
EP2315734-012	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	92.2	72.0 129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	91.2	71.0 127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	85.3	68.0 129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	93.0	69.0 134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	97.0	65.0 140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	93.0	53.0 129



Sub-Matrix: **WATER**

Sub-Matrix: WATER									
				Matrix Spike (MS) Report					
Laboratory sample ID		Sample ID	Method: Compound	CAS Number	Spike Concentration	SpikeRecovery(%)	Acceptable Limits (%)		
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427316)									
EP2315738-015		0960_MW139_231108	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	112	72.0	129	
			EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	108	71.0	127	
			EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	94.4	68.0	129	
			EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	101	69.0	134	
			EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	91.8	65.0	140	
			EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	80.1	53.0	129	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427308)									
EP2315734-012	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	92.7	73.0	142		
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	97.7	72.0	129		
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129		
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	94.4	72.0	130		
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	100	71.0	133		
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	90.0	69.0	130		
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.0	71.0	134		
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	94.6	69.0	133		
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	98.6	72.0	134		
		EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.25 µg/L	87.6	65.0	144		
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	111	71.0	132		
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316)									
EP2315738-015	0960_MW139_231108	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	102	73.0	142		
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	110	72.0	129		
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	98.6	72.0	129		
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.6	72.0	130		
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	96.4	71.0	133		
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	106	69.0	130		
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	110	71.0	134		
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.4	69.0	133		
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	97.8	72.0	134		
		EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.25 µg/L	89.0	65.0	144		
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	110	71.0	132		
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308)									
EP2315734-012	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	107	59.0	135		
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	93.6	70.0	130		
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	88.0	70.0	130		
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	92.8	70.0	130		



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%)	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427308) - continued							
EP2315734-012	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EIFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	97.6	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EIFOSAA)	2991-50-6	0.25 µg/L	113	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427316)							
EP2315738-015	0960_MW139_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	125	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	111	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EIFOSA)	4151-50-2	0.625 µg/L	119	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	92.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EIFOSE)	1691-99-2	0.625 µg/L	106	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	106	65.0	136
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427308)	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EIFOSAA)	2991-50-6	0.25 µg/L	92.0	61.0	135
		EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	94.9	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	95.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	90.8	67.0	138
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316)	0960_MW139_231108	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	92.3	70.0	130
		EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	106	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	112	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	99.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	91.7	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315738	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth GW - MB	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]	No. of samples received	: 15
Order number	: pfas-omp Learmonth	No. of samples analysed	: 15

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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2315734--013	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	EP2315734--013	Anonymous	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count			Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected			
Laboratory Duplicates (DUP)								
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	41	7.32	10.00		NEPM 2013 B3 & ALS QC Standard	
Matrix Spikes (MS)								
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	41	4.88	5.00		NEPM 2013 B3 & ALS QC Standard	

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation		Analysis	
Container / Client Sample ID(s)	Date extracted		Due for extraction	Evaluation	Date analysed	Evaluation
ED037P: Alkalinity by PC Titrator						
Clear Plastic Bottle - Natural (ED037-P) 0960_MW151_231108, 0960_MW148D_231108, 0960_MW104_231108	0960_MW238_231108, 0960_MW148S_231108,	08-Nov-2023	---	---	17-Nov-2023	22-Nov-2023
Clear Plastic Bottle - Natural (ED037-P) 0960_MW124_231108, 0960_MW105_231108, 0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108	0960_MW102_231108, 0960_MW159_231108, 0960_MW126_231108, 0960_MW172_231108,	08-Nov-2023	---	---	21-Nov-2023	22-Nov-2023



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

Method		Sample Date	Extraction / Preparation		Analysis	
Container / Client Sample ID(s)	Date extracted		Due for extraction	Evaluation	Date analysed	Evaluation
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA						
Clear Plastic Bottle - Natural (ED041G)		08-Nov-2023	----	----	20-Nov-2023	06-Dec-2023
0960_MW151_231108, 0960_MW148D_231108, 0960_MW104_231108, 0960_MW102_231108, 0960_MW159_231108, 0960_MW126_231108, 0960_MW172_231108,						
0960_MW238_231108, 0960_MW148S_231108, 0960_MW124_231108, 0960_MW105_231108, 0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108						
ED045G: Chloride by Discrete Analyser						
Clear Plastic Bottle - Natural (ED045G)		08-Nov-2023	----	---	20-Nov-2023	06-Dec-2023
0960_MW151_231108, 0960_MW148D_231108, 0960_MW104_231108, 0960_MW102_231108, 0960_MW159_231108, 0960_MW126_231108, 0960_MW172_231108,						
0960_MW238_231108, 0960_MW148S_231108, 0960_MW124_231108, 0960_MW105_231108, 0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108						
ED093F: Dissolved Major Cations						
Clear Plastic Bottle - Natural (ED093F)		08-Nov-2023	----	---	13-Nov-2023	15-Nov-2023
0960_MW151_231108, 0960_MW148D_231108, 0960_MW104_231108, 0960_MW102_231108,						
0960_MW238_231108, 0960_MW148S_231108, 0960_MW124_231108, 0960_MW105_231108						
Clear Plastic Bottle - Natural (ED093F)		08-Nov-2023	----	---	14-Nov-2023	15-Nov-2023
0960_MW159_231108, 0960_MW126_231108, 0960_MW172_231108,						
0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108						
EP231A: Perfluoroalkyl Sulfonic Acids						
HDPE (no PTFE) (EP231X)		08-Nov-2023	16-Nov-2023	06-May-2024	✓	06-May-2024
0960_MW151_231108, 0960_QC119_231108, 0960_MW148S_231108, 0960_MW124_231108, 0960_MW105_231108, 0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108						
0960_MW238_231108, 0960_MW148D_231108, 0960_MW104_231108, 0960_MW102_231108, 0960_MW159_231108, 0960_MW126_231108, 0960_MW172_231108,						



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

Method		Sample Date	Extraction / Preparation		Evaluation	Analysis	
Container / Client Sample ID(s)	Date extracted		Due for extraction	Date analysed		Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0960_MW151_231108, 0960_QC119_231108, 0960_MW148S_231108, 0960_MW124_231108, 0960_MW105_231108, 0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108		08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0960_MW151_231108, 0960_QC119_231108, 0960_MW148S_231108, 0960_MW124_231108, 0960_MW105_231108, 0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108		08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0960_MW151_231108, 0960_QC119_231108, 0960_MW148S_231108, 0960_MW124_231108, 0960_MW105_231108, 0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108		08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0960_MW151_231108, 0960_QC119_231108, 0960_MW148S_231108, 0960_MW124_231108, 0960_MW105_231108, 0960_MW103_231108, 0960_MW170_231108, 0960_MW139_231108		08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Method	Count		Rate (%)		Evaluation	Quality Control Specification
Analytical Methods			QC	Regular	Actual	Expected		
Laboratory Duplicates (DUP)								
Alkalinity by Auto Titrator		ED037-P	3	29	10.34	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
Major Cations - Dissolved		ED093F	4	31	12.90	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	3	41	7.32	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
Laboratory Control Samples (LCS)								
Alkalinity by Auto Titrator		ED037-P	4	29	13.79	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
Major Cations - Dissolved		ED093F	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	3	41	7.32	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
Method Blanks (MB)								
Alkalinity by Auto Titrator		ED037-P	2	29	6.90	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
Major Cations - Dissolved		ED093F	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	3	41	7.32	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
Matrix Spikes (MS)								
Chloride by Discrete Analyser		ED045G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	2	41	4.88	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
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWL/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)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



ALS Compass

SAMPLING *Intelligence*



Environmental Division
Perth

Work Order Reference
EP2315739



Telephone : +61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PEASOMP-23 Client: STANTEC

Project Manager:

Phone:

54789 59786 59787 59788 59789 59790
ALS Compass COC Reference: 59820 59798 Samples: 59794 59792 59785

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time: 9/11/23

Date / Time:

1220

10/11

Relinquished by:

Received by:

Date / Time:

Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass



CHAIN OF CUSTODY

COC#: 59794

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth SD - MB

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SS234		08/11/2023 09:11 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_QC122		08/11/2023 09:12 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
003	0960_SS108		08/11/2023 09:59 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
004	0960_QC126		08/11/2023 09:59 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
005	0960_SS265		08/11/2023 10:12 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
006	0960_SS170		08/11/2023 10:37 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
007	0960_SS114		08/11/2023 11:09 AM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

ALS

COC#: 59794

ALS Laboratory: EP Perth

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SD - MB

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_SS113		08/11/2023 11:21 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
009	0960_SD219		08/11/2023 12:44 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
010	0960_SS235		08/11/2023 12:50 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
011	0960_SS168		08/11/2023 03:21 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
012	0960_SS174		08/11/2023 03:22 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
013	0960_SS277		08/11/2023 03:22 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
014	0960_SS176		08/11/2023 03:23 PM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59794

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SD - MB

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Fres ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
015	0960_SS278		08/11/2023 03:23 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
016	0960_SS279		08/11/2023 03:24 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
017	0960_SS166		08/11/2023 03:24 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
018	0960_SS243		08/11/2023 03:25 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
019	0960_SS157		08/11/2023 03:26 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
020	0960_SS231		08/11/2023 03:26 PM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59794

ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SD - MB

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SS234	HDPE Soil Jar	200 mL	00621222053630	Grey	No	
002	0960_QC122	HDPE Soil Jar	200 mL	00621222053626	Grey	No	
003	0960_SS108	HDPE Soil Jar	200 mL	00621222067068	Grey	No	
004	0960_QC126	HDPE Soil Jar	200 mL	00621222067113	Grey	No	
005	0960_SS265	HDPE Soil Jar	200 mL	00620322054937	Grey	No	
006	0960_SS170	HDPE Soil Jar	200 mL	00621222067079	Grey	No	
007	0960_SS114	HDPE Soil Jar	200 mL	00621222053696	Grey	No	
008	0960_SS113	HDPE Soil Jar	200 mL	00621019097709	Grey	No	
009	0960_SD219	HDPE Soil Jar	200 mL	00620322054890	Grey	No	
010	0960_SS235	HDPE Soil Jar	200 mL	00620322054856	Grey	No	
011	0960_SS168	HDPE Soil Jar	200 mL	00620322054845	Grey	No	
012	0960_SS174	HDPE Soil Jar	200 mL	00620322054896	Grey	No	
013	0960_SS277	HDPE Soil Jar	200 mL	00620322054874	Grey	No	
014	0960_SS176	HDPE Soil Jar	200 mL	00620322054863	Grey	No	
015	0960_SS278	HDPE Soil Jar	200 mL	00621222067115	Grey	No	
016	0960_SS279	HDPE Soil Jar	200 mL	00621222053615	Grey	No	
017	0960_SS166	HDPE Soil Jar	200 mL	00620322054848	Grey	No	
018	0960_SS243	HDPE Soil Jar	200 mL	00621222067069	Grey	No	
019	0960_SS157	HDPE Soil Jar	200 mL	00620322054868	Grey	No	
020	0960_SS231	HDPE Soil Jar	200 mL	00620322054966	Grey	No	

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



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2315739**

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

Laboratory : **Environmental Division Perth**
Contact : **Customer Services EP**
Address : **26 Rigali Way Wangara WA Australia
6065**

E-mail : **[REDACTED]**stantec.com
Telephone : **----**
Facsimile : **----**

E-mail : **ALSEnviro.Perth@alsglobal.com**
Telephone : **+61-8-9406 1301**
Facsimile : **+61-8-9406 1399**

Project : **WA_0960_PFASOMP_23**
Order number : **pfas-omp Learmonth**
C-O-C number : **59794**
Site : **Learmonth SD - MB**
Sampler : **[REDACTED]**

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

Dates

Date Samples Received : **10-Nov-2023 12:20**
Client Requested Due : **21-Nov-2023**
Date

Issue Date : **13-Nov-2023**
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **4**
Receipt Detail :

Security Seal : **Not Available**
Temperature : **17.6 - Ice present**
No. of samples received / analysed : **20 / 20**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

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

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (28 analytes)
EP2315739-001	08-Nov-2023 09:11	0960_SS234_231108	✓	✓
EP2315739-002	08-Nov-2023 09:12	0960_QC122_231108	✓	✓
EP2315739-003	08-Nov-2023 09:59	0960_SS108_231108	✓	✓
EP2315739-004	08-Nov-2023 09:59	0960_QC126_231108	✓	✓
EP2315739-005	08-Nov-2023 10:12	0960_SS265_231108	✓	✓
EP2315739-006	08-Nov-2023 10:37	0960_SS170_231108	✓	✓
EP2315739-007	08-Nov-2023 11:09	0960_SS114_231108	✓	✓
EP2315739-008	08-Nov-2023 11:21	0960_SS113_231108	✓	✓
EP2315739-009	08-Nov-2023 12:44	0960_SD219_231108	✓	✓
EP2315739-010	08-Nov-2023 12:50	0960_SS235_231108	✓	✓
EP2315739-011	08-Nov-2023 15:21	0960_SS168_231108	✓	✓
EP2315739-012	08-Nov-2023 15:22	0960_SS174_231108	✓	✓
EP2315739-013	08-Nov-2023 15:22	0960_SS277_231108	✓	✓
EP2315739-014	08-Nov-2023 15:23	0960_SS176_231108	✓	✓
EP2315739-015	08-Nov-2023 15:23	0960_SS278_231108	✓	✓
EP2315739-016	08-Nov-2023 15:24	0960_SS279_231108	✓	✓
EP2315739-017	08-Nov-2023 15:24	0960_SS166_231108	✓	✓
EP2315739-018	08-Nov-2023 15:25	0960_SS243_231108	✓	✓
EP2315739-019	08-Nov-2023 15:26	0960_SS157_231108	✓	✓
EP2315739-020	08-Nov-2023 15:26	0960_SS231_231108	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

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

Issue Date : 13-Nov-2023
Page : 3 of 3
Work Order : EP2315739 Amendment 0
Client : STANTEC AUSTRALIA PTY LTD





CERTIFICATE OF ANALYSIS

Work Order : **EP2315739**
Client : **STANTEC AUSTRALIA PTY LTD**
Contact : **[REDACTED]**
Address : **GROUND FLOOR 226 ADELAIDE TERRACE
PERTH 6000**
Telephone : **----**
Project : **WA_0960_PFASOMP_23**
Order number : **pfas-omp Learmonth**
C-O-C number : **59794**
Sampler : **[REDACTED]**
Site : **Learmonth SD - MB**
Quote number : **SY/139/19 B**
No. of samples received : **20**
No. of samples analysed : **20**

Page : 1 of 11
Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : +61-8-9406 1301
Date Samples Received : 10-Nov-2023 12:20
Date Analysis Commenced : 14-Nov-2023
Issue Date : 21-Nov-2023 12:32



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- 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

				0960_SS234_231108	0960_QC122_231108	0960_SS108_231108	0960_QC126_231108	0960_SS265_231108
Sampling date / time				08-Nov-2023 09:11	08-Nov-2023 09:12	08-Nov-2023 09:59	08-Nov-2023 09:59	08-Nov-2023 10:12
Compound	CAS Number	LOR	Unit	EP2315739-001	EP2315739-002	EP2315739-003	EP2315739-004	EP2315739-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	2.4	2.0	7.6	2.9	6.3
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	0.0019
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	0.0135	0.0227	0.0056	0.0048	0.0066
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0002	0.0003	<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	0.0004
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0003	0.0003	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0002	0.0005	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS234_231108	0960_QC122_231108	0960_SS108_231108	0960_QC126_231108	0960_SS265_231108
Sampling date / time					08-Nov-2023 09:11	08-Nov-2023 09:12	08-Nov-2023 09:59	08-Nov-2023 09:59	08-Nov-2023 10:12
Compound	CAS Number	LOR	Unit	EP2315739-001	EP2315739-002	EP2315739-003	EP2315739-004	EP2315739-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0140	0.0237	0.0059	0.0048	0.0091	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0135	0.0227	0.0056	0.0048	0.0085	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0135	0.0227	0.0056	0.0048	0.0091	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	86.0	97.0	87.0	91.5	102	
13C8-PFOA	---	0.0002	%	105	116	101	108	121	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS170_231108	0960_SS114_231108	0960_SS113_231108	0960_SD219_231108	0960_SS235_231108
Sampling date / time				08-Nov-2023 10:37	08-Nov-2023 11:09	08-Nov-2023 11:21	08-Nov-2023 12:44	08-Nov-2023 12:50
Compound	CAS Number	LOR	Unit	EP2315739-006	EP2315739-007	EP2315739-008	EP2315739-009	EP2315739-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	3.2	2.2	0.7	0.4	0.6
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	0.0015
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0003
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0043	0.0078	0.0028	0.0056	0.0434
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0009	<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	0.0006
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 (PFTriDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS170_231108	0960_SS114_231108	0960_SS113_231108	0960_SD219_231108	0960_SS235_231108
Sampling date / time					08-Nov-2023 10:37	08-Nov-2023 11:09	08-Nov-2023 11:21	08-Nov-2023 12:44	08-Nov-2023 12:50
Compound	CAS Number	LOR	Unit	EP2315739-006	EP2315739-007	EP2315739-008	EP2315739-009	EP2315739-010	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0043	0.0087	0.0028	0.0056	0.0460	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0043	0.0078	0.0028	0.0056	0.0449	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0043	0.0078	0.0028	0.0056	0.0455	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	91.0	96.0	103	105	99.5	
13C8-PFOA	---	0.0002	%	104	106	110	108	112	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SS168_231108	0960_SS174_231108	0960_SS277_231108	0960_SS176_231108	0960_SS278_231108
Sampling date / time				08-Nov-2023 15:21	08-Nov-2023 15:22	08-Nov-2023 15:22	08-Nov-2023 15:23	08-Nov-2023 15:23
Compound	CAS Number	LOR	Unit	EP2315739-011	EP2315739-012	EP2315739-013	EP2315739-014	EP2315739-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	3.3	0.2	1.6	1.1	1.4
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	0.0007	0.0053	0.0065	<0.0002	0.0028
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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS168_231108	0960_SS174_231108	0960_SS277_231108	0960_SS176_231108	0960_SS278_231108
Sampling date / time					08-Nov-2023 15:21	08-Nov-2023 15:22	08-Nov-2023 15:22	08-Nov-2023 15:23	08-Nov-2023 15:23
Compound	CAS Number	LOR	Unit	EP2315739-011	EP2315739-012	EP2315739-013	EP2315739-014	EP2315739-015	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0007	0.0055	0.0065	<0.0002	0.0028	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0007	0.0053	0.0065	<0.0002	0.0028	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0007	0.0053	0.0065	<0.0002	0.0028	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	102	106	106	96.0	98.5	
13C8-PFOA	---	0.0002	%	110	101	97.0	98.0	97.0	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS279_231108	0960_SS166_231108	0960_SS243_231108	0960_SS157_231108	0960_SS231_231108
Sampling date / time				08-Nov-2023 15:24	08-Nov-2023 15:24	08-Nov-2023 15:25	08-Nov-2023 15:26	08-Nov-2023 15:26
Compound	CAS Number	LOR	Unit	EP2315739-016	EP2315739-017	EP2315739-018	EP2315739-019	EP2315739-020
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	3.3	5.0	0.8	2.0	0.2
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	0.0005
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	0.0044	0.0007	0.0064	0.0055	0.0385
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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS279_231108	0960_SS166_231108	0960_SS243_231108	0960_SS157_231108	0960_SS231_231108
Sampling date / time					08-Nov-2023 15:24	08-Nov-2023 15:24	08-Nov-2023 15:25	08-Nov-2023 15:26	08-Nov-2023 15:26
Compound	CAS Number	LOR	Unit	EP2315739-016	EP2315739-017	EP2315739-018	EP2315739-019	EP2315739-020	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0044	0.0007	0.0066	0.0055	0.0394	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0044	0.0007	0.0064	0.0055	0.0390	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0044	0.0007	0.0064	0.0055	0.0390	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	100	108	102	97.0	102	
13C8-PFOA	---	0.0002	%	94.5	98.0	99.0	104	93.5	



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315739	Page	: 1 of 16
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 59794	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]		
Site	: Learmonth SD - MB		
Quote number	: SY/139/19 B		
No. of samples received	: 20		
No. of samples analysed	: 20		



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

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 5430087)									
EP2315739-001	0960_SS234_231108	EA055: Moisture Content	----	0.1	%	2.4	2.5	0.0	0% - 20%
EP2315739-011	0960_SS168_231108	EA055: Moisture Content	----	0.1	%	3.3	3.3	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5420867)									
EP2315736-005	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	0.0013	0.0012	10.9	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2315737-005	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	0.0005	0.0005	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5421439)									
EP2315739-008	0960_SS113_231108	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 0028	0 0027	4 3	0% 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	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 (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5421439) - continued									
EP2315952-018	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
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5424210)									
EP2315739 012	0960 SS174 231108	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	0.0053	0.0061	12.8	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2315952-043	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: 5420867)									
EP2315736-005	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 (PFTriDA)	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
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2315737-005	Anonymous	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: Perfluorodecanoic acid (PFDA)	335-76-2	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: 5420867) - continued									
EP2315737-005	Anonymous	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
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5421439)									
EP2315739-008	0960_SS113_231108	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
EP2315952-018	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
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5424210)									
EP2315739-012	0960_SS174_231108	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	0.0003	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: 5424210) - continued									
EP2315739-012	0960_SS174_231108	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
EP2315952-043	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: 5420867)							
EP2315736-005	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
EP2315737-005	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



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5420867) - continued									
EP2315737-005	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5421439)									
EP2315739-008	0960_SS113_231108	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
EP2315952-018	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
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5424210)									
EP2315739-012	0960_SS174_231108	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



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5424210) - continued									
EP2315739-012	0960_SS174_231108	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP2315952-043	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5420867)									
EP2315736-005	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
EP2315737-005	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5421439)									
EP2315739-008	0960_SS113_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit



Sub-Matrix: 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: 5421439) - continued									
EP2315952-018	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5424210)									
EP2315739-012	0960_SS174_231108	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
EP2315952-043	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
EP231P: PFAS Sums (QC Lot: 5420867)									
EP2315736-005	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0013	0.0012	8.0	No Limit
EP2315737-005	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5421439)									
EP2315739-008	0960_SS113_231108	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0028	0.0027	3.6	0% - 50%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0028	0.0027	3.6	0% - 50%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0028	0.0027	3.6	0% - 50%
EP2315952-018	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0002	0.0002	0.0	No Limit

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 Work Order : EP2315739
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_23



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 (%)
EP231P: PFAS Sums (QC Lot: 5421439) - continued									
EP2315952-018	Anonymous	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0002	0.0002	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5424210)									
EP2315739-012	0960_SS174_231108	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0055	0.0064	15.1	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0053	0.0061	14.0	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0053	0.0061	14.0	0% - 20%
EP2315952-043	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420867)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	105	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.0	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	99.6	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	106	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	101	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	106	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5421439)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	109	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	103	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	112	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	96.6	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	101	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5424210)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	95.9	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	108	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	103	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	97.0	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	102	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420867)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	108	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.8	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	112	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	113	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	111	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	69.0	135



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420867) - continued								
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	108	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5421439)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	108	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	116	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	107	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	117	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	111	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	105	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5424210)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	114	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	112	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.8	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.4	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	109	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420867)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	119	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	101	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	97.6	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	91.5	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	93.1	61.9	139



Sub-Matrix: **SOIL**

Method: Compound				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
CAS Number	LOR	Unit					Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420867) - continued								
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.4	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.0	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5421439)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	137	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	106	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	102	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	116	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	111	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.0	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5424210)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	115	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	80.8	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.1	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	110	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	88.6	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.0	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420867)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	117	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	102	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	108	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	97.5	54.8	124
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5421439)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	115	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	115	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	89.2	65.0	137



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5421439) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	90.8	54.8	124
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5424210)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	106	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	103	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	108	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	89.6	54.8	124
EP231P: PFAS Sums (QCLot: 5420867)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231P: PFAS Sums (QCLot: 5421439)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231P: PFAS Sums (QCLot: 5424210)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5420867)							
EP2315736-006	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	114	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	107	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	98.0	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	104	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	110	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	102	59.0	134



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5421439)							
EP2315739-009	0960_SD219_231108	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	98.7	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	101	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	90.8	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	110	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	88.4	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5424210)							
EP2315739-013	0960_SS277_231108	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	97.0	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	104	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	90.8	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	93.7	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	# Not Determined	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	107	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5420867)							
EP2315736-006	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	108	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	118	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	105	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	102	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	108	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	103	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	113	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	110	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	106	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	96.8	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	98.0	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5421439)							
EP2315739-009	0960_SD219_231108	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	102	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	116	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	109	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	109	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	109	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	109	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	113	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	101	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	108	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	102	66.0	139



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5421439) - continued							
EP2315739-009	0960_SD219_231108	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	102	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5424210)							
EP2315739-013	0960_SS277_231108	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	106	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	112	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	98.0	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	101	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	102	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	97.0	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	96.9	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	109	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	115	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.00125 mg/kg	102	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	110	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5420867)							
EP2315736-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	128	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	88.9	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	114	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	95.7	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	106	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	87.6	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	124	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5421439)							
EP2315739-009	0960_SD219_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	128	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	102	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	101	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	121	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	107	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	114	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	87.6	61.0	139



Sub-Matrix: **SOIL**

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: 5424210)							
EP2315739-013	0960_SS277_231108	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	112	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	81.3	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	113	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	90.5	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	105	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	95.6	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	90.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5420867)							
EP2315736-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	112	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	99.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	104	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	87.4	60.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5421439)							
EP2315739-009	0960_SD219_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	121	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	119	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	90.0	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	93.4	60.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5424210)							
EP2315739-013	0960_SS277_231108	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	118	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	113	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	117	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	109	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315739	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth SD - MB	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]	No. of samples received	: 20
Order number	: pfas-omp Learmonth	No. of samples analysed	: 20

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							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2315739--009	0960_SD219_231108	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EP2315739--013	0960_SS277_231108	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055)							
0960_SS234_231108,	0960_QC122_231108,	08-Nov-2023	---	---	20-Nov-2023	22-Nov-2023	✔
0960_SS108_231108,	0960_QC126_231108,						
0960_SS265_231108,	0960_SS170_231108,						
0960_SS114_231108,	0960_SS113_231108,						
0960_SD219_231108,	0960_SS235_231108,						
0960_SS168_231108,	0960_SS174_231108,						
0960_SS277_231108,	0960_SS176_231108,						
0960_SS278_231108,	0960_SS279_231108,						
0960_SS166_231108,	0960_SS243_231108,						
0960_SS157_231108,	0960_SS231_231108						



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SS113_231108, 0960_SS235_231108,	0960_SD219_231108, 0960_SS168_231108	08-Nov-2023	14-Nov-2023	06-May-2024	✔	14-Nov-2023	24-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS174_231108, 0960_SS176_231108, 0960_SS279_231108, 0960_SS243_231108, 0960_SS231_231108	0960_SS277_231108, 0960_SS278_231108, 0960_SS166_231108, 0960_SS157_231108,	08-Nov-2023	15-Nov-2023	06-May-2024	✔	15-Nov-2023	25-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS234_231108, 0960_SS108_231108, 0960_SS265_231108, 0960_SS114_231108	0960_QC122_231108, 0960_QC126_231108, 0960_SS170_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	26-Dec-2023	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) 0960_SS113_231108, 0960_SS235_231108,	0960_SD219_231108, 0960_SS168_231108	08-Nov-2023	14-Nov-2023	06-May-2024	✔	14-Nov-2023	24-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS174_231108, 0960_SS176_231108, 0960_SS279_231108, 0960_SS243_231108, 0960_SS231_231108	0960_SS277_231108, 0960_SS278_231108, 0960_SS166_231108, 0960_SS157_231108,	08-Nov-2023	15-Nov-2023	06-May-2024	✔	15-Nov-2023	25-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS234_231108, 0960_SS108_231108, 0960_SS265_231108, 0960_SS114_231108	0960_QC122_231108, 0960_QC126_231108, 0960_SS170_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	26-Dec-2023	✔



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) 0960_SS113_231108, 0960_SS235_231108,	0960_SD219_231108, 0960_SS168_231108	08-Nov-2023	14-Nov-2023	06-May-2024	✔	14-Nov-2023	24-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS174_231108, 0960_SS176_231108, 0960_SS279_231108, 0960_SS243_231108, 0960_SS231_231108	0960_SS277_231108, 0960_SS278_231108, 0960_SS166_231108, 0960_SS157_231108,	08-Nov-2023	15-Nov-2023	06-May-2024	✔	15-Nov-2023	25-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS234_231108, 0960_SS108_231108, 0960_SS265_231108, 0960_SS114_231108	0960_QC122_231108, 0960_QC126_231108, 0960_SS170_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	26-Dec-2023	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SS113_231108, 0960_SS235_231108,	0960_SD219_231108, 0960_SS168_231108	08-Nov-2023	14-Nov-2023	06-May-2024	✔	14-Nov-2023	24-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS174_231108, 0960_SS176_231108, 0960_SS279_231108, 0960_SS243_231108, 0960_SS231_231108	0960_SS277_231108, 0960_SS278_231108, 0960_SS166_231108, 0960_SS157_231108,	08-Nov-2023	15-Nov-2023	06-May-2024	✔	15-Nov-2023	25-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS234_231108, 0960_SS108_231108, 0960_SS265_231108, 0960_SS114_231108	0960_QC122_231108, 0960_QC126_231108, 0960_SS170_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	26-Dec-2023	✔



Matrix: SOIL

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) 0960_SS113_231108, 0960_SS235_231108,	0960_SD219_231108, 0960_SS168_231108	08-Nov-2023	14-Nov-2023	06-May-2024	✔	14-Nov-2023	24-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS174_231108, 0960_SS176_231108, 0960_SS279_231108, 0960_SS243_231108, 0960_SS231_231108	0960_SS277_231108, 0960_SS278_231108, 0960_SS166_231108, 0960_SS157_231108,	08-Nov-2023	15-Nov-2023	06-May-2024	✔	15-Nov-2023	25-Dec-2023	✔
HDPE Soil Jar (EP231X) 0960_SS234_231108, 0960_SS108_231108, 0960_SS265_231108, 0960_SS114_231108	0960_QC122_231108, 0960_QC126_231108, 0960_SS170_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	26-Dec-2023	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	6	53	11.32	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	53	5.66	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	53	5.66	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	53	5.66	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.



ALS Compass

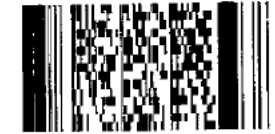
SAMPLING *Intelligence*

Custody Document for Submissions via ALS Compass App



Environmental Division
Perth

Work Order Reference
EP2315740



Telephone : - 61-8-9106 1301

Project: WA-0960-PEASOMP-23 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 59789 59786 59787 59788 59789 59790
Samples: 59794 59792 59785

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by:

Date / Time: 9/11/23

Date / Time:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass

CHAIN OF CUSTODY

ALS COC#: 59798 ALS Laboratory: EP Perth

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SW/OTH - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

QUOTE NO: SY/139/19 B

SAMPLER MOBILE [REDACTED]

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SW125		08/11/2023 09:31 AM	WATER	ALS: 3 Non ALS: 0	No	X		
002	0960_OTH107		08/11/2023 02:34 PM	WATER	ALS: 3 Non ALS: 0	No	X		
003	0960_OTH106		08/11/2023 04:18 PM	WATER	ALS: 3 Non ALS: 0	No	X		



CHAIN OF CUSTODY

(ALS) COC#: 59798

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFAASOMP_23

SITE: Learmonth SW/OTH - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SW125	Clear Plastic Bottle - Natural	125 mL	00071121128602	Green	No	
001	0960_SW125	HDPE (no PTFE)	20 mL	00351221020692	Grey	No	
001	0960_SW125	HDPE (no PTFE)	20 mL	00351221020783	Grey	No	
002	0960_OTH107	Clear Plastic Bottle - Natural	125 mL	00070522075386	Green	No	
002	0960_OTH107	HDPE (no PTFE)	20 mL	00351221020579	Grey	No	
002	0960_OTH107	HDPE (no PTFE)	20 mL	00351221020526	Grey	No	
003	0960_OTH106	Clear Plastic Bottle - Natural	125 mL	00071121128616	Green	No	
003	0960_OTH106	HDPE (no PTFE)	20 mL	00351221020500	Grey	No	
003	0960_OTH106	HDPE (no PTFE)	20 mL	00351221020531	Grey	No	
Total Bottle Count: ALS: 9, Non ALS: 0							



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2315740

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact : Customer Services EP
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
Telephone :
Facsimile :

E-mail : ALSEnviro.Perth@alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_23
Order number : pfas-omp Learmonth
C-O-C number : 59798
Site : Learmonth SW/OTH - JS
Sampler :

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

Dates

Date Samples Received : 10-Nov-2023 12:20
Client Requested Due : 21-Nov-2023
Date :

Issue Date : 13-Nov-2023
Scheduled Reporting Date : **21-Nov-2023**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 4
Receipt Detail :

Security Seal : Not Available
Temperature : 17.6 - Ice present
No. of samples received / analysed : 3 / 3

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2315740	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023 12:20
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 59798	Issue Date	: 21-Nov-2023 16:15
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SW/OTH - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 3		
No. of samples analysed	: 3		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Lab Technician	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW125_231108	0960_OTH107_231108	0960_OTH106_231108	---	---
				8	8	8	---	---
Sampling date / time				08-Nov-2023 09:31	08-Nov-2023 14:34	08-Nov-2023 16:18	---	---
Compound	CAS Number	LOR	Unit	EP2315740-001	EP2315740-002	EP2315740-003	-----	-----
				Result	Result	Result	---	---
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	---	---
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	---	---
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	391	131	124	---	---
Total Alkalinity as CaCO ₃	---	1	mg/L	391	131	124	---	---
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	13	2530	2650	---	---
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	166	19100	19200	---	---
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	146	435	435	---	---
Magnesium	7439-95-4	1	mg/L	19	1410	1400	---	---
Sodium	7440-23-5	1	mg/L	82	11700	11800	---	---
Potassium	7440-09-7	1	mg/L	11	437	434	---	---
EN055: Ionic Balance								
∅ Total Anions	---	0.01	meq/L	12.8	594	599	---	---
∅ Total Cations	---	0.01	meq/L	12.7	658	661	---	---
∅ Ionic Balance	---	0.01	%	0.27	5.09	4.92	---	---
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	---	---
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	---	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	<0.01	---	---
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	---	---
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.07	<0.01	<0.01	---	---
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	---	---

EP231D: (n:2) Fluorotelomer Sulfonic Acids



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW125_231108	0960_OTH107_23110 8	0960_OTH106_23110 8	---	---
Sampling date / time				08-Nov-2023 09:31	08-Nov-2023 14:34	08-Nov-2023 16:18	---	---
Compound	CAS Number	LOR	Unit	EP2315740-001	EP2315740-002	EP2315740-003	-----	-----
				Result	Result	Result	---	---
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	---	---
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	---	---
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	---	---
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	---	---
EP231P: PFAS Sums								
Sum of PFAS	---	0.01	µg/L	0.07	<0.01	<0.01	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.07	<0.01	<0.01	---	---
Sum of PFAS (WA DER List)	---	0.01	µg/L	0.07	<0.01	<0.01	---	---
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	97.3	98.4	90.0	---	---
13C8-PFOA	---	0.02	%	105	105	102	---	---



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315740	Page	: 1 of 9
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 59798	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED]		
Site	: Learmonth SW/OTH - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 3		
No. of samples analysed	: 3		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Lab Technician	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5426126)									
EP2315733-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	99	98	1.4	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	926	919	0.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1020	1020	0.8	0% - 20%
EP2315733-016	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	368	366	0.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	368	366	0.7	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5421113)									
EP2315731-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	132	8.0	0% - 20%
EP2315741-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2750	2880	4.6	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5421114)									
EP2315731-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1050	1040	1.0	0% - 20%
EP2315741-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	20900	20900	0.2	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5420842)									
EP2315738-010	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	462	496	7.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	628	673	6.9	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	5830	6280	7.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	193	206	6.6	0% - 20%
EP2315862-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	46	45	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	197	203	2.9	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	969	999	3.0	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 5420842) - continued									
EP2315862-001	Anonymous	ED093F: Potassium	7440-09-7	1	mg/L	28	28	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTriDA)	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: 5427316)									
EP2315738-008	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

Page : 4 of 9
 Work Order : EP2315740
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_23



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5427316) - continued									
EP2315738-008	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5427316)									
EP2315738-008	Anonymous	EP231X: Sum of PFAS	---	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.01	<0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5426126)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	116	85.1	126
				<1	200 mg/L	104	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421113)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.8	89.9	112
				<1	500 mg/L	96.2	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5421114)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	88.6	113
				<1	1000 mg/L	99.6	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5420842)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	102	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	104	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	104	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427313)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	108	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	115	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	102	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	111	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	99.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	91.9	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427316)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	116	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	104	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	97.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	99.8	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	95.9	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.8	53.0	142



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427313)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	118	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	98.4	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	105	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	113	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	115	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	115	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	109	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	110	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	115	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	106	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	99.8	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	108	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	107	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	97.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	102	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427313)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	108	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	126	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	128	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	120	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	95.4	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	102	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	97.2	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427316)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	130	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	118	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	110	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	110	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	89.9	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	106	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	104	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427313)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	97.3	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	106	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	96.4	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	95.8	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	104	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	108	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	95.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	96.9	64.2	133
EP231P: PFAS Sums (QCLot: 5427313)								
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: 5427316)								
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**

Matrix Spike (MS) Report



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421113)							
EP2315731-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	112	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5421114)							
EP2315731-001	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	112	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	108	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	94.4	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	101	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	91.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	80.1	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	102	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	110	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	98.6	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.6	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	96.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	106	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	110	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.4	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	97.8	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	89.0	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	110	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	125	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	111	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	119	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	92.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	106	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	106	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	92.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316)							
EP2315738-015	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	106	63.0	143



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427316) - continued							
EP2315738-015	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	112	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	99.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	91.7	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315740	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth SW/OTH - JS	Issue Date	: 21-Nov-2023
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 3
Order number	: pfas-omp Learmonth	No. of samples analysed	: 3

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- 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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED045G: Chloride by Discrete Analyser	EP2315731--001	Anonymous	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	21	4.76	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	21	4.76	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED037P: Alkalinity by PC Titrator									
Clear Plastic Bottle - Natural (ED037-P)	0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	---	---	---	21-Nov-2023	22-Nov-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Clear Plastic Bottle - Natural (ED041G)	0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	---	---	---	20-Nov-2023	06-Dec-2023	✓
ED045G: Chloride by Discrete Analyser									
Clear Plastic Bottle - Natural (ED045G)	0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	---	---	---	20-Nov-2023	06-Dec-2023	✓



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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) 0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	---	---	---	14-Nov-2023	15-Nov-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0960_SW125_231108, 0960_OTH106_231108	0960_OTH107_231108,	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	21	4.76	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	21	9.52	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	21	9.52	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	21	4.76	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



ALS Compass

SAMPLING *Intelligence*

Custody Document for Submissions via ALS Compass App



Environmental Division
Perth
Work Order Reference
EP2315741



Telephone : +61-8-9406 1301

Project: WA-0960-PPASOMP-23 Client: STANTEC

Project Manager: _____

ALS Compass COC Reference: 54789-59786 59787 59788 59789 59790
Samples: 59794 59792 59785

Phone: _____

Sampler: _____

Phone: _____

Turnaround Requirements: Standard _____ Urgent _____

Special Instructions:

Custody:

Relinquished by: STANTEC

Received by: _____

Relinquished by: _____

Received by: _____

Date / Time: 9/11/23

Date / Time: _____

Date / Time: _____

Date / Time: _____

Right Solutions - Right Partner

alsglobal.com/als-compass



CHAIN OF CUSTODY

COC#: 59820

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_23

SITE: Learmonth SW/OTH - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SW207		08/11/2023 02:15 PM	WATER	ALS: 3 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 59820

ALS Laboratory: EP Perth

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_23

SITE: Learmonth SW/OTH - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SW207	HDPE (no PTFE)	20 mL	00350821001891	Grey	No	
001	0960_SW207	HDPE (no PTFE)	20 mL	00350821001831	Grey	No	
001	0960_SW207	Clear Plastic Bottle - Natural	125 mL	00070522145068	Green	No	
Total Bottle Count: ALS: 3, Non ALS: 0							



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2315741

Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: [REDACTED]@stantec.com	E-mail	: ALSEnviro.Perth@alsglobal.com
Telephone	: ----	Telephone	: +61-8-9406 1301
Facsimile	: ----	Facsimile	: +61-8-9406 1399
Project	: WA_0960_PFASOMP_23	Page	: 1 of 2
Order number	: pfas-omp Learmonth	Quote number	: ES2022MWHAUS0002 (SY/139/19 B)
C-O-C number	: 59820	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Learmonth SW/OTH - CG		
Sampler	: [REDACTED] [REDACTED]		

Dates

Date Samples Received	: 10-Nov-2023 12:20	Issue Date	: 13-Nov-2023
Client Requested Due Date	: 21-Nov-2023	Scheduled Reporting Date	: 21-Nov-2023

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 4	Temperature	: 17.6 - Ice present
Receipt Detail	:	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
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2315741	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023 12:20
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 59820	Issue Date	: 20-Nov-2023 22:58
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SW/OTH - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 1		
No. of samples analysed	: 1		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

0960_SW207_231108

Sampling date / time

08-Nov-2023 14:15

Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	202	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	202	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2750	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	20900	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	524	----	----	----	----
Magnesium	7439-95-4	1	mg/L	1590	----	----	----	----
Sodium	7440-23-5	1	mg/L	13200	----	----	----	----
Potassium	7440-09-7	1	mg/L	491	----	----	----	----
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	651	----	----	----	----
☐ Total Cations	----	0.01	meq/L	744	----	----	----	----
☐ Ionic Balance	----	0.01	%	6.66	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

0960_SW207_231108

Sampling date / time

08-Nov-2023 14:15

Compound

CAS Number

LOR

Unit

EP2315741-001

Result

EP231B: Perfluoroalkyl Carboxylic Acids

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

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----

EP231D: (n:2) Fluorotelomer Sulfonic Acids



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

0960_SW207_231108

Sampling date / time

08-Nov-2023 14:15

Compound

CAS Number

LOR

Unit

EP2315741-001

Result

EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued

4:2 Fluorotelomer sulfonic acid
 (4:2 FTS)

757124-72-4

0.05

µg/L

<0.05

6:2 Fluorotelomer sulfonic acid
 (6:2 FTS)

27619-97-2

0.05

µg/L

<0.05

8:2 Fluorotelomer sulfonic acid
 (8:2 FTS)

39108-34-4

0.05

µg/L

<0.05

10:2 Fluorotelomer sulfonic acid
 (10:2 FTS)

120226-60-0

0.05

µg/L

<0.05

EP231P: PFAS Sums

Sum of PFAS

0.01

µg/L

<0.01

Sum of PFHxS and PFOS

355-46-4/1763-23-1

0.01

µg/L

<0.01

Sum of PFAS (WA DER List)

0.01

µg/L

<0.01

EP231S: PFAS Surrogate

13C4-PFOS

0.02

%

96.9

13C8-PFOA

0.02

%

112



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2315741	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: Customer Services EP
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 14-Nov-2023
C-O-C number	: 59820	Issue Date	: 20-Nov-2023
Sampler	: [REDACTED]		
Site	: Learmonth SW/OTH - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 1		
No. of samples analysed	: 1		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5423588)									
EP2315731-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	286	294	2.8	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	286	294	2.8	0% - 20%
EP2315732-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	744	742	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	744	742	0.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5421113)									
EP2315731-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	132	8.0	0% - 20%
EP2315741-001	0960_SW207_231108	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2750	2880	4.6	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5421114)									
EP2315731-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1050	1040	1.0	0% - 20%
EP2315741-001	0960_SW207_231108	ED045G: Chloride	16887-00-6	1	mg/L	20900	20900	0.2	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5420842)									
EP2315738-010	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	462	496	7.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	628	673	6.9	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	5830	6280	7.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	193	206	6.6	0% - 20%
EP2315862-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	46	45	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	197	203	2.9	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	969	999	3.0	0% - 20%

Page : 3 of 6
Work Order : EP2315741
Client : STANTEC AUSTRALIA PTY LTD
Project : WA_0960_PFASOMP_23



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 5420842) - continued									
EP2315862-001	Anonymous	ED093F: Potassium	7440-09-7	1	mg/L	28	28	0.0	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5423588)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	----	---	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	115	85.1	126
				<1	200 mg/L	102	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421113)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.8	89.9	112
				<1	500 mg/L	96.2	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5421114)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	88.6	113
				<1	1000 mg/L	99.6	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5420842)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	102	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	104	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	104	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5427313)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	108	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	115	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	102	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	111	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	99.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	91.9	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427313)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	118	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	98.4	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	105	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5427313) - continued								
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	113	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	100	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	115	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	115	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	109	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5427313)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	108	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	126	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	128	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	120	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	95.4	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	102	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	97.2	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5427313)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	97.3	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	106	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	96.4	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	95.8	64.2	133
EP231P: PFAS Sums (QCLot: 5427313)								
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**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5421113)							
EP2315731-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	112	70.4	130



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID		Sample ID	Method: Compound	CAS Number	Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low High
ED045G: Chloride by Discrete Analyser (QCLot: 5421114)							
EP2315731-001		Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0 130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2315741	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_23	Date Samples Received	: 10-Nov-2023
Site	: Learmonth SW/OTH - CG	Issue Date	: 20-Nov-2023
Sampler	: [REDACTED]	No. of samples received	: 1
Order number	: pfas-omp Learmonth	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.
- 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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED045G: Chloride by Discrete Analyser	EP2315731--001	Anonymous	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) 0960_SW207_231108	08-Nov-2023	---	---	---	16-Nov-2023	22-Nov-2023	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) 0960_SW207_231108	08-Nov-2023	---	---	---	20-Nov-2023	06-Dec-2023	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) 0960_SW207_231108	08-Nov-2023	---	---	---	20-Nov-2023	06-Dec-2023	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) 0960_SW207_231108	08-Nov-2023	---	---	---	14-Nov-2023	15-Nov-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0960_SW207_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✓	16-Nov-2023	06-May-2024	✓



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0960_SW207_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0960_SW207_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0960_SW207_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0960_SW207_231108	08-Nov-2023	16-Nov-2023	06-May-2024	✔	16-Nov-2023	06-May-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	19	10.53	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
Major Cations - Dissolved	ED093F	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	6	0.00	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
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	19	10.53	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
Major Cations - Dissolved	ED093F	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	16.67	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
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	19	5.26	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
Major Cations - Dissolved	ED093F	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	6	16.67	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
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	6	0.00	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
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

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CHAIN OF CUSTODY RECORD

CLIENT DETAILS		Page 1 of 1	
Company Name : Stantec Australia	Contact Name : [REDACTED]	Purchase Order : PFAS-OMP 304700525	COC Number : AS-OMP 304700525 -02
Office Address : 226 Adelaide Tce, Perth, WA, 6000		PROJECT Number : WA_0960_PFASOMP_23	Eurofins mgt quote ID : NA
	Email for COC/SRN/Results : [REDACTED]	PROJECT Name : WA_0960_PFASOMP_23	Data output format: PDF, ESDAT

Special Directions & Comments : Please send ESdat files to derp.labreports@esdat.com.au with the project No in the header file Please send email invoice to SAPinvoices@stantec.com	Analytes PFAS (28 analytes)	Some common holding times (with correct preservation). For further information contact the lab																		
		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:50%;">Waters</th> <th style="width:50%;">Soils</th> </tr> </thead> <tbody> <tr> <td>BTEX, MAH, VOC 14 days</td> <td>BTEX, MAH, VOC 14 days</td> </tr> <tr> <td>TRH, PAH, Phenols, Pesticides 7 days</td> <td>TRH, PAH, Phenols, Pesticides 14 days</td> </tr> <tr> <td>Heavy Metals 6 months</td> <td>Heavy Metals 6 months</td> </tr> <tr> <td>Mercury, CrVI 28 days</td> <td>Mercury, CrVI 28 days</td> </tr> <tr> <td>Microbiological testing 24 hours</td> <td>Microbiological testing 72 hours</td> </tr> <tr> <td>BOD, Nitrate, Nitrite, Total N 2 days</td> <td>Anions 28 days</td> </tr> <tr> <td>Solids - TSS, TDS etc 7 days</td> <td>SPOCAS, pH Field and FOX, CRS 24 hours</td> </tr> <tr> <td>Ferrous iron 7 days</td> <td>ASLP, TCLP 7 days</td> </tr> </tbody> </table>	Waters	Soils	BTEX, MAH, VOC 14 days	BTEX, MAH, VOC 14 days	TRH, PAH, Phenols, Pesticides 7 days	TRH, PAH, Phenols, Pesticides 14 days	Heavy Metals 6 months	Heavy Metals 6 months	Mercury, CrVI 28 days	Mercury, CrVI 28 days	Microbiological testing 24 hours	Microbiological testing 72 hours	BOD, Nitrate, Nitrite, Total N 2 days	Anions 28 days	Solids - TSS, TDS etc 7 days	SPOCAS, pH Field and FOX, CRS 24 hours	Ferrous iron 7 days	ASLP, TCLP 7 days
Waters	Soils																			
BTEX, MAH, VOC 14 days	BTEX, MAH, VOC 14 days																			
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Ferrous iron 7 days	ASLP, TCLP 7 days																			

#	Sample ID	Date	Matrix	PFAS (28 analytes)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	0960_QC215_230628	8/11/2023	Soil	X																												
2	0960_QC216_230628	8/11/2023	Water	X																												
3	0960_QC217_230628	8/11/2023	Water	X																												
4	0960_QC218_230628	8/11/2023	Soil	X																												
5	0960_QC219_230628	8/11/2023	Water	X																												
6	0960_QC220_230628	8/11/2023	Water	X																												
7	0960_QC221_230628	8/11/2023	Water	X																												
8	0960_QC222_230628	8/11/2023	Soil	X																												
9	0960_QC223_230628	8/11/2023	Soil	X																												
10	0960_QC224_230628	8/11/2023	Water	X																												
11	0960_QC225_230628	8/11/2023	Water	X																												
12	0960_QC226_230628	8/11/2023	Soil	X																												
13	0960_QC227_230628	8/11/2023	Water	X																												
14																																
15																																
16																																
17																																
18																																
19																																

Relinquished By: Stantec	Received By: [REDACTED]	Turn around time	Method Of Shipment	Temperature on arrival: 10.9
Date & Time : 10/11/2023	Date & Time : 10/11/23 12:19	1 DAY ☐ 2 DAY ☐ 3 DAY ☐	☒ Courier ☐ Hand Delivered ☐ Postal Courier Consignment # : 8113003420	Report number: 1043510
Signature: [REDACTED]	Signature: [REDACTED]	STANDARD ☒ Other: ☐		

Perth	Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle	Auckland	Auckland (Asb)	Christchurch	Tauranga
46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370	8 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289	35 O'Rourke Road Penrose, Auckland 1081 +64 9 526 4551 IANZ# 1327	Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1081 +64 9 525 0568 IANZ# 1308	43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402

Sample Receipt Advice

Company name: Stantec Australia Pty Ltd (WA)
Contact name: [REDACTED]
Project name: WA_0960_PFASOMP_23
Project ID: WA_0960_PFASOMP_23
Turnaround time: 5 Day
Date/Time received: Nov 10, 2023 12:19 PM
Eurofins reference: 1043510

Sample Information

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

Notes

We did not receive QC217. We have received 2x extra containers for QC216. We have received 1x 125mL inorganics bottles for: QC220, QC224 and QC227 - no inorganics testing listed. Please advise. | UPDATE: PFAS on 0960_QC216_231108 has been cancelled due to bottles being mislabelled between QC216 and QC217.

Contact

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

[REDACTED]

Results will be delivered electronically via email to [REDACTED] - [REDACTED]@stantec.com.

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



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

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NATA# 1261
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NATA# 1261
Site# 25079 & 25289

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Auckland 1061
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1277 Cameron Road,
Gate Pa,
Tauranga 3112
+64 9 525 0568
IANZ# 1402

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

Project Name: WA_0960_PFASOMP_23
Project ID: WA_0960_PFASOMP_23

Order No.: PFAS-OMP 304700525
Report #: 1043510
Phone: 0458 839 200
Fax:

Received: Nov 10, 2023 12:19 PM
Due: Nov 17, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

CANCELLED

Moisture Set

Per- and Polyfluoroalkyl Substances (PFASs)

Perth Laboratory - NATA # 2377 Site # 2370

X

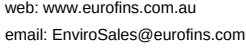
Melbourne Laboratory - NATA # 1261 Site # 1254

X

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	0960_QC215_231108	Nov 08, 2023		Soil	L23-No0029187		X	X
2	0960_QC216_231108	Nov 08, 2023		Water	L23-No0029188	X		
3	0960_QC218_231108	Nov 08, 2023		Soil	L23-No0029189		X	X
4	0960_QC219_231108	Nov 08, 2023		Water	L23-No0029190			X
5	0960_QC220_231108	Nov 08, 2023		Water	L23-No0029191			X
6	0960_QC221_231108	Nov 08, 2023		Water	L23-No0029192			X
7	0960_QC222_231108	Nov 08, 2023		Soil	L23-No0029193		X	X



ABN: 50 005 085 521

NZBN: 9429046024954

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ce 1/2 Frost Drive
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NATA# 1261
Site# 25079 & 25289

Tauranga
1277 Cameron Road,
Gate Pa,
5 Tauranga 3112
+64 9 525 0568
IANZ# 1402

Received: Nov 10, 2023 12:19 PM
Due: Nov 17, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail						CANCELLED	Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)
Perth Laboratory - NATA # 2377 Site # 2370						X		
Melbourne Laboratory - NATA # 1261 Site # 1254							X	X
8	0960_QC223_231108	Nov 08, 2023		Soil	L23-No0029194		X	X
9	0960_QC224_231108	Nov 08, 2023		Water	L23-No0029195			X
10	0960_QC225_231108	Nov 08, 2023		Water	L23-No0029196			X
11	0960_QC226_231108	Nov 08, 2023		Soil	L23-No0029197		X	X
12	0960_QC227_231108	Nov 08, 2023		Water	L23-No0029198			X
Test Counts						1	5	11

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



NATA Accredited
Accreditation Number 2377
Site Number 2370

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention:

Report 1043510-S-V2
Project name WA_0960_PFASOMP_23
Project ID WA_0960_PFASOMP_23
Received Date Nov 10, 2023

Client Sample ID			0960_QC215_2 31108	0960_QC218_2 31108	0960_QC222_2 31108	0960_QC223_2 31108
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L23- No0029187	L23- No0029189	L23- No0029193	L23- No0029194
Date Sampled			Nov 08, 2023	Nov 08, 2023	Nov 08, 2023	Nov 08, 2023
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	8.4	6.0	2.3	1.5
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoropentanoic acid (PFPeA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorohexanoic acid (PFHxA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoroheptanoic acid (PFHpA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanoic acid (PFOA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorononanoic acid (PFNA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorodecanoic acid (PFDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoroundecanoic acid (PFUnDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorododecanoic acid (PFDoDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorotridecanoic acid (PFTeDA) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
13C4-PFBA (surr.)	1	%	40	74	84	112
13C5-PFPeA (surr.)	1	%	59	93	102	97
13C5-PFHxA (surr.)	1	%	55	83	86	96
13C4-PFHpA (surr.)	1	%	54	79	79	77
13C8-PFOA (surr.)	1	%	56	76	79	103
13C5-PFNA (surr.)	1	%	80	101	106	92
13C6-PFDA (surr.)	1	%	111	109	119	77
13C2-PFUnDA (surr.)	1	%	113	111	120	78
13C2-PFDoDA (surr.)	1	%	110	118	128	91
13C2-PFTeDA (surr.)	1	%	84	95	95	68
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10

Client Sample ID			0960_QC215_2 31108	0960_QC218_2 31108	0960_QC222_2 31108	0960_QC223_2 31108
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L23- No0029187	L23- No0029189	L23- No0029193	L23- No0029194
Date Sampled			Nov 08, 2023	Nov 08, 2023	Nov 08, 2023	Nov 08, 2023
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
13C8-FOSA (surr.)	1	%	100	101	103	75
D3-N-MeFOSA (surr.)	1	%	87	87	87	113
D5-N-EtFOSA (surr.)	1	%	114	107	118	107
D7-N-MeFOSE (surr.)	1	%	94	100	109	77
D9-N-EtFOSE (surr.)	1	%	85	85	94	100
D5-N-EtFOSAA (surr.)	1	%	72	88	99	86
D3-N-MeFOSAA (surr.)	1	%	72	99	106	111
Perfluoroalkyl sulfonic acids (PFSA)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorononanesulfonic acid (PFNS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	5	ug/kg	^{N09} < 5	< 5	< 5	< 5
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS) ^{N11}	5	ug/kg	^{N09} 6.9	< 5	^{N09} 20	^{N09} 6.3
Perfluorodecanesulfonic acid (PFDS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
13C3-PFBS (surr.)	1	%	84	79	86	101
18O2-PFHxS (surr.)	1	%	69	75	80	98
13C8-PFOS (surr.)	1	%	98	92	99	89
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
13C2-4:2 FTSA (surr.)	1	%	28	83	90	116
13C2-6:2 FTSA (surr.)	1	%	35	70	75	121
13C2-8:2 FTSA (surr.)	1	%	116	127	134	106
13C2-10:2 FTSA (surr.)	1	%	96	140	125	74
PFASs Summations						
Sum (PFHxS + PFOS)*	5	ug/kg	6.9	< 5	20	6.3
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	6.9	< 5	20	6.3
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	6.9	< 5	20	6.3
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10	< 10	20	< 10
Sum of PFASs (n=30)*	50	ug/kg	< 50	< 50	< 50	< 50

Client Sample ID			0960_QC226_2 31108
Sample Matrix			Soil
Eurofins Sample No.			L23- No0029197
Date Sampled			Nov 08, 2023
Test/Reference	LOR	Unit	
Sample Properties			
% Moisture	1	%	1.1
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	5	ug/kg	< 5
Perfluoropentanoic acid (PFPeA) ^{N11}	5	ug/kg	< 5
Perfluorohexanoic acid (PFHxA) ^{N11}	5	ug/kg	< 5
Perfluoroheptanoic acid (PFHpA) ^{N11}	5	ug/kg	< 5
Perfluorooctanoic acid (PFOA) ^{N11}	5	ug/kg	< 5
Perfluorononanoic acid (PFNA) ^{N11}	5	ug/kg	< 5
Perfluorodecanoic acid (PFDA) ^{N11}	5	ug/kg	< 5
Perfluoroundecanoic acid (PFUnDA) ^{N11}	5	ug/kg	< 5
Perfluorododecanoic acid (PFDoDA) ^{N11}	5	ug/kg	< 5
Perfluorotridecanoic acid (PFTeDA) ^{N15}	5	ug/kg	< 5
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	5	ug/kg	< 5
13C4-PFBA (surr.)	1	%	84
13C5-PFPeA (surr.)	1	%	100
13C5-PFHxA (surr.)	1	%	89
13C4-PFHpA (surr.)	1	%	84
13C8-PFOA (surr.)	1	%	87
13C5-PFNA (surr.)	1	%	108
13C6-PFDA (surr.)	1	%	123
13C2-PFUnDA (surr.)	1	%	127
13C2-PFDoDA (surr.)	1	%	134
13C2-PFTeDA (surr.)	1	%	107
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	5	ug/kg	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	5	ug/kg	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	5	ug/kg	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	5	ug/kg	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	5	ug/kg	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	10	ug/kg	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	10	ug/kg	< 10
13C8-FOSA (surr.)	1	%	99
D3-N-MeFOSA (surr.)	1	%	97
D5-N-EtFOSA (surr.)	1	%	121
D7-N-MeFOSE (surr.)	1	%	124
D9-N-EtFOSE (surr.)	1	%	99
D5-N-EtFOSAA (surr.)	1	%	97
D3-N-MeFOSAA (surr.)	1	%	101
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	5	ug/kg	< 5
Perfluorononanesulfonic acid (PFNS) ^{N15}	5	ug/kg	< 5
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	5	ug/kg	< 5
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	5	ug/kg	< 5
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	5	ug/kg	< 5
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	5	ug/kg	< 5

Client Sample ID			0960_QC226_2 31108
Sample Matrix			Soil
Eurofins Sample No.			L23- No0029197
Date Sampled			Nov 08, 2023
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorooctanesulfonic acid (PFOS) ^{N11}	5	ug/kg	^{N09} < 5
Perfluorodecanesulfonic acid (PFDS) ^{N15}	5	ug/kg	< 5
13C3-PFBS (surr.)	1	%	93
18O2-PFHxS (surr.)	1	%	89
13C8-PFOS (surr.)	1	%	103
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	5	ug/kg	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	10	ug/kg	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	5	ug/kg	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	5	ug/kg	< 5
13C2-4:2 FTSA (surr.)	1	%	113
13C2-6:2 FTSA (surr.)	1	%	103
13C2-8:2 FTSA (surr.)	1	%	151
13C2-10:2 FTSA (surr.)	1	%	128
PFASs Summations			
Sum (PFHxS + PFOS)*	5	ug/kg	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10
Sum of PFASs (n=30)*	50	ug/kg	< 50

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
% Moisture - Method: LTM-GEN-7080 Moisture	Melbourne	Nov 13, 2023	14 Days
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Nov 21, 2023	28 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Nov 21, 2023	28 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Nov 21, 2023	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Nov 21, 2023	28 Days
PFASs Summations - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Melbourne	Nov 13, 2023	



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Project Name: WA_0960_PFASOMP_23
Project ID: WA_0960_PFASOMP_23

Order No.: PFAS-OMP 304700525
Report #: 1043510
Phone: 0458 839 200
Fax:

Received: Nov 10, 2023 12:19 PM
Due: Nov 17, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Moisture Set

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

X

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	0960_QC215_231108	Nov 08, 2023		Soil	L23-No0029187	X	X
2	0960_QC216_231108	Nov 08, 2023		Water	L23-No0029188		X
3	0960_QC218_231108	Nov 08, 2023		Soil	L23-No0029189	X	X
4	0960_QC219_231108	Nov 08, 2023		Water	L23-No0029190		X
5	0960_QC220_231108	Nov 08, 2023		Water	L23-No0029191		X
6	0960_QC221_231108	Nov 08, 2023		Water	L23-No0029192		X
7	0960_QC222_231108	Nov 08, 2023		Soil	L23-No0029193	X	X
8	0960_QC223_231108	Nov 08, 2023		Soil	L23-No0029194	X	X



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

Project Name: WA_0960_PFASOMP_23
Project ID: WA_0960_PFASOMP_23

Order No.: PFAS-OMP 304700525
Report #: 1043510
Phone: 0458 839 200
Fax:

Received: Nov 10, 2023 12:19 PM
Due: Nov 17, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

Moisture Set

Per- and Polyfluoroalkyl Substances (PFASs)

Melbourne Laboratory - NATA # 1261 Site # 1254

9	0960_QC224_231108	Nov 08, 2023		Water	L23-No0029195	X	X
10	0960_QC225_231108	Nov 08, 2023		Water	L23-No0029196		X
11	0960_QC226_231108	Nov 08, 2023		Soil	L23-No0029197	X	X
12	0960_QC227_231108	Nov 08, 2023		Water	L23-No0029198		X

Test Counts

5

12

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

applicable: Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

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

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

PFAS field samples that contain surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported, have been reviewed, and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/kg	< 5			5	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 5			5	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 5			5	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 5			5	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 5			5	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 5			5	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 5			5	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/kg	< 5			5	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/kg	< 5			5	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/kg	< 5			5	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/kg	< 5			5	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/kg	< 5			5	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/kg	< 5			5	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/kg	< 5			5	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/kg	< 5			5	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/kg	< 5			5	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/kg	< 10			10	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/kg	< 10			10	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA)s							
Perfluorobutanesulfonic acid (PFBS)	ug/kg	< 5			5	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/kg	< 5			5	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/kg	< 5			5	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/kg	< 5			5	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 5			5	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/kg	< 5			5	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 5			5	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/kg	< 5			5	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)s							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/kg	< 5			5	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/kg	< 10			10	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/kg	< 5			5	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/kg	< 5			5	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	73			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	78			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	79			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	74			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	74			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	75			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	73			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	81			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	81			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	76			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	80			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	76			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	79			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	58			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	67			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	82			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	71			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	73			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)									
Perfluorobutanesulfonic acid (PFBS)			%	70			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	67			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	79			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	75			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	72			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	66			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	72			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	73			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	75			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	80			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	76			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	66			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)									
				Result 1					
Perfluorobutanoic acid (PFBA)	M23-No0032461	NCP	%	76			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M23-No0032461	NCP	%	77			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M23-No0032461	NCP	%	80			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-No0032461	NCP	%	75			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M23-No0032461	NCP	%	75			50-150	Pass	
Perfluorononanoic acid (PFNA)	M23-No0032461	NCP	%	85			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M23-No0032461	NCP	%	78			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-No0032461	NCP	%	77			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-No0032461	NCP	%	76			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-No0032461	NCP	%	62			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-No0032461	NCP	%	82			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	M23-No0032461	NCP	%	85			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-No0032461	NCP	%	82			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-No0032461	NCP	%	87			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-No0032461	NCP	%	83			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-No0032461	NCP	%	82			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-No0032461	NCP	%	83			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-No0032461	NCP	%	87			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M23-No0032461	NCP	%	80			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-No0032461	NCP	%	97			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-No0032461	NCP	%	87			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-No0032461	NCP	%	73			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-No0032461	NCP	%	78			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-No0032461	NCP	%	58			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-No0032461	NCP	%	74			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-No0032461	NCP	%	82			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-No0032461	NCP	%	72			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-No0032461	NCP	%	69			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-No0032461	NCP	%	75			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-No0032461	NCP	%	79			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M23-No0027792	NCP	%	17	17	<1	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTTrDA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-No0025852	NCP	ug/kg	< 10	< 10	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-No0025852	NCP	ug/kg	< 10	< 10	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-No0025852	NCP	ug/kg	< 10	< 10	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-No0025852	NCP	ug/kg	< 5	< 5	<1	30%	Pass

Comments

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised by:

	Analytical Services Manager
	Senior Analyst-PFAS
	Senior Analyst-Sample Properties



General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request

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NATA Accredited
Accreditation Number 2377
Site Number 2370

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention:

Report **1043510-W-V3**
Project name **WA_0960_PFASOMP_23**
Project ID **WA_0960_PFASOMP_23**
Received Date **Nov 10, 2023**

Client Sample ID			0960_QC219_2 31108	0960_QC220_2 31108	0960_QC221_2 31108	0960_QC224_2 31108
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L23- No0029190	L23- No0029191	L23- No0029192	L23- No0029195
Date Sampled			Nov 08, 2023	Nov 08, 2023	Nov 08, 2023	Nov 08, 2023
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	0.72	< 0.05	0.10	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	1.1	< 0.01	0.08	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	4.4	< 0.01	0.18	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.39	< 0.01	^{N09} 0.04	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 0.74	< 0.01	^{N09} 0.05	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	69	98	63	68
13C5-PFPeA (surr.)	1	%	83	117	95	109
13C5-PFHxA (surr.)	1	%	107	114	97	108
13C4-PFHpA (surr.)	1	%	96	114	99	103
13C8-PFOA (surr.)	1	%	92	133	107	115
13C5-PFNA (surr.)	1	%	99	107	97	86
13C6-PFDA (surr.)	1	%	88	93	98	76
13C2-PFUnDA (surr.)	1	%	80	75	86	69
13C2-PFDoDA (surr.)	1	%	64	55	89	73
13C2-PFTeDA (surr.)	1	%	24	11	78	69
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	110	113	111	92
D3-N-MeFOSA (surr.)	1	%	115	90	139	86

Client Sample ID			0960_QC219_2 31108	0960_QC220_2 31108	0960_QC221_2 31108	0960_QC224_2 31108
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L23- No0029190	L23- No0029191	L23- No0029192	L23- No0029195
Date Sampled			Nov 08, 2023	Nov 08, 2023	Nov 08, 2023	Nov 08, 2023
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
D5-N-EtFOSA (surr.)	1	%	123	97	158	92
D7-N-MeFOSE (surr.)	1	%	93	91	100	73
D9-N-EtFOSE (surr.)	1	%	86	84	94	70
D5-N-EtFOSAA (surr.)	1	%	84	82	98	69
D3-N-MeFOSAA (surr.)	1	%	97	90	101	78
Perfluoroalkyl sulfonic acids (PFSA's)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	^{N09} 1.3	< 0.01	^{N09} 0.08	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.02	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	0.78	< 0.01	0.04	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 1.2	< 0.01	^{N09} 0.07	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 9.0	< 0.01	^{N09} 0.57	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.75	< 0.01	^{N09} 0.04	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 9.3	< 0.01	^{N09} 6.9	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	107	109	98	103
18O2-PFHxS (surr.)	1	%	104	108	91	94
13C8-PFOS (surr.)	1	%	105	101	96	83
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	94	95	92	95
13C2-6:2 FTSA (surr.)	1	%	76	89	83	76
13C2-8:2 FTSA (surr.)	1	%	59	72	77	62
13C2-10:2 FTSA (surr.)	1	%	64	59	90	65
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	18.3	< 0.01	7.47	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	10.04	< 0.01	6.95	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	19.04	< 0.01	7.52	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	26.95	< 0.05	8	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	29.68	< 0.1	8.15	< 0.1

Client Sample ID			0960_QC225_2 31108	0960_QC227_2 31108
Sample Matrix			Water	Water
Eurofins Sample No.			L23- No0029196	L23- No0029198
Date Sampled			Nov 08, 2023	Nov 08, 2023
Test/Reference	LOR	Unit		
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.04	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.15	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	^{N09} 0.03	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 0.02	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	72	68
13C5-PFPeA (surr.)	1	%	111	111
13C5-PFHxA (surr.)	1	%	107	111
13C4-PFHpA (surr.)	1	%	106	107
13C8-PFOA (surr.)	1	%	117	111
13C5-PFNA (surr.)	1	%	97	78
13C6-PFDA (surr.)	1	%	88	52
13C2-PFUnDA (surr.)	1	%	83	38
13C2-PFDoDA (surr.)	1	%	79	38
13C2-PFTeDA (surr.)	1	%	54	38
Perfluoroalkyl sulfonamido substances				
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	100	69
D3-N-MeFOSA (surr.)	1	%	122	73
D5-N-EtFOSA (surr.)	1	%	132	74
D7-N-MeFOSE (surr.)	1	%	87	40
D9-N-EtFOSE (surr.)	1	%	82	39
D5-N-EtFOSAA (surr.)	1	%	89	43
D3-N-MeFOSAA (surr.)	1	%	96	52
Perfluoroalkyl sulfonic acids (PFSAs)				
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	^{N09} 0.06	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	0.03	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 0.09	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.64	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.03	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 1.2	< 0.01
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01

Client Sample ID			0960_QC225_2 31108	0960_QC227_2 31108
Sample Matrix			Water	Water
Eurofins Sample No.			L23- No0029196	L23- No0029198
Date Sampled			Nov 08, 2023	Nov 08, 2023
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonic acids (PFSA)				
13C3-PFBS (surr.)	1	%	108	109
18O2-PFHxS (surr.)	1	%	94	100
13C8-PFOS (surr.)	1	%	84	64
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	105	118
13C2-6:2 FTSA (surr.)	1	%	90	90
13C2-8:2 FTSA (surr.)	1	%	72	44
13C2-10:2 FTSA (surr.)	1	%	74	38
PFASs Summations				
Sum (PFHxS + PFOS)*	0.01	ug/L	1.84	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	1.22	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	1.86	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	2.14	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	2.29	< 0.1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Nov 15, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Nov 15, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Nov 15, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Nov 15, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Nov 13, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			



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Project Name: WA_0960_PFASOMP_23
Project ID: WA_0960_PFASOMP_23

Order No.: PFAS-OMP 304700525
Report #: 1043510
Phone: 0458 839 200
Fax:

Received: Nov 10, 2023 12:19 PM
Due: Nov 17, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

CANCELLED

Moisture Set

Per- and Polyfluoroalkyl Substances (PFASs)

Perth Laboratory - NATA # 2377 Site # 2370

X

Melbourne Laboratory - NATA # 1261 Site # 1254

X

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	0960_QC215_231108	Nov 08, 2023		Soil	L23-No0029187		X	X
2	0960_QC216_231108	Nov 08, 2023		Water	L23-No0029188	X		
3	0960_QC218_231108	Nov 08, 2023		Soil	L23-No0029189		X	X
4	0960_QC219_231108	Nov 08, 2023		Water	L23-No0029190			X
5	0960_QC220_231108	Nov 08, 2023		Water	L23-No0029191			X
6	0960_QC221_231108	Nov 08, 2023		Water	L23-No0029192			X
7	0960_QC222_231108	Nov 08, 2023		Soil	L23-No0029193		X	X



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Project Name: WA_0960_PFASOMP_23
Project ID: WA_0960_PFASOMP_23

Order No.: PFAS-OMP 304700525
Report #: 1043510
Phone: 0458 839 200
Fax:

Received: Nov 10, 2023 12:19 PM
Due: Nov 17, 2023
Priority: 5 Day
Contact Name: [REDACTED]

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail

CANCELLED

Moisture Set

Per- and Polyfluoroalkyl Substances (PFASs)

Perth Laboratory - NATA # 2377 Site # 2370

X

Melbourne Laboratory - NATA # 1261 Site # 1254

8	0960_QC223_231108	Nov 08, 2023		Soil	L23-No0029194		X	X
9	0960_QC224_231108	Nov 08, 2023		Water	L23-No0029195			X
10	0960_QC225_231108	Nov 08, 2023		Water	L23-No0029196			X
11	0960_QC226_231108	Nov 08, 2023		Soil	L23-No0029197		X	X
12	0960_QC227_231108	Nov 08, 2023		Water	L23-No0029198			X
Test Counts						1	5	11

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

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

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

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

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA)s							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)s							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	116			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	92			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	114			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	108			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	103			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	105			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	110			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	102			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	112			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	80			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	109			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	127			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	115			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	143			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	122			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	106			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	111			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	118			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)									
Perfluorobutanesulfonic acid (PFBS)			%	117			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	113			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	135			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	118			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	103			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	118			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	112			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	90			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	122			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	128			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	119			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	118			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)									
				Result 1					
Perfluorononanoic acid (PFNA)	L23-No0029190	CP	%	108			50-150	Pass	
Perfluorodecanoic acid (PFDA)	L23-No0029190	CP	%	108			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	L23-No0029190	CP	%	109			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	L23-No0029190	CP	%	120			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	L23-No0029190	CP	%	58			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L23-No0029190	CP	%	112			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	L23-No0029190	CP	%	124			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L23-No0029190	CP	%	114			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L23-No0029190	CP	%	138			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L23-No0029190	CP	%	119			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L23-No0029190	CP	%	108			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L23-No0029190	CP	%	113			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L23-No0029190	CP	%	122			50-150	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoroalkyl sulfonic acids (PFASs)				Result 1					
Perfluorodecanesulfonic acid (PFDS)	L23-No0029190	CP	%	118			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L23-No0029190	CP	%	118			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L23-No0029190	CP	%	130			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L23-No0029190	CP	%	118			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L23-No0029190	CP	%	122			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorohexanoic acid (PFHxA)	M23-No0025367	NCP	%	101			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)				Result 1					
Perfluorooctanesulfonic acid (PFOS)	M23-No0025367	NCP	%	94			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluoropentanoic acid (PFPeA)	L23-No0029374	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorohexanoic acid (PFHxA)	L23-No0027304	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFASs)				Result 1	Result 2	RPD			
Perfluorooctanesulfonic acid (PFOS)	L23-No0027304	NCP	ug/L	0.01	< 0.01	15	30%	Pass	

Comments

V2: Sample names have been dated 231108 for all samples, rather than 230628

V3: 0960_QC216_231108 testing has been cancelled.

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised by:

[Redacted]

Analytical Services Manager

[Redacted]

Senior Analyst-PFAS

[Redacted]

[Redacted]

General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request

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APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES



now



Monitoring Date	Monitoring Location	Sample_ID	Screen Interval	Screen Level	TOC	Well Depth (m)	SWL (mbTOC)	RWL (mAHD)	Other Observations on Bore/Site	Sampling Method	R1 - Temp (°C)	R1 - DO (mg/L)	R1 - EC (us/Cm)
Interlab QC bottles mislabeled QC216 - not analysed.													
8/11/2023	MW018	0960_MW018_231108	5.5-8.5_	Single_Level	6.403	8.5	5.759	0.644	QC216 not analysed due to mislabel of QC217.	HydraSleeve	27.5	4.39	2938
8/11/2023	MW021	0960_MW021_231108	5.6-8.6_	Single_Level	6.745	8.6	6.01	0.735		HydraSleeve	30.2	3.73	3399
8/11/2023	MW102	0960_MW102_231108	2.5-8.5_	Single_Level	4.6266	8.5	4.67	-0.043		HydraSleeve	28.8	0.48	90284
8/11/2023	MW103	0960_MW103_231108	1-5.8_	Single_Level	2.2785	5.8	2.385	-0.106		HydraSleeve	28.6	0.7	74885
8/11/2023	MW104	0960_MW104_231108	1-6.5_	Single_Level	2.7256	6.5	2.745	-0.019		HydraSleeve	28.2	0.69	80177
8/11/2023	MW105	0960_MW105_231108	2-8_	Single_Level	3.7272	8.0	3.59	0.137		HydraSleeve	29.7	1.06	46065
8/11/2023	MW112	0960_MW112_231108	3-8_	Single_Level	5.1191	8.0	4.52	0.599		HydraSleeve	29.7	3.34	11448
8/11/2023	MW113	0960_MW113_231108	4-10_	Single_Level	7.3165	10.0	6.57	0.746		HydraSleeve	28.5	2.42	11154
8/11/2023	MW114	0960_MW114_231108	4-10_	Single_Level	7.7467	10.0	7.168	0.579		HydraSleeve	29.5	1.85	8899
8/11/2023	MW115	0960_MW115_231108	3-8_	Single_Level	4.9133	8.0	4.559	0.354		HydraSleeve	32.1	1.27	33068
8/11/2023	MW122	0960_MW122_231108	1.7-7.7_	Single_Level	3.9702	7.7	3.8	0.17		HydraSleeve	31	1.09	21081
8/11/2023	MW124	0960_MW124_231108	1-6_	Single_Level	2.9183	6.0	2.96	-0.042		HydraSleeve	28	0.53	85511
8/11/2023	MW126	0960_MW126_231108	2-8_	Single_Level	4.5088	8.0	4.3	0.209		HydraSleeve	29.1	0.82	63896
8/11/2023	MW127	0960_MW127_231108	2.5-8.5_	Single_Level	5.6238	8.5	5.38	0.244		HydraSleeve	29.6	2.11	69767
8/11/2023	MW134	0960_MW134_231108	1-5.7_	Single_Level	2.5155	5.7	2.43	0.085		HydraSleeve	31.8	1.38	62548
8/11/2023	MW135	0960_MW135_2.5-3_231108	2.5-3_	Multi_level	2.7781	3.0	2.55	0.228		Peristaltic Pump	33.3	2.72	33785
8/11/2023	MW137	0960_MW137_2.5-3_231108	2.5-3_	Multi_level	2.1691	3.0	1.74	0.429		Peristaltic Pump	29.2	0.66	76255
Bore Damaged. Casing bent in all depths at approx 1.0m. No sample													
8/11/2023	MW138		7-7.5_	Multi_level	3.3205	7.5							
8/11/2023	MW139	0960_MW139_231108	2-7_	Single_Level	4.1386	7.0	3.97	0.169		HydraSleeve	29	0.58	63137
8/11/2023	MW140	0960_MW140_1.5-2_231108	1.5-2_	Multi_level	2.4916	2	2.09	0.402		Peristaltic Pump	30.1	1.47	102718
8/11/2023	MW141	0960_MW141_3-3.5_231108	3-3.5_	Multi_level	2.8073	3.5	2.34	0.467		Peristaltic Pump	30.1	3.5	38569
8/11/2023	MW143	0960_MW143_3-3.5_231108	3-3.5_	Multi_level	2.8174	3.5	2.73	0.087		Peristaltic Pump	31.7	4.4	4099
8/11/2023	MW144	0960_MW144_3-3.5_231108	3-3.5_	Multi_level	3.0481	3.5	2.95	0.098		Peristaltic Pump	32.7	1.94	39937
8/11/2023	MW145	0960_MW145_5-5.5_231108	5-5.5_	Multi_level	3.1481	5.5	3.319	-0.171		Peristaltic Pump	30.2	2.05	33051
8/11/2023	MW146	0960_MW146_7-7.5_231108	7-7.5_	Multi_level	2.802	7.5	2.914	-0.112		Peristaltic Pump	29.3	3.05	88437
8/11/2023	MW147	0960_MW147_5-5.5_231108	5-5.5_	Multi_level	2.9152	5.5	2.915	0		Peristaltic Pump	30.1	2.25	34436
8/11/2023	MW148D	0960_MW148D_231108	14-20_	Single_Level	3.5778	20.0	3.59	-0.012		HydraSleeve	27.5	2.06	78944
8/11/2023	MW148S	0960_MW148S_231108	2-8_	Single_Level	3.6851	8	3.565	0.12		HydraSleeve	28	0.81	39948
8/11/2023	MW151	0960_MW151_231108	2-8_	Single_Level	4.0631	8.0	3.88	0.183		HydraSleeve	27.2	1.93	11380
8/11/2023	MW159	0960_MW159_231108	3-9_	Single_Level	4.1895	9.0	3.96	0.229		HydraSleeve	30	1.8	31536
8/11/2023	MW162	0960_MW162_231108	17-20_	Single_Level	6.856	20.0	6.36	0.496		HydraSleeve	30	0.51	12735
8/11/2023	MW163	0960_MW163_231108	17-20_	Single_Level	6.7808	20.0	6.175	0.606		HydraSleeve	31.7	-0.7	10912
8/11/2023	MW164	0960_MW164_231108	17-20_	Single_Level	6.7893	20.0	6.139	0.65		HydraSleeve	29.4	3.72	6122
8/11/2023	MW165	0960_MW165_231108	3-9_	Single_Level	6.1043	9.0	5.542	0.562		HydraSleeve	30	1.92	2273
8/11/2023	MW166	0960_MW166_231108	2.5-8.5_	Single_Level	5.7441	8.5	5.279	0.465		HydraSleeve	29.9	2.77	2724
8/11/2023	MW167	0960_MW167_231108	2.5-8.5_	Single_Level	6.2094	8.5	5.523	0.686		HydraSleeve	29.9	1.82	5165
8/11/2023	MW168	0960_MW168_231108	2.5-8.5_	Single_Level	6.1713	8.5	5.64	0.531		HydraSleeve	26.7	1.51	11789
8/11/2023	MW170	0960_MW170_231108	2.5-8.5_	Single_Level	5.639	8.5	5.3	0.339		HydraSleeve	30.8	2.8	39007
8/11/2023	MW172	0960_MW172_231108	2.5-8.5_	Single_Level	5.6193	8.5	5.17	0.449		HydraSleeve	31.3	2.02	33042
8/11/2023	MW175	0960_MW175_4-4.5_231108	4-4.5_	Multi_level	4.7916	4.5	4.43	0.362		Peristaltic Pump	27.4	0.39	5994
8/11/2023	MW176	0960_MW176_1.5-2_231108	1.5-2_	Multi_level	2.1274	2	2.01	0.117		Peristaltic Pump	29.9	2.13	56254
8/11/2023	MW177	0960_MW177_1.5-2_231108	1.5-2_	Multi_level	2.2299	2.0	1.87	0.36		Peristaltic Pump	28.7	1.03	94669
8/11/2023	MW178	0960_MW178_2-2.5_231108	2-2.5_	Multi_level	2.1612	2.5	2.13	0.031		Peristaltic Pump	31.5	2.29	92746
8/11/2023	MW179	0960_MW179_3.2-3.7_231108	3.2-3.7_	Multi_level	2.2371	3.7	2.14	0.097	Ants	Peristaltic Pump	33.5	1.18	80827
8/11/2023	MW180	0960_MW180_3.5-4_231108	3.5-4_	Multi_level	1.9226	4.0	1.836	0.087		Peristaltic Pump	28.8	2.43	86402
8/11/2023	MW181	0960_MW181_1.5-2_231108	1.5-2_	Multi_level	2.2333	2	2.06	0.173		Peristaltic Pump	30	0.53	100365
8/11/2023	MW211	0960_MW211_231108	NA	Single_Level	6.3409	NA	5.596	0.745		HydraSleeve	29.7	2.03	12547
8/11/2023	MW233	0960_MW233_231108	4-7_	Single_Level	6.262	7.0	5.649	0.613		HydraSleeve	30.9	2.61	12095
8/11/2023	MW238	0960_MW238_231108	3-6_	Single_Level	3.98	6.0	3.79	0.19		HydraSleeve	27.7	3.59	6089
8/11/2023	OTH103	0960_OTH103_231108								Direct into Bottle	26.1	2.25	63528
8/11/2023	OTH106	0960_OTH106_231108								Direct into Bottle	28.8	2.71	57468
8/11/2023	OTH107	0960_OTH107_231108								Direct into Bottle	32.6	4.02	57068
8/11/2023	OTH129	0960_OTH129_231108								Direct into Bottle	25.5	2.53	59423
8/11/2023	OTH132	0960_OTH132_231108								Direct into Bottle	23.7	2.58	60905
8/11/2023	OTH134	0960_OTH134_231108								Direct into Bottle	24.3	2.84	57710

Monitoring Location	R1 - TDS (mg/L)	R1 - pH	R1 - Eh (mV)	R2 - Temp (°C)	R2 - DO (mg/L)	R2 - EC (us/Cm)	R2 - TDS (mg/L)	R2 - pH	R2 - Eh (mV)	Reading 3 time	R3 - Temp (Co)	R3 - DO (mg/L)	R3 - EC (us/Cm)	R3 - TDS (mg/L)	R3 - pH	R3 - Eh (mV)
MW018	1910	7.74	-30							08:35						
MW021	2208	7.72	-37.1							08:10						
MW102	58965	6.87	-73.6							10:40						
MW103	48685	6.82	-11.2							13:15						
MW104	52130	7.02	15.8							09:40						
MW105	29965	6.85	-141.5							11:13						
MW112	7444	7.26	-92.8							09:28						
MW113	7250	6.9	-112.7							08:58						
MW114	5785	6.98	-83.2							11:07						
MW115	21496	6.73	-40.9							12:00						
MW122	13703	7.09	-94.1							11:12						
MW124	55575	7.04	-162.9							09:59						
MW126	41535	6.88	56.8							13:53						
MW127	45362	6.98	-72.3							10:30						
MW134	40656	7.19	-98.1							13:17						
MW135	21964	7.53	-45.4	33.4	2.66	33801	21977	7.52	-51.9	14:02	33.5	2.63	33789	21961	7.52	-56.5
MW137	49570	7.13	-56.8	28.7	1.03	78045	50735	7.15	-38.5	13:24	28.6	1.03	78120	50786	7.15	-37.4
MW138										13:16						
MW139	41080	6.07	74.1							15:57						
MW140	66789	7.14	129.8	29.9	2.01	100009	65022	7.15	126.4	15:39	29.9	2.01	100110	65083	7.15	128.3
MW141	25076	7.33	-85.5	30.2	3.3	38615	25105	7.33	-87.8	15:52	30.2	3.14	38469	25125	7.32	-89.2
MW143	2663	7.21	-102.2	31.7	4.21	4084	2655	7.21	-103.3	11:40	31.8	4.04	4069	2643	7.21	-104
MW144	25966	7.13	-97.4	32.8	1.92	39962	25978	7.12	-98.2	12:19	32.8	1.86	39971	25983	7.12	-98.3
MW145	25498	7.06	-30.5							12:53						
MW146	57438	7.12	-86.7							12:34						
MW147	21941	7.14	-56.6							16:26						
MW148D	51285	7.58	63.4							09:03						
MW148S	25967.5	6.83	43							09:07						
MW151	7397	7.15	30.8							08:28						
MW159	20494.5	6.78	14.6							12:49						
MW162	8276	6.8	-54.7							10:30						
MW163	7093	7.06	-33.5							09:58						
MW164	3979	8.01	-30.2							09:48						
MW165	1477	7.98	-49.9							11:24						
MW166	1770	7.79	-36.9							11:34						
MW167	3357	7.31	-34.2							11:45						
MW168	7663	6.93	-113.6							08:12						
MW170	25356	7.15	82.2							15:17						
MW172	21469.5	7.05	74.5							15:06						
MW175	3896	7.6	-30.4	27.5	0.02	4168	2710	7.58	-130.6	08:48	27.5	0.02	4183	2720	7.58	-133.4
MW176	36582	7.18	81.2	29	2.08	55779	36254	7.15	35.3	12:35	29.1	2.07	55774	36249	7.15	41
MW177	61555	7.03	-29.7	28.8	1.15	94130	61188	7.02	-19.4	11:26	28.8	1.13	94145	61199	7.02	-18.6
MW178	60298	7.2	-87.3	31.6	2.11	92829	60340	7.2	-91.3	12:41	31.7	1.95	92865	60365	7.2	-93.7
MW179	52575	7.73	95.9	30.1	0.7	79139	51458	7.31	-29.4	14:15	30.1	0.68	79270	51534	7.31	-25.9
MW180	56200	7.46	-64.3							16:06						
MW181	65268	7.13	45.4	28.5	1.2	94520	61425	7.12	47.3	16:02	28.5	1.03	94477	61407	7.11	52.2
MW211	8255	7.99	-31.2							08:58						
MW233	7863	7.39	-91.2							10:15						
MW238	3958.5	7.78	37.3							08:43						
OTH103	41319	7.69	-52.4							09:55						
OTH106	37353	7.79	-89.5							15:36						
OTH107	37092	3.06	-53.2							14:53						
OTH129	38645	7.75	120.9							09:17						
OTH132	39593	7.67	149.6							08:10						
OTH134	37516	7.82	124.9							08:19						

Monitoring			
Location	QC Dup Sample #	Odour Comments	Colour
MW018	QC117/217		
MW021	QC116/216		
MW102			Cloudy
MW103			Cloudy,Brown
MW104			Clear
MW105			Cloudy,Brown
MW112			Brown
MW113	QC120/220		Brown
MW114			
MW115			
MW122			Brown
MW124			Cloudy
MW126			Cloudy
MW127			Clear
MW134			Brown
MW135			Clear
MW137			Cloudy
MW138			
MW139			Clear
MW140			Cloudy,Brown
MW141			Brown
MW143			Brown
MW144			Brown
MW145			
MW146			
MW147			
MW148D			Clear
MW148S			Clear
MW151			Cloudy
MW159			Cloudy,Brown
MW162			
MW163			
MW164	QC125/225		
MW165			
MW166			
MW167			
MW168			Brown
MW170			Cloudy
MW172			Cloudy
MW175		Dirt smell	Cloudy,Brown
MW176			Cloudy,Brown
MW177			Cloudy,Brown
MW178			Brown
MW179			Cloudy,Brown
MW180			
MW181			Cloudy,Brown
MW211	QC121/221		
MW233			
MW238	QC119/219		Cloudy
OTH103			Cloudy
OTH106			Clear
OTH107			Clear
OTH129			Clear
OTH132		Salty	Clear
OTH134			Cloudy

Monitoring Site ID	Date	Sample ID	Sampling Method	Sample Depth (m)	WaterBody Depth (m)	Location	Flow Rate	Comments	Temperature °C	DO (mg/L)	EC (µs/Cm)	TDS (mg/L)	pH	Eh (mV)	Water Colour	Turbidity
SW001	8/11/2023	0960_SW001_231108	Direct_into_Bottle	0.05	0.05	Offsite	Slow	Sampled from shallow puddle	36.2	3.07	100054	65007	7.94	101.2		Low
SW108	8/11/2023							Dry								
SW113	8/11/2023							Dry								
SW114	8/11/2023							Dry								
SW121	8/11/2023							Dry								
SW122	8/11/2023							Dry								
SW123	8/11/2023							Dry - no sample								
SW124	8/11/2023							Dry								
SW125	8/11/2023	0960_SW125_231108	Direct_into_Bottle	0.1	0.1	Onsite	Slow	Sampled from shallow puddle	27.3	1.87	1394	906	7.74	-96.9	Brown	Medium
SW157	8/11/2023							Dry								
SW166	8/11/2023							Dry								
SW168	8/11/2023							Dry								
SW170	8/11/2023							Dry								
SW174	8/11/2023							Dry								
SW176	8/11/2023							Dry								
SW189	8/11/2023							Dry								
SW190	8/11/2023							DRY								
SW192	8/11/2023							DRY								
SW193	8/11/2023							DRY								
SW198	8/11/2023							Dry. No sample								
SW199	8/11/2023							Dry								
SW200	8/11/2023							Dry - no sample								
SW205	8/11/2023							DRY								
SW207	8/11/2023	0960_SW207_231108	Direct_into_Bottle	0.2	0.5	Offsite	Slow		29.5	3.58	61714	40111	7.72	-69.7	Brown	Medium
SW208	8/11/2023	0960_SW208_231108	Direct_into_Bottle	0.1	1	Offsite	Medium	Creek mouth connected to ocean (tidal). QC124,	24.4	3.59	57019	37060	8.17	124.1	Clear	Low
SW209	8/11/2023	0960_SW209_231108	Direct_into_Bottle	0.1	0.2	Offsite	Slow		32.4	2.73	73906	48041	7.81	125.5	Clear	Low
SW210	8/11/2023							Dry. No sample								
SW211	8/11/2023	0960_SW211_231108	Direct_into_Bottle	0.1	0.2	Offsite	Slow		33.4	5.05	113360	73685	8.62	100.7	Clear / green	Low
SW219	8/11/2023							Dry								
SW227	8/11/2023							Dry. No sample								
SW231	8/11/2023							Dry								
SW234	8/11/2023							Dry								
SW235	8/11/2023							Dry								
SW243	8/11/2023							Dry								
SW265	8/11/2023							Dry								
SW277	8/11/2023		Shovel_Trowel					Dry								
SW278	8/11/2023							Dry								
SW279	8/11/2023		Other					Dry								
SW288	8/11/2023							Dry								
SW291	8/11/2023							Dry. No sample								
SW292	8/11/2023							Dry. No sample								
SW293	8/11/2023							Dry. No sample								
SW298	8/11/2023							DRY								
SW300	8/11/2023	0960_SW300_231108	Direct_into_Bottle	0.1	0.1	Offsite	Slow	Puddle in 4WD tracks	35.1	0	113756	73939	8.97	103.5	Green/ clear	Low
SW301	8/11/2023							DRY								
SW302	8/11/2023	0960_SW302_231108	Direct_into_Bottle	0.2	0.45	Offsite	Slow		32.4	3.4	93370	60705	7.97	96.3	Clear / green	Low
SW303	8/11/2023	0960_SW303_231108	Direct_into_Bottle	0.1	0.8	Offsite	Slow		29	1.48	73772	47957	7.27	-33.2	Slight cloudy	Medium
SW304	8/11/2023	0960_SW304_231108	Direct_into_Bottle	0.1	0.15	Offsite	Slow	Stagnant water in puddle. QC127/QC227	32.4	4.19	84167	54711	8.11	136.8	Slight Cloudy	Medium
SW305	8/11/2023	0960_SW305_231108	Direct_into_Bottle	0.1	0.2	Offsite	Slow		26.7	1.92	70704	45976	7.67	134.2	Clear	Medium

Monitoring Site ID	Date	Sample ID	Inspector	Depth of Sediment Sampling (m)	Sampling Method	Sample Condition	Sample Description	Comments
SD199	8/11/2023	0960_SD199_231108		0.1	Direct_into_Bottle	Dry	Silty sand, fine to med grained, brown orange, trace fines	
SD200	8/11/2023	0960_SD200_231108		0.2	Shovel_Trowel	Dry	Orange	
SD205	8/11/2023	0960_SD205_231108		0.1	Direct_into_Bottle	Dry	Brown CLAY	
SD207	8/11/2023	0960_SD207_231108		0.1	Shovel_Trowel	Wet	Orange	
SD208	8/11/2023	0960_SD208_231108		0.15	Direct_into_Bottle	Wet	SAND, med/course grained with shells	Creek bed connected to ocean
SD209	8/11/2023	0960_SD209_231108		0.1	Direct_into_Bottle	Wet	Clayey SAND, grey/brown, fine to med grain	
SD210	8/11/2023	0960_SD210_231108		0.2	Shovel_Trowel	Dry	Orange	
SD211	8/11/2023	0960_SD211_231108		0.1	Direct_into_Bottle	Wet	Sandy CLAY, brown/grey	
SD219	8/11/2023	0960_SD219_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SD300	8/11/2023	0960_SD300_231108		0.1	Direct_into_Bottle	Wet	Brown CLAY	
SD301	8/11/2023	0960_SD301_231108		0.1	Direct_into_Bottle	Wet	Sandy CLAY, brown grey	
SD302	8/11/2023	0960_SD302_231108		0.2	Direct_into_Bottle	Wet	Sandy CLAY, Brown	
SD303	8/11/2023	0960_SD303_231108		0.2	Direct_into_Bottle	Wet	Sandy CLAY, red grey	
SD304	8/11/2023	0960_SD304_231108		0.1	Direct_into_Bottle	Wet	Sandy CLAY, brown and grey	
SD305	8/11/2023	0960_SD305_231108		0.1	Direct_into_Bottle	Wet	Silty CLAY, grey/red/black	
SS108	8/11/2023	0960_SS108_231108		0.1	Shovel_Trowel	Dry	Brown clay very dry	QC126/226
SS113	8/11/2023	0960_SS113_231108		0.1	Shovel_Trowel	Dry	Brown clay w gravels	
SS114	8/11/2023	0960_SS114_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS122	8/11/2023	0960_SS122_231108		0.1	Direct_into_Bottle	Dry	Silty sand, fine to med grained, brown orange, trace fines, trace gravels	
SS123	8/11/2023	0960_SS123_231108		0.2	Shovel_Trowel	Dry	Orange	
SS124	8/11/2023	0960_SS124_231108		0.1	Direct_into_Bottle	Dry	Silty sand, fine to med grained, brown orange, traces fines, traces gravels	QC123/223
SS125	8/11/2023	0960_SS125_231108		0.1	Direct_into_Bottle	Wet	Silty sand, fine to med grained, brown orange, trace organics	
SS157	8/11/2023	0960_SS157_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS166	8/11/2023	0960_SS166_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS168	8/11/2023	0960_SS168_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS170	8/11/2023	0960_SS170_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS174	8/11/2023	0960_SS174_231108		0.1		Dry	Brown fine clay	
SS176	8/11/2023	0960_SS176_231108		0.1	Shovel_Trowel	Wet	Brown fine clay	
SS189	8/11/2023	0960_SS189_231108		0.1	Direct_into_Bottle	Dry	Silty sand, fine to medium grained, brown orange, trace fines	
SS190	8/11/2023	0960_SS190_231108		0.1	Direct_into_Bottle	Dry	silty SAND, red, fine to med grain	QC115, QC215
SS192	8/11/2023	0960_SS192_231108		0.15	Direct_into_Bottle	Dry	SAND, yellow/white, fine-med grain	QC118, QC218
SS193	8/11/2023	0960_SS193_231108		0.1	Direct_into_Bottle	Dry	CLAY, red, moist	
SS198	8/11/2023	0960_SS198_231108		0.2	Shovel_Trowel	Dry	Orange	
SS227	8/11/2023	0960_SS227_231108		0.2	Shovel_Trowel	Dry	Orange	
SS231	8/11/2023	0960_SS231_231108		0.1		Dry	Brown fine clay	
SS234	8/11/2023	0960_SS234_231108		0.1	Shovel_Trowel	Dry	Orange clay	QC122/222
SS235	8/11/2023	0960_SS235_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS243	8/11/2023	0960_SS243_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS265	8/11/2023	0960_SS265_231108		0.1	Shovel_Trowel	Dry	Brown clay fine very dry	
SS277	8/11/2023	0960_SS277_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS278	8/11/2023	0960_SS278_231108		0.1	Shovel_Trowel	Dry	Brown fine clay	
SS279	8/11/2023	0960_SS279_231108		0.1	Shovel_Trowel	Dry	Brown clay	
SS288	8/11/2023	0960_SS288_231108		0.1	Direct_into_Bottle	Dry	Silty sand, fine to medium grained, brown orange, trace shells	
SS291	8/11/2023	0960_SS291_231108		0.1	Shovel_Trowel	Dry	Orange	
SS292	8/11/2023	0960_SS292_231108		0.2	Shovel_Trowel	Dry	Orange	
SS293	8/11/2023	0960_SS293_231108		0.2	Shovel_Trowel	Dry	Orange	
SS298	8/11/2023	0960_SS298_231108		0.1	Direct_into_Bottle	Dry	SAND, red, fine grained	
SS301	8/11/2023	0960_SS301_231108		0.1	Direct_into_Bottle	Dry	Red CLAY	



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: [REDACTED]

Contact: [REDACTED]

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 20D101039

Cable length: 1m 22B100428

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	172.90 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.13
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 1 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant 5.0 ± 1.0 in GLP file		✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µs/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (22B100314)	Check Temp NATA	Room Temp	20.8	-0.1	°C	NA	20.7	°C
pH (22M)	pH 7.00	392512	7.01	-14.90	mV	6.99	7.01	pH
pH (22M)	pH 4.00	394799	4.00	158.00	mV	4.01	4.00	pH
Conductivity (22B100314)	2764 µs/cm at 25°C	23/2308	2764	GLP	5.12	2699	2764	µs/cm
ORP (200101SIA605102)	Zobell A & B	23/3006	238	238	mV	227.7	237.6	mV
Zero DO (20B140053)	NaSO3 in distilled water	10175	0.0	NA	NA	0.8	0.0	%
100% DO (20B140053)	100% Air Saturation	Air	100.0	5.83	uA	117.7	100.0	%

Calibrated by: [REDACTED]

Calibration Date: 19-Oct-23

Next Due: 16-Apr-24



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: XXXXXXXXXX
Contact: XXXXXXXXXX

Manufacturer: YSI
Instrument: Professional Plus with Quatro cable
Serial #: 23G103462
Cable length: 1m (23G100262)

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	172.60 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.05
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 8 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant 5.0 ± 1.0 in GLP file		✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	polarographic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (23G100242)	Check Temp NATA	Room Temp	20	0	°C	NA	20	°C
pH (23F)	pH 7.00	392512	7.01	-1.80	mV	7.03	7.01	pH
pH (23F)	pH 4.00	394799	4.00	170.80	mV	4.07	4.00	pH
Conductivity (23G100242)	2764 µS/cm at 25°C	23/0402	2764	GLP	5.01	2757	2764	µS/cm
ORP (23E)	Zobell A & B	23/2504	240	240	mV	218.9	231.6	mV
Zero DO (23D100530)	NaSO3 in distilled water	10175	0.0	NA	NA	0.4	0.0	%
100% DO (23D100530)	100% Air Saturation	Air	100.0	6.1	uA	126.6	100.0	%

Calibrated by: XXXXXXXXXX

Calibration Date: 20-Sep-23

Next Due: 18-Mar-24



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: [REDACTED]
Contact: [REDACTED]

Manufacturer: YSI
Instrument: Professional Plus with Quatro cable
Serial #: 22C103026
Cable length: 1m (22B100428)

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	172.90 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.44
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 11 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant 5.0 ± 1.0 in GLP file		✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	polarographic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (22B100315)	Check Temp NATA	Room Temp	18.2	-0.1	°C	NA	18.1	°C
pH (22D)	pH 7.00	392512	7.01	-19.70	mV	7.04	7.01	pH
pH (22D)	pH 4.00	394799	4.00	153.20	mV	3.99	4.00	pH
Conductivity (22B100315)	2764 µS/cm at 25°C	23/2308	2764	GLP	4.97	2787	2764	µS/cm
ORP (22B)	Zobell A & B	23/2504	244	244	mV	238.3	233.1	mV
Zero DO (22E100254)	NaSO3 in distilled water	10175	0.0	NA	NA	1	0.0	%
100% DO (22E100254)	100% Air Saturation	Air	100.0	4	uA	75.1	100.0	%

Calibrated by: [REDACTED]

Calibration Date: 03-Oct-23
Next Due: 31-Mar-24



Calibration Report

Multi-Parameter Water Quality Instrument

Customer:

Contact:

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 22F106114

Cable length: 1m 22H100437

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	173.70 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.13
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 7 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (14R100330)	Check Temp NATA	Room Temp	23.2	0	°C	NA	23.2	°C
pH (21M)	pH 7.00	392512	7.01	-33.70	mV	7.06	7.01	pH
pH (21M)	pH 4.00	394799	4.00	140.00	mV	4.07	4.00	pH
Conductivity (14R100330)	2764 µS/cm at 25°C	23/2308	2764	GLP	4.83	2768	2764	µS/cm
ORP (19D)	Zobell A & B	23/3006	233	233	mV	218.1	225.6	mV
Zero DO (16H1000098)	NaSO ₃ in distilled water	10175	0.0	NA	NA	0	0.0	%
100% DO (16H100098)	100% Air Saturation	Air	100.0	6.4	uA	104.2	100.0	%

Calibrated by:

Calibration Date: 19-Oct-23

Next Due: 16-Apr-24

Date of Bump Test	Site ID	Unit Brand/ Model	Ambient Air Oxygen Calibration	Zero % Oxygen Solution Calibration	Standard Concentrations	Ambient Temperature (°C)	Bump Test Reading	Bump Test Readings within ±5%?	Comment	Test by (Name)	(Signature)
8/1/23	0960-	YSI #22C03076	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N	30.9	pH 4.00: 6.05 pH 7.00: 7.11 EC: 1,510 34,093	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	N.I		
8/1/23	0960-	YSI #20800039	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N	31.1	pH 4.00: 6.16 pH 7.00: 7.12 EC: 1,510 34,096	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	N.I		
8/1/23	0960-	YSI #22F10011	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N	30.3	pH 4.00: 6.12 pH 7.00: 7.13 EC: 1,473 34,092	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	N.I		
8/1/23	0960-	YSI #23609462	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 ☒ Y / N pH 7.00 ☒ Y / N EC: 1,413µS/cm ☒ Y / N	30.9	pH 4.00: 6.29 pH 7.00: 7.13 Temp: 1,213 EC: 34,045	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150µS/cm) ☒ Y / N	Faulty cable EC readings incorrect.		
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☐ Y	0% Calibration? ☐ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			

APPENDIX

E

DATA QUALITY REVIEW



now



Data Quality Review PFAS Ongoing Monitoring Plan November 2023 Monitoring Event

This appendix reviews the Quality Assurance (QA) and Quality Control (QC) documentation. Quality assurance encompasses the actions, procedures, checks and decisions undertaken to ensure sample integrity and representativeness, and the reliability and accuracy of analysis results. The QA documentation should also include an indication of the Data Quality Objectives sought in relation to each significant action, test or process involved in the assessment.

QC activities measure the effectiveness of the QA procedures by undertaking testing, and then comparing results to previously established objectives. QC work will include the internal laboratory testing as well as results of QC samples submitted such as trip blanks and duplicates. The quality of the information and/or data is deemed satisfactory when the QC results demonstrate that agreed objectives have been met.

QA/QC Aspects	Evidence & Evaluation
QA Documentation	
Project Quality Plan/Work Plan and Data Quality Objectives	The field investigation was carried out on the 8 November 2023 and is generally in accordance with the proposed scope of work, as documented in the SAQP (PFAS OMP SAQP RAAF Base Learmonth, Rev.10, Cardno, October 2023) issued to the client and in general compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i>, NEPM <i>National Environment Protection (Assessment of Site Contamination) Measure</i> and PFAS NEMP 2.0. A quality control program was implemented during the Investigation and the quality assurance procedures used have been reiterated in the report (PFAS OMP November 2023 Factual Report). In addition, a safety, health and environment work method statement (SHEWMS) was also prepared. The Data Quality Objectives were expressed in terms of the purpose of the assessment and the relevant assessment criteria.
Data Representativeness	
Use of Composites	No Composites were used during the investigation
Holding Times	Chain of custody and laboratory reports provide evidence of holding times. Holding times were in compliance with required timeframes.
Verification of field procedures	The methodology conducted during this investigation is documented in the body of the report and was in general conformance with the SAQP. Experienced field scientists familiar with the sampling procedures were involved in the field works. Non-disposable equipment was decontaminated between sample locations.
Laboratory Reports	The following laboratory reports were considered for this data quality review: ▪ ALS reports: EP2315721, EP2315732, EP2315733, EP2315734, EP2315735, EP2315736, EP2315737, EP2315738, EP2315739, EP2315740, EP2315741. ▪ Eurofins ARL report: 1043510.

QA/QC Aspects

Evidence & Evaluation

Data Precision & Accuracy

QC sample Frequency

QC sample type	SAQP required frequency	Sample Collected
Blind duplicate	1 in 10 primary samples (10%)	6 for 48 groundwater samples (12.5%) 2 in 11 surface water samples (18.2%) 5 in 49 sediment samples (10.2%)
Interlab duplicate	1 in 10 primary samples (10%)	4 for 48 groundwater samples (8.33%) 2 in 11 surface water samples (18.2%) 5 in 49 sediment samples (10.2%)
Rinsate	1 per field personnel per day	4 for 1 day (4 field personnel) (100%)
Field Blank	1 per field personnel per day	4 for 1 day (4 field personnel) (100%)

The required QC frequency was not achieved for interlab duplicates for groundwater samples due to a field labelling error. However, the overall frequency for water interlab duplicates was above 10%. Therefore this is not considered to have impacted the reliability of the dataset.

RPD Acceptance criteria

Magnitude of Results	Acceptable RPD range
< 10 x LOR	No limits
10 – 20 LOR	0% - 50%
> 20 x LOR	0% - 20%

QC Testing –
Blind Duplicates
(Primary Lab)

Groundwater

- Primary Groundwater Samples Analysed: 48
- Blind Duplicate Samples Analysed: 6

All RPDs were within acceptance criteria with the following exceptions:

- QC116 (PFOS – 22%).
- QC117 (PFPeA – 23%, PFHxA – 21%).
- QC119 (PFHpS – 23%)

Surface water

- Primary surface water Samples Analysed: 11
- Blind Duplicate Samples Analysed: 2

All RPDs were within acceptance criteria.

Sediment

- Primary Sediment Samples Analysed: 49
- Blind Duplicate Samples Analysed: 5

All RPDs were within acceptance criteria with the following exceptions:

- QC115 (PFOS – 26%).
- QC122 (PFOS – 51%)
- QC123 (PFOS – 143%)

These exceedances are likely due to the low concentrations of analytes under review or the heterogeneity of the samples. This is not considered to have impacted the validity of the interpretation drawn upon this dataset. The most conservative value (i.e. higher concentration) was adopted for the assessment.

QA/QC Aspects	Evidence & Evaluation
QC Testing – Interlab Duplicates (Secondary Lab)	Groundwater - Primary Groundwater Samples Analysed: 48 - Interlab Duplicate Samples Analysed: 4 All RPDs were within acceptance criteria with the following exceptions: - QC219 (PFPeS – 46%, PFHpS – 65%). These exceedances are likely due the difference of methodologies between the primary and secondary laboratories and the low concentrations of analytes under review. In all cases the primary sample reported higher concentrations than the duplicate sample therefore the results reported on are considered conservative. This is not considered to have impacted the validity of the interpretation drawn upon this dataset. Surface water - Primary surface water Samples Analysed: 11 - Interlab Duplicate Samples Analysed: 2 All RPDs were within acceptance criteria. Sediment - Primary sediment Samples Analysed: 49 - Interlab Duplicate Samples Analysed: 5 All RPDs were within acceptance criteria with the following exceptions: - QC215 (PFOS – 27%). - QC222 (PFOS – 39%). - QC223 (PFOS – 71%). These exceedances are likely due the difference of methodologies between the primary and secondary laboratories and the low concentrations of analytes under review or the heterogeneity of the samples. This is not considered to have impacted the validity of the interpretation drawn upon this dataset. The most conservative value (i.e. higher concentration) was adopted for the assessment.
	Field Blanks Field Blanks were collected at a rate of one per fieldwork day. All field blank samples tested reported analytes below the laboratory limit of reporting.
	Evidence of the laboratories internal QC testing is present and complete in the reports. ALS (Primary) performed internal QC with adequate testing and satisfactory results for method blank, matrix spikes, laboratory control samples and laboratory duplicates. All Method Blank results were within acceptable range. All Matrix Spikes generally reported recoveries within the acceptance range with the exception of the following: - EP2315731, EP2315740, EP2315741: - Samples ID: Anonymous, MW175: Chloride matrix spike recovery not determined due to the background concentrations exceeding 4x spike level. - EP2315732, EP2315733, EP2315734, EP2315738: - Samples ID: Anonymous, MW168, SW211: Chloride and Sulfate matrix spike recovery not determined due to the background concentrations exceeding 4x spike level. - EP2315735, EP2315739: - Sample ID: SD190, SD219, SS277: PFOS matrix spike recovery not determined due to the background concentrations exceeding 4x spike level. The following quality control frequency outlier was reported: - EP2315731, EP2315732, EP2315733, EP2315734: - Laboratory Duplicates: PFAS by LCMSMS, expected frequency 10% not achieved.

QA/QC Aspects	Evidence & Evaluation
	- EP2315738, EP2315740, EP2315741: - Laboratory Duplicates: PFAS by LCMSMS, expected frequency 10% not achieved. - Matrix Spike: PFAS by LCMSMS, expected frequency 5% not achieved. The above outliers/exceptions are not considered to affect the reliability of the dataset.
Laboratory Method Detection Limit	Laboratory reports indicate the method detection limits were generally lower than the respective assessment criteria.
NATA endorsement of laboratory reports	Laboratory reports were stamped with the NATA endorsement stamp and signature. ALS Accreditation No. 825 Eurofins ARL Accreditation No. 1261
Calibration of Field Equipment	All equipment used during the investigation was calibrated by the supplier prior to use and daily readings of reference solutions (bump tests) were completed. The equipment calibration certificates, and daily field bump test records are provided in Appendix D.
Decontamination and Equipment Blanks	Rinsate blanks were collected at a rate of one per day per sampler when reusable equipment was used. All rinsate samples tested reported analytes concentrations below the laboratory LORs.
Data Comparability	
Standard Procedures	Fieldwork procedures are detailed in the SAQP and reports and are comparable for each phase of Investigation.
Qualified Personnel	Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.
Sample Integrity	Field Chain of Custody/Laboratory request forms can be found in Appendix C.
Data Completeness	
Completeness of test program	The scope of work undertaken was generally consistent with the SAQP.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection process and therefore, the data set used as the basis for groundwater, seepage water, surface water and sediment investigation is considered valid and complete.

PFAS OMP Biannual Monitoring Event Factual Report

May 2024

RAAF Learmonth

304700525



Prepared for
Department of Defence

26 June 2024



now



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Chemical Names

DOC	Dissolved Organic Carbon
DO	Dissolved Oxygen
PFAS	Per- and Poly-fluoroalkyl Substances
PFHxS	Per-fluorohexane Sulphonate
PFOA	Per-fluorooctanoic Acid
PFOS	Per-fluorooctane Sulfonate
TDS	Total Dissolved Solids (salinity of water)

Technical Terms

AFFF	Aqueous Film Forming Foam
AHD	Australian Height Datum
AS	Australian Standard
BGL	Below Ground Level
COC	Chain of Custody
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
EC	Electrical Conductivity
EPA	Environment Protection Authority
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
HIL	Health Investigation Level
HSL	Health Screening Level
LOR	Limit of Reporting
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
RWL	Reduced water level
SAQP	Sampling and Analysis Quality Plan
SWL	Standing water level

Units

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

Site Specific

OMP	Ongoing Monitoring Plan
OMR	Ongoing Monitoring Report
FTG	Fire Training Ground
RAAF	Royal Australian Airforce

1 Introduction

1.1 Background

Cardno now Stantec (“Cardno”) was engaged by the Australian Department of Defence (“Defence”) to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) biannual monitoring event at the Royal Australian Airforce (RAAF) Learmonth (“the site”). The site is located approximately 30 km south of Exmouth, Western Australia (WA) (Figure 1, Appendix A).

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

- > Cardno, May 2024, Reference: DEF19009, ‘*PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) RAAF Base Learmonth*’. Rev 12.

The SAQP was reviewed prior to the monitoring event, and no change relevant to this monitoring event was made.

For the purposes of this report:

- > “the site” was defined as RAAF Base Learmonth.
- > the “Management Area” was defined as comprising the site, plus the land east of the Base, including the salt pan, drainage channels, WAPET Creek and extends to Exmouth Gulf (Figure 2, Appendix A).

1.2 Purpose & Objectives

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

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

The objectives of the report are:

- > To provide a succinct summary of the May 2024 monitoring event and provision of analytical results with supporting tables and figures.
- > To provide confirmation of the current understanding of risk.
- > To provide supporting data for the assessment of management actions, where relevant.

1.3 Relevant Guidelines

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

- > National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended 2013) (ASC NEPM).
- > Heads of Environmental Protection Authority’s Australia and New Zealand (HEPA), January 2020, *PFAS National Environmental Management Plan (NEMP) 2.0*.
- > Australian Standard AS 4482-2005 *Guide to the investigation and sampling of sites with potentially contaminated soils, Part 1 - Non-volatile and semi-volatile compounds*.¹
- > Standards Australia 1998. AS/NZ 5667:1998 *Water quality – sampling*.
- > Australian and New Zealand Guidelines, 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

¹ It is noted that this AS has been withdrawn and is referenced here as a state of knowledge document.

- > Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*².
- > Department of Defence, Department of Energy, 2018, *Quality System Manual Schedule B15*.
- > U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process (EPA QA/G-4)*.
- > USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8)*.
- > National Health and Medical Research Council (NHMRC), August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.

2 Scope of Work

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

2.1 Groundwater Monitoring

Sampling of selected groundwater wells was performed in accordance with the SAQP, applying methods set out in Section 3 of this report. The groundwater wells monitored as part of the OMP are presented in Table 2-1, and are shown on Figure 4, Appendix A.

Table 2-1 Groundwater Monitoring Locations

Monitoring Area	Location ID	Number
Source Area 1 – Maintenance Area	MW018, MW021, MW112, MW113, MW114, MW115, MW162, MW163, MW164, MW165, MW166, MW167, MW168, MW211, MW233.	15
Source Area 2 – Fuel Farm	MW105, MW148D, MW148S, MW151, MW159, MW238.	6
Pathway	MW102, MW103, MW104, MW122, MW124, MW126, MW127, MW134, MW135, MW138, MW139, MW140, MW143, MW144, MW145, MW146, MW147, MW170, MW172, MW175, MW180, MW181.	22
Receptor	MW137, MW141, MW176, MW177, MW178, MW179.	6

2.2 Seepage Water Monitoring

Sampling of selected seepage water monitoring locations was performed in accordance with the SAQP, applying methods set out in section 3 of this report. The seepage water locations monitored as part of the OMP are presented in Table 2-2 and are shown on Figure 4, Appendix A.

Table 2-2 Seepage Water Monitoring Locations

Monitoring Area	Location ID	Number
Seepage	OTH103, OTH106, OTH107, OTH129, OTH132, OTH134.	6

2.3 Tap Water Monitoring

Sampling of tap water was conducted in accordance with the methodology implemented for the PFAS OMP. The tap water locations monitored as part of the OMP are presented in Table 2-3 and are shown on Figure 4, Appendix A.

² It is noted that site is located on Commonwealth Land and is regulated under the Commonwealth environmental legislation, the State based DWER guidelines are relevant for the sampling of off-Site private properties and waterways.

Table 2-3 Tap Water Monitoring Locations

Monitoring Area	Location ID	Number
Offsite	POT103, POT105, POT106, POT107	4
Onsite	POT108, POT109, POT110	3

2.4 Surface Water Monitoring

Sampling of selected surface water monitoring locations was performed in accordance with the SAQP, applying methods set out in Section 3 of this report. The surface water locations monitored as part of the OMP are presented in Table 2-4 and are shown on Figure 5, Appendix A.

Table 2-4 Surface water Monitoring Locations

Monitoring Area	Location ID	Number
Drainage channels	SW108, SW113, SW114, SW121, SW122, SW123, SW124, SW125, SW157, SW166, SW168, SW170, SW174, SW176, SW189, SW190, SW192, SW193, SW198, SW199, SW200, SW219, SW227, SW231, SW234, SW235, SW243, SW265, SW277, SW278, SW279, SW288, SW291, SW292, SW293, SW298.	36
WAPET Creek	SW001, SW205, SW207, SW208, SW209, SW210, SW211, SW300, SW301, SW302, SW303, SW304, SW305.	13

2.5 Sediment Monitoring

Sampling of selected sediment (or shallow soil if dry) monitoring locations was performed in accordance with the SAQP, applying methods set out in Section 3 of this report. The sediment locations monitored as part of the OMP are presented in Table 2-5 and are shown on Figure 6, Appendix A.

Table 2-5 Sediment Monitoring Locations

Monitoring Area	Location ID	Number
Drainage channels	SD199, SD200, SD219, SS108, SS113, SS114, SS121, SS122, SS123, SS124, SS125, SS157, SS166, SS168, SS170, SS174, SS176, SS189, SS190, SS192, SS193, SS198, SS227, SS231, SS234, SS235, SS243, SS265, SS277, SS278, SS279, SS288, SS291, SS292, SS293, SS298.	36
WAPET Creek	SD205, SD207, SD208, SD209, SD210, SD211, SD300, SD301, SD302, SD303, SD304, SD305, SS301.	13

Note: 'SS' prefix indicates a shallow soil (dry) location, 'SD' prefix a sediment (wet) location

2.6 Data Management

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

- > The sample naming convention detailed in the DCMM Annex L was used in the field;
- > All field data collected was uploaded to the Defence ESdat database;
- > Laboratory data was uploaded and approved in ESdat; and
- > QA/QC data was reconciled.

2.7 Deviations from the OMP SAQP

Deviations from the SAQP (Cardno, May 2024) for the May 2024 monitoring event are presented in Table 2-6.

Table 2-6 Summary of deviations from the OMP SAQP

Location	Deviation	Comments
SW108, SW113, SW114, SW121, SW122, SW123, SW124, SW125, SW157, SW166, SW168, SW170, SW174, SW176, SW189, SW190, SW198, SW199, SW200, SW219, SW227, SW231, SW234, SW235, SW243, SW265, SW277, SW278, SW279, SW288, SW291, SW292, SW293, SW298.	Not sampled	These surface water monitoring locations were found dry. No impact on the OMP – sediment samples were collected at these locations and analysed for PFAS.
MW138	Not Sampled	Bores casings (multi level) have been damaged at 0.9 mbTOC. Medium impact – PFAS concentrations have been detected at this monitoring location since the start of the OMP. This well is located off-site along the central drainage channel exiting the site. A replacement multi-level well was installed.
MW163	Not Sampled	Monitoring well was found damaged (driven into).
MW137, MW141, MW176, MW177, MW178, MW179, OTH103, OTH106, OTH107, OTH129, OTH132, OTH134, SW193, SW208, SW209, SW210, SW211, SW298, SW301, SW305.	Analysed for non-standard LOR, all screens sampled for multi-level wells.	Defence's request. Positive impact, additional data collected.
POT105, POT106, POT107, POT109, POT110	Sampled	Tap water locations added to the monitoring network for this event at Defence's request. Positive impact, additional data collected. It is noted that POT103 and POT108 could not be sampled.
Several locations.	Dissolved Oxygen (DO) not recorded	Equipment failure, no impact on OMP.

3 Methodology

3.1 Groundwater Sampling Methodology

Groundwater monitoring was undertaken applying the methods detailed in Table 3-1.

Table 3-1 Groundwater Sampling Method

Activity	Details
Well Gauging	Standing Water Level (SWL) were gauged using an interface probe. All wells were measured against a surveyed mark at the top of the well casing.
Groundwater Field Parameters	For the single level wells, the field parameters were recorded via a water quality meter from HydraSleeves® or hand-bailed water. For the multilevel wells, the field parameters were recorded with a flow cell during purging. The following field parameters were recorded: ▪ pH. ▪ electrical conductivity (EC). ▪ oxidation reduction potential (ORP). ▪ Dissolved oxygen (DO). ▪ Temperature. Once field parameters have stabilised (as indicated by at least three consecutive measurements falling within +/- 10% of each other) measurement were recorded on field data records. All field instruments (e.g. water quality meter) were calibrated by the equipment supplier and reading of reference solutions (bump tests) undertaken daily in the field to optimise the accuracy of the measurements taken. Calibration certificates and bump tests records are provided in Appendix D.
Deployment and Retrieval of HydraSleeves® (single level well sample collection)	HydraSleeves® were deployed with top weight sample collection to begin at the lowest point. HydraSleeves® sampling devices were left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment. Samples were collected via continuous pull method at a rate allowing the water to pass through the check valve into the sample sleeve. Samples were discharged immediately (minimise changes in chemistry) via discharge tube. Following sampling, HydraSleeves® were deployed in preparation for the next OMP monitoring event using the same string for consistency between event (same depth of sampling i.e. within screen).
Peristaltic pump (multi-level wells sample collection)	The shallowest (non-dry) screen intervals were sampled at each multi-level well location, using Teflon-free dedicated and disposable high-density polyethylene (HDPE) tubing coupled to a peristaltic pump system. The groundwater was purged at a low flow rate of 0.2 mL/min. SWL and field parameters were measured during purging and post sample collection to ensure limited drawdown effects. The groundwater was sampled when the field parameters had stabilised.
Alternative sampling methodology (hand bailing)	Disposable HDPE hand bailers, attached to a polypropylene string, were used when the water column wasn't sufficient to fill the HydraSleeve®. Purging of the well (i.e. removal of 3x well volume) was undertaken prior to sampling to ensure that a sample representative of the aquifer is taken. Field parameters were regularly recorded during the bailer purge to confirm field parameter stability is achieved.
Decontamination procedure	Dedicated HydraSleeves®/tubing and single use nitrile gloves were used at each groundwater well thus removing the need for decontamination. All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.

Activity	Details
Sample identification, preservation transport and holding times	Each sample container was pre-labelled by the laboratory with a unique barcode for identification. Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under Chain of Custody (CoC) documentation. Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).
Laboratory Testing	Groundwater samples were submitted for the following analysis: - Full PFAS analytical suite (refer to the SAQP for full list of analytes). - Major anions and cations (include calcium, magnesium, sodium, potassium, chloride, sulfate, alkalinity and ionic balance). The primary laboratory was ALS Global Laboratories (Perth), and the secondary laboratory (quality control) was Eurofins ARL (Perth). Both laboratories are NATA-accredited for the parameters tested. Copies of the NATA stamped laboratory reports and CoC documentation are included in Appendix C.
Laboratory Testing – Quality Control	Groundwater QC samples were collected at the following frequencies as detailed in the SAQP: - Field duplicate (intra-laboratory) samples at 1 per 10 water samples or 1 per batch if the batch is less than 10 samples. - Field triplicate (inter-laboratory) samples at 1 per 10 water samples and sent to a secondary laboratory. - Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. interface probe)]. - Field blank samples at 1 per day.

3.2 Seepage Water Sampling Methodology

Seepage water monitoring procedure is detailed in Table 3-2.

Table 3-2 Seepage water Sampling method

Activity	Details
Field parameters	The following field parameters were recorded using a water quality meter: - pH. - EC. - ORP. - DO. - Temperature. Field observations such as water flow, odours or sheen presence were also recorded on field sampling sheets.
Sampling Method	Sampling was carried out in a two-hour period; one hour each side of the low tide. Sampling protocol involved a shallow excavation in the beach sand; just above where inundation by wave action is occurring. Sampling containers were lowered into the exposed seepage water and filled.
Decontamination procedure	All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.
Sample identification, preservation transport and holding times	Each sample container was pre-labelled by the laboratory with a unique barcode for identification. Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under CoC documentation. Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).
Laboratory Testing	Seepage water samples were submitted for the following analysis:

Activity	Details
	- Full PFAS analytical suite (refer to the SAQP for full list of analytes). - Major anions and cations (include calcium, magnesium, sodium, potassium, chloride, sulfate, alkalinity and ionic balance).
Laboratory Testing – Quality Control	Seepage water QC samples were collected at the following frequencies as detailed in the SAQP (Cardno, October 2023): - Field duplicate (intra-laboratory) samples at 1 per 10 water samples or 1 per batch if the batch is less than 10 samples. - Field triplicate (inter-laboratory) samples at 1 per 10 water samples and sent to a secondary laboratory. - Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. interface probe)]. - Field blank samples at 1 per day.

3.3 Tap Water Sampling Methodology

Tap water samples were collected from the first draw of water from the tap in accordance with the methodology adopted for the PFAS OMP. Physicochemical parameters (pH, temperature, EC, ORP and DO) were recorded in the field, and samples submitted to the laboratory for standard LOR PFAS suite analysis.

3.4 Surface Water Sampling Methodology

Surface water monitoring procedure is detailed in Table 3-3.

Table 3-3 Surface water Sampling Method

Activity	Details
Field parameters	The following field parameters were recorded using a water quality meter: - pH. - EC. - ORP. - DO. - Temperature. Field observations such as water flow, odours or sheen presence were also recorded on field sampling sheets.
Sampling Method	Surface water samples were collected directly into sample containers using a 'Grab' (manual) sample method via a long-handled sampling device. Where depth permits, the sample container was positioned at least 10 cm below the surface water level and above the sediment bed and oriented with the capped opening facing downwards to avoid the collection of surface films.
Decontamination procedure	All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.
Sample identification, preservation transport and holding times	Each sample container was pre-labelled by the laboratory with a unique barcode for identification. Samples were collected directly into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under CoC documentation. Sample containers, preservation procedures, sample storage requirements and holding times were undertaken in accordance with those recommended by Standards Australia (AS/NZS 5667.1:1998 and AS 4482.1 as appropriate).
Laboratory Testing	Surface water samples were submitted for the following analysis: - Full PFAS analytical suite (refer to the SAQP for full list of analytes). - Major anions and cations (include calcium, magnesium, sodium, potassium, chloride, sulfate, alkalinity and ionic balance).

Activity	Details
Laboratory Testing – Quality Control	Surface water QC samples were collected at the following frequencies as detailed in the SAQP (Cardno, May 2024): - Field duplicate (intra-laboratory) samples at 1 per 10 water samples or 1 per batch if the batch is less than 10 samples. - Field triplicate (inter-laboratory) samples at 1 per 10 water samples and sent to a secondary laboratory. - Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. interface probe)]. - Field blank samples at 1 per day.

3.5 Sediment Sampling Methodology

Sediment sampling methodology is detailed in Table 3-4.

Table 3-4 Sediment Sampling Method

Activity	Details
Sample Collection	Sediment samples were collected at the sediment/water interface using hand tools (e.g. trowel, hand auger, PVC pipe etc.) with samples placed directly into appropriately labelled, laboratory supplied sample containers and packed in chilled containers for delivery to the laboratory under CoC documentation. At each sampling location, the sediment sample was visually assessed, and observations (including physical description) recorded on field data sheets.
Field Records	The following information was recorded on the field data sheets: - Sample description. - Sampling time and date. - Weather conditions. - Sample Collection method. - Sampling equipment decontamination procedures where non-disposable sampling equipment is utilised.
Decontamination	All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection.
Laboratory Testing	Sediment samples were submitted for the following analysis: Full PFAS analytical suite (refer to the SAQP for full list of analytes).
Laboratory Testing – Quality Control	Sediment QC samples were collected at the following frequencies as detailed in the SAQP (Cardno, May 2024): - Field duplicate (intra-laboratory) samples greater than 1 per 20 sediment samples or 1 per batch if the batch is less than 20 samples. - Field triplicate (inter-laboratory) samples greater than 1 per 20 sediment samples and sent to a secondary laboratory. - Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. trowel)]. - Field blank samples at 1 per day.

3.6 Quality Control / Quality Assurance

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

- > QA documentation.
- > Bias.
- > Data Representativeness.
- > Data Precision & Accuracy.

- > Laboratory Performance.
- > Data Comparability.
- > Data Set Completeness.

A detailed review of these aspects has been undertaken, the results of which are presented in Appendix E. The QA/QC review concluded that there are no significant systematic errors in the data collection process and therefore, the dataset used for the assessment is considered valid and complete.

3.7 Assessment Criteria

3.7.1 Groundwater, tap water, seepage water and surface water

The adopted assessment criteria for groundwater, tap water, seepage water and surface water are detailed in Table 3-5.

Table 3-5 Criteria for groundwater, tap water, seepage water and surface water

Exposure Scenario	Adopted Assessment Criteria		Guidance
	PFHxS / PFOS µg/L	PFOA	
Human Health – Recreational Water	2 ¹	10	NHMRC 2019, HEPA 2020
Ecological – 99% species protection	0.00023 ²	19	HEPA 2020

1. Sum of PFOS and PFHxS.
2. PFOS only; Practical screening guideline of 0.01 µg/L is based on typical current laboratory limit of reporting. Therefore, it should be noted that warning and action levels would not be relevant until the detection limits are reduced or the screening levels are increased (HEPA 2020).

3.7.2 Sediment

It is noted that there are currently no Australian regulatory endorsed assessment levels for risk posed to ecology or human health by PFAS in sediment. Sediment results have been compared to available historical data for the purpose of this assessment.

4 Field Observations and Results

4.1 General Site Observations

No significant weather event or site activities that could have impacted the monitoring event or results obtained were noted during the May 2024 monitoring event. No significant rainfall occurred leading to or during the May 2024 monitoring event and the daily maximum temperature recorded during the event was 28.3°C.

4.2 Groundwater

4.2.1 Summary of Field Observations

4.2.1.1 Physicochemical parameters

Stabilised physicochemical parameters, water colour and observations recorded during the groundwater sampling program are presented in field sampling records, included in Appendix D. Groundwater was fresh to hyper saline [TDS ranging from 1,898 mg/L (MW211) to 107,037 mg/L (MW181)], and generally near neutral [pH ranging 6.31 (MW162) to 8.05 (MW211)]. Groundwater temperature was on average 29.0°C, and DO readings generally indicate aerobic groundwater condition at most monitoring wells [DO ranging from 0.43 mg/L (MW147) to 6.18 mg/L (MW211)]. Field parameters were generally consistent with the previous monitoring events.

4.2.1.2 Groundwater Elevation and Migration

Well gauging was undertaken over several tide cycles which has been considered when interpreting inferred groundwater contours and flow direction.

Groundwater elevations ranged from -0.175 mAHD (MW127) to 0.967 mAHD (MW179).

Groundwater flow beneath the site was interpreted to be easterly, towards the Exmouth Gulf, consistent with the previous monitoring events. Groundwater is generally inferred to flow towards an area of groundwater depression that lie between the site and the coast (refer to Figure 3). Groundwater elevation in wells closer to the shore may be influenced by tidal pressure.

Groundwater elevation contours and flow direction are shown in Figure 3, Appendix A. Gauging records are presented in Appendix D.

4.2.2 Groundwater Laboratory Results

4.2.2.1 PFAS analytes

The results of laboratory analysis have been compared against adopted assessment criteria. Tabulated analytical results are provided within Appendix B. A summary of results exceeding the adopted criteria is presented in Table 4-1. Laboratory results have also been compared to available historical data to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 4 in Appendix A presents the groundwater monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-1 Summary of Groundwater Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	10 ²	1.98 (MW151)	64	0
PFOS	MW018, MW021, MW105, MW112, MW115, MW137_0.8-1.3, MW137_2.5-3.0, MW137_4.5-5.0, MW137_6.5-7.0, MW141_1.5-2.0, MW141_3.0-3.5, MW141_5.0-5.5, MW141_7.0-7.5, MW148D, MW148S, MW151, MW162, MW164, MW165, MW166, MW167, MW168, MW172, MW175_4.0-4.5, MW176_1.5-2.0, MW176_3.5-4.0, MW176_6.0-6.5, MW176_8.5-9.0, MW177_1.5-2.0, MW177_3.5-4.0, MW177_6.0-6.5, MW177_8.5-9.0, MW178_4.4-5, MW178_7.0-7.5, MW178_9.0-9.5, MW179_1.0-1.5, MW179_3.2-3.7, MW179_5.9-6.4, MW179_8.5-9.0 MW211, MW233, MW238.	0.00023/0.01 ³	25.7 (MW151)	64	42
Sum of PFOS and PFHxS	MW148D, MW148S, MW151, MW162, MW172, MW211, MW233, MW238	2 ²	60.2 (MW151)	64	8

Notes:

1. Non-inclusive of quality control samples
2. HEPA 2020 guideline value for human health – Recreational Use
3. HEPA 2020 guideline value for ecological 99% species protection (LOR adopted for samples tested for standard LOR)

Findings are summarised as follows:

- > First-time detections of PFOA were recorded at MW137 (screen intervals 4.5-5.0 and 6.5-7.0), MW176 (3.5-4.0 and 6.0-6.5), MW177 (8.5-9.0) and MW178 (7.0-7.5 and 9.0-9.5). However, the concentrations recoded were all below the standard LOR (0.01 µg/L).

- > A first-time detection of the sum of PFOS and PFHxS was recorded at MW176_8.5-9.0 (0.0005 µg/L recorded).
- > New exceedances of the ecological criteria for PFOS (0.00023 µg/L) were reported at MW176_8.5-9.0 and MW177_8.5-9.0. However, the concentrations recorded were all below the standard LOR (0.01 µg/L).

4.2.2.2 Non-PFAS analytes

Tabulated laboratory results for non-PFAS analytes are provided within Appendix B. Results were compared to historical range for each monitoring location. Total anions concentrations ranged from 17.6 (MW211) and 1,380 (MW145) meq/L. Total cations concentrations ranged from 15.1 (MW211) and 1,390 (MW181) meq/L. Non-PFAS analytes concentrations were of the same order of magnitude as previous monitoring events.

4.3 Seepage Water

4.3.1 Summary of Field Observations

Stabilised physiochemical parameters, water colour and observations recorded during the monitoring event are presented in field sampling record sheets, included in Appendix D. Seepage water temperature was on average 23.2°C, DO readings indicate aerobic conditions, pH was near neutral, and TDS indicates saline water condition. Field parameters were generally consistent with the previous monitoring events.

4.3.2 Laboratory Results

4.3.2.1 PFAS analytes

The results of laboratory analysis have been compared against adopted assessment criteria. Tabulated analytical results are provided within Appendix B. A summary of results is presented in Table 4-2. Laboratory results have also been compared to available historical data in order to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 4 in Appendix A presents the seepage water monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-2 Summary of Seepage water Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	10 ²	0.0008 (OTH103)	6	0
PFOS	OTH103, OTH129, OTH132, OTH134	0.00023 ³	0.0017 (OTH134)	6	0
Sum of PFOS and PFHxS	-	2 ²	<0.01	6	0

Notes:

1. Non-inclusive of quality control samples
2. HEPA 2020 guideline value for human health – Recreational Use
3. HEPA 2020 guideline value for ecological 99% species protection

Findings are summarised as follows:

- > A first-time detection of PFOA was reported at OTH103 (0.0008 µg/L recorded). The concentration was lower than the standard LOR (0.01 µg/L).
- > There was no first-time detection of Sum of PFOS and PFHxS or new exceedance of guideline values at the seepage water monitoring locations during the May 2024 monitoring event.

4.3.2.2 Non-PFAS analytes

Tabulated laboratory results for non-PFAS analytes are provided within Appendix B. Results were compared to historical range for each monitoring location. Total anions concentrations ranged from 594 (OTH132) and 713 (OTH107) meq/L. Total cations concentrations ranged from 628 (OTH107) and 658 (OTH132) meq/L. Non-PFAS analytes concentrations were of the same order of magnitude as previous monitoring events.

4.4 Tap Water

4.4.1 Summary of Field Observations

Observations recorded during the tap water sampling program are provided in the field sampling record sheets within Appendix D. Tap water temperature was on average 27.0°C, DO readings indicate aerobic conditions, pH was near neutral, and TDS indicates fresh water condition.

4.4.2 Laboratory Results

Tabulated analytical results are provided within Appendix B. Laboratory results have been compared to available historical data to identify tap water monitoring locations where a first-time detection of Sum of PFOS and PFHxS or PFOA or a new exceedance of guideline values were reported. Figure 5 in Appendix A presents the tap water monitoring locations.

Findings are summarised as follows:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS at the tap water monitoring locations during the May 2024 monitoring event.
- > None of the five (5) tap water samples recorded PFAS concentrations above the LOR.

4.5 Surface Water

4.5.1 Summary of Field Observations

Stabilised physiochemical parameters, water colour and turbidity observations recorded during the monitoring event are presented in field sampling record sheets, included in Appendix D. Field parameters were generally consistent with the previous monitoring events. pH was near neutral to slightly alkaline, and water condition was aerobic and generally saline [TDS ranging from 37,085 (SW208) to 48,131 mg/L (SW211)].

4.5.2 Laboratory Results

4.5.2.1 PFAS analytes

The results of laboratory analysis have been compared against adopted assessment criteria. Tabulated analytical results are provided within Appendix B. A summary of results exceeding the adopted criteria is presented in Table 4-3. Laboratory results have also been compared to available historical data in order to identify monitoring wells where a first-time detection of Sum of PFOS and PFHxS or PFOA; or a new exceedance of guideline values were reported. Figure 5 in Appendix A presents the surface water monitoring locations. The laboratory reports are provided in Appendix C.

Table 4-3 Summary of Surface water Results Exceeding Adopted Criteria

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results ¹	No. Results Above Criteria
PFOA	-	10 ²	<LOR	15	0
PFOS	SW193, SW210, SW211	0.00023 ³	0.0034 (SW211)	15	3
Sum of PFOS and PFHxS	-	2 ²	0.0039 (SW211)	15	0

Notes:

1. Non-inclusive of quality control samples
2. HEPA 2020 guideline value for human health – Recreational Use
3. HEPA 2020 guideline value for ecological 99% species protection (primary laboratory LOR adopted)

Findings are summarised as follows:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS or new exceedance of guideline values at the surface water monitoring locations during the May 2024 monitoring event.

4.5.2.2 *Non-PFAS analytes*

Tabulated laboratory results for non-PFAS analytes are provided within Appendix B. Results were compared to historical range, where available, for each monitoring location. Total anions concentrations ranged from 584 (SW192) and 905 (SW211) meq/L. Total cations concentrations ranged from 616 (SW208) and 911 (SW211) meq/L. Non-PFAS analytes concentrations were of the same order of magnitude as previous monitoring events.

4.6 Sediment

4.6.1 Summary of Field Observations

Observations recorded during the sediment sampling program are provided in the field sampling record sheets within Appendix D.

4.6.2 Laboratory Results

Tabulated analytical results are provided within Appendix B. Laboratory results have been compared to available historical data to identify sediment monitoring locations where a first-time detection of Sum of PFOS and PFHxS or PFOA was reported. Figure 6 in Appendix A presents the sediment monitoring locations.

Findings are summarised as follows:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS at the sediment monitoring locations during the May 2024 monitoring event.

4.7 Changes to the Monitoring Network Condition

The following change to the monitoring network condition was noted during the May 2024 monitoring event:

- > Monitoring well MW163 was found damaged, the well has been driven into and could not be repaired or sampled.
- > A replacement multi-level well was installed to replace the damaged well MW138.

5 Summary and Conclusions

Cardno undertook the May 2024 groundwater, seepage water, surface water and sediment monitoring event at RAAF Base Learmonth as part of the PFAS OMP. Sampling and testing was undertaken at 42 groundwater monitoring wells, five (5) tap water locations, 15 surface water locations, six (6) seepage water locations and 49 sediment monitoring locations. 34 surface water monitoring locations could not be sampled as these were found dry, and two monitoring wells (MW138 and MW163) were found damaged.

Groundwater levels were gauged in all wells before sampling. Groundwater is inferred to flow towards an area of groundwater depression that lies between the site and the coast.

The groundwater laboratory results reported the following:

- > Of the 64 samples that were tested, PFOS (42 samples) and Sum of PFHxS and PFOS (eight samples) reported concentrations that exceeded the HEPA (2020) ecological guideline value for 99% protection species and HEPA (2020) guideline value for recreational use respectively.
- > First-time detections of PFOA were recorded at MW137 (screen intervals 4.5-5.0 and 6.5-7.0), MW176 (3.5-4.0 and 6.0-6.5), MW177 (8.5-9.0) and MW178 (7.0-7.5 and 9.0-9.5). However, the concentrations recorded were all below the standard LOR (0.01 µg/L).
- > A first-time detection of the sum of PFOS and PFHxS was recorded at MW176_8.5-9.0 (0.0005 µg/L recorded).
- > New exceedances of the ecological criteria for PFOS (0.00023 µg/L) were reported at MW176_8.5-9.0 and MW177_8.5-9.0. However, the concentrations recorded were all below the standard LOR (0.01 µg/L).

The seepage water laboratory results reported the following:

- > A first-time detection of PFOA was reported at OTH103 (0.0008 µg/L recorded). The concentration was lower than the standard LOR (0.01 µg/L).
- > There was no first-time detection of Sum of PFOS and PFHxS or new exceedance of guideline values at the seepage water monitoring locations during the May 2024 monitoring event.

The tap water laboratory results reported the following:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS at the tap water monitoring locations during the May 2024 monitoring event.
- > None of the five (5) tap water samples recorded PFAS concentrations above the LOR.

The surface water laboratory results reported the following:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS or new exceedance of guideline values at the surface water monitoring locations during the May 2024 monitoring event.

The sediment laboratory results reported the following:

- > There was no first-time detection of PFOA or Sum of PFOS and PFHxS at the sediment monitoring locations during the May 2024 monitoring event.

PFAS concentrations were generally within the historical range for all media sampled. No change in the risk understanding of the management area was identified based on the May 2024 sampling results.

The following action should be considered prior to the next monitoring event:

- > Repair or replacement of damaged monitoring well MW163.

The next OMP sampling event for RAAF Base Learmonth will be scheduled following the OMP review. Ongoing Monitoring Reports are being prepared for the November 2021 – October 2022 and November 2022 – October 2023 monitoring periods.

6 References

General References

1. Australian Standard AS 4482-2005 *Guide to the investigation and sampling of sites with potentially contaminated soils*, Part 1 – Non-volatile and semi-volatile compounds.
2. Australian Standard AS 4482-1999 *Guide to the investigation and sampling of sites with potentially contaminated soils*, Part 2 – Volatile substances.
3. *Contaminated Sites Act 2003*, Western Australia.
4. Department of Defence, May 2021, *PFAS OMP Factual Report Guidance* Version 0.2.
5. Department of Defence, July 2018 amended June 2021, *Contamination Management Manual*, Annex L *Guidance on Data Management*.
6. Department of the Environment and Energy (2017) in the National Greenhouse and Energy Reporting Scheme Measurement *Technical Guidelines for the Estimation of Emissions by Facilities in Australia*.
7. Department of Water and Environmental Regulation (DWER), 2021, *Assessment and Management of Contaminated Sites*.
8. Department of Water and Environment Regulation (DWER), 2018, Perth Groundwater Atlas, (<https://maps.water.wa.gov.au/#/webmap/gwm>).
9. Environmental Protection Agency (United States EPA), November 2002, Reference: EPA/240/R-02/004, 'Guidance on Environmental Data Verification and Data Validation'.
10. The Heads of EPAs Australia and New Zealand (HEPA; 2020) *PFAS National Environmental Management Plan (NEMP) 2.0*, January 2020.
11. National Environment Protection Council (NEPC), 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended), registered May 2013.
12. National Health and Medical Research Council (NHMRC) (2011, as updated 2022) *National Water Quality Management Strategy Australian Drinking Water Guidelines 6*, Version 3.8, September 2022.
13. NHMRC, August 2019, *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.
14. Standards Australia/Standards New Zealand (1998) AS5667.1:1998 'Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples'.
15. U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process* (EPA QA/G-4).
16. USEPA, 2002, *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8).

Site Specific References

17. Cardno, May 2024, Reference: DEF19009, 'PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) RAAF Base Learmonth'. Rev 12.
18. Cardno, April 2023, *2021 Annual Interpretive Report RAAF Base Learmonth*.
19. Cardno, October 2022, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
20. Cardno, August 2022, *PFAS OMP First Flush Sampling Event Factual Report RAAF Base Learmonth*.
21. Cardno, April 2021, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
22. Cardno, August 2021, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
23. Cardno, July 2021, *PFAS OMP 2020 Annual Interpretive Report, RAAF Base Learmonth*.
24. Cardno, May 2021, *PFAS OMP First Flush Sampling Event Factual Report RAAF Base Learmonth*.
25. Cardno, February 2021, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
26. Cardno, July 2020, *PFAS OMP First Flush Sampling Event Factual Report RAAF Base Learmonth*.
27. Cardno, April 2020, *PFAS OMP Biannual Monitoring Event Factual Report RAAF Base Learmonth*.
28. Department of Defence, May 2019, *RAAF Base Learmonth PFAS Ongoing Monitoring Plan*.

29. GHD, December 2018, *RAAF Base Learmonth – PFAS Investigations – Preliminary and Detailed Site Investigation Report*.
30. GHD, April 2019, *RAAF Base Learmonth – PFAS Investigations – Ecological Risk Assessment Preliminary (ERA)*.

APPENDIX

A

FIGURES



now





Legend

 Management Area

 RAAF Learmonth

FIGURE 1
1:60,000 Scale at A3



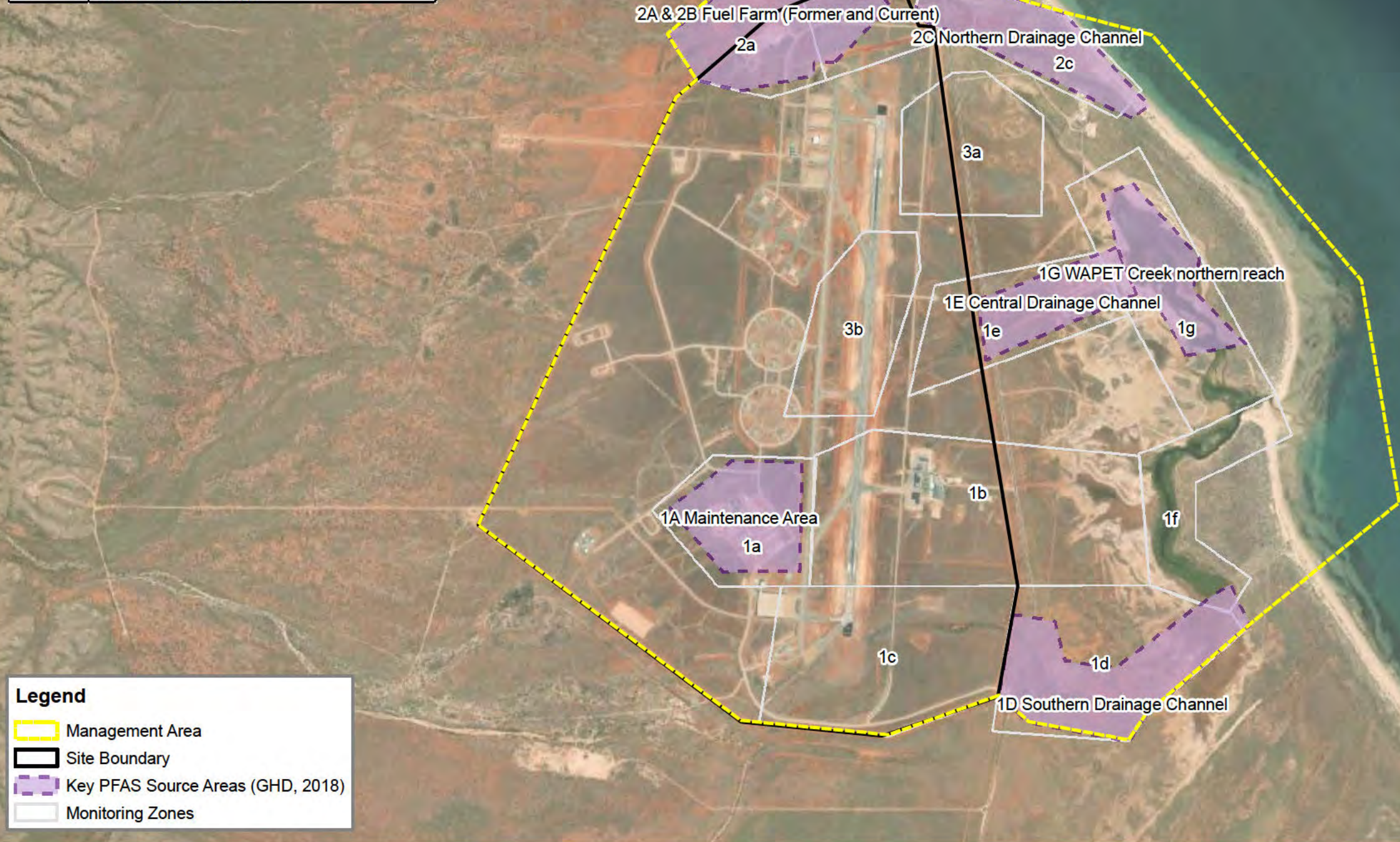
Site Location

MAY 2024 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE




Map Produced by Cardno WA
Date: 2024-06-16 | Project: DEF19009
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Map: DEF19009_WA_0960-GS-001_RegionalLocation 02.mxd
Aerial Imagery Supplied by Google Earth

1a	Maintenance Area (Source Area)
1b	Pathway (site drains and groundwater)
1c	Pathway (groundwater)
1d	Southern Drainage Channel (Pathway)
1e	Central Drainage Channel (Pathway)
1f	Southern reach of WAPET Creek (Receptor)
1g	Northern reach of WAPET Creek (Receptor)
2a	Current Fuel Farm (Source Area)
2b	Former Fuel Farm (Pathway)
2c	Northern Drainage Channel (Pathway)
3a	Pathway (groundwater)
3b	Site drains (Pathway)



Legend

- Management Area
- Site Boundary
- Key PFAS Source Areas (GHD, 2018)
- Monitoring Zones

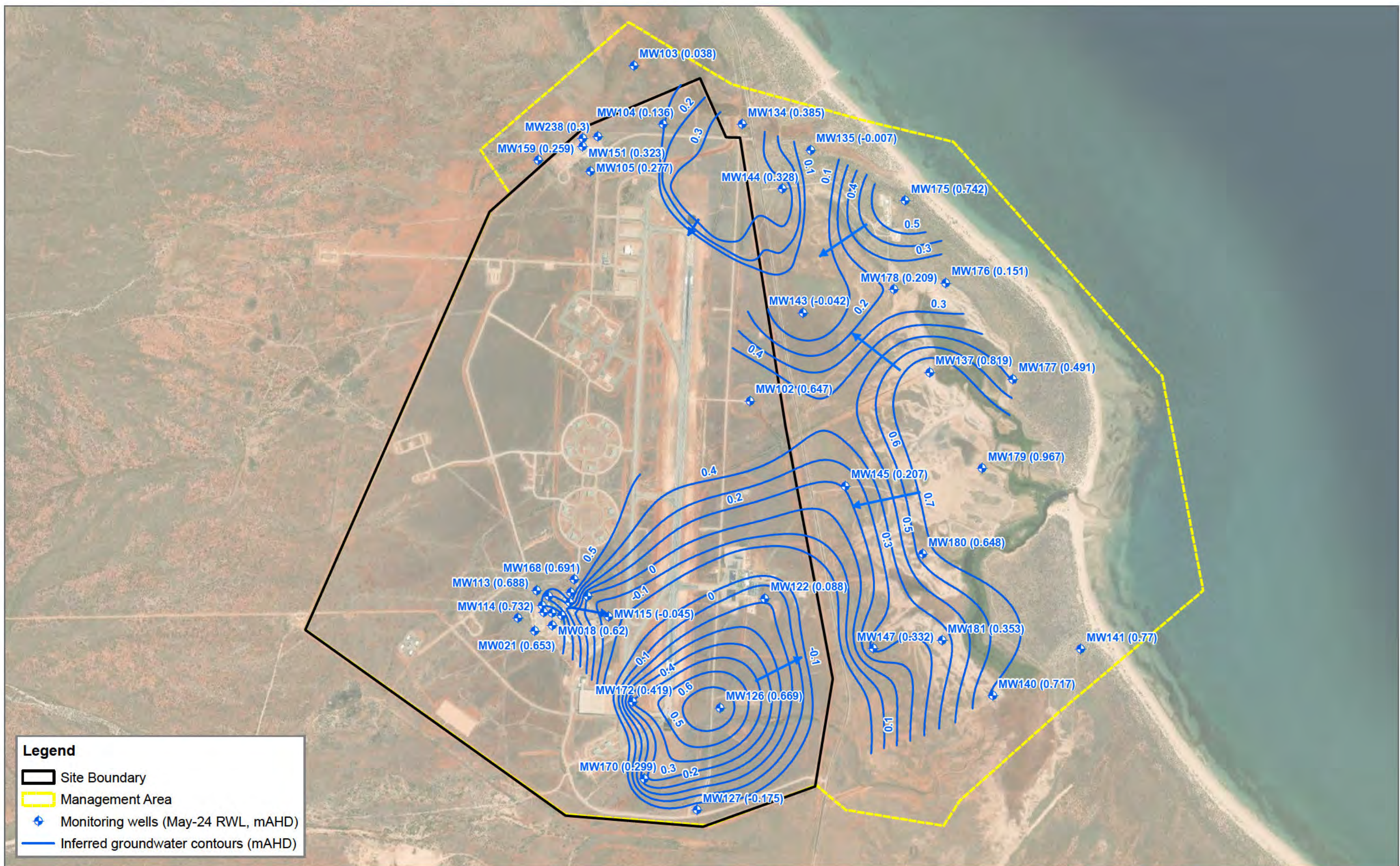


FIGURE 3
1:22,000 Scale at A3

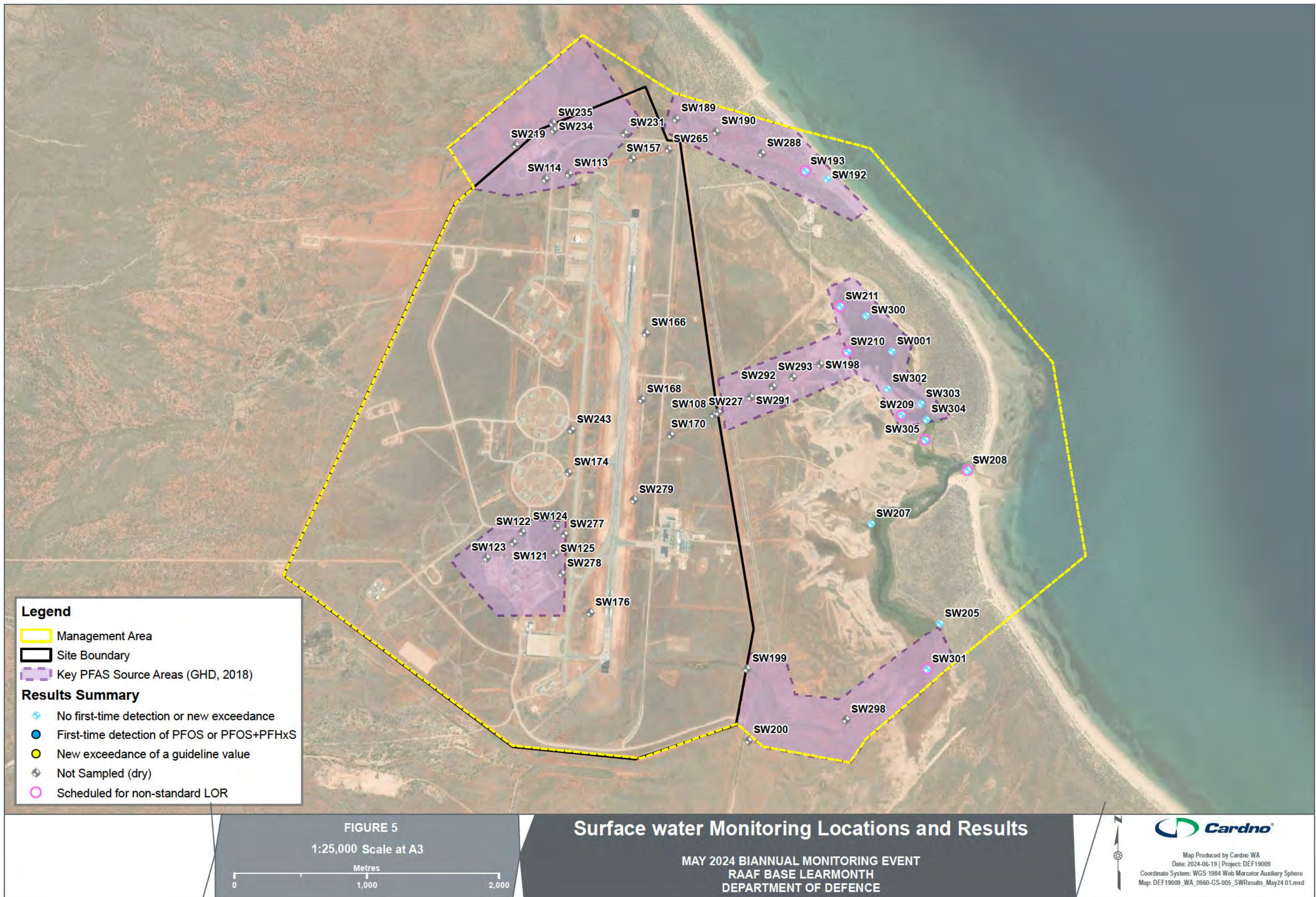
Metres
0 750 1,500

Inferred Groundwater Contours

MAY 2024 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-06-17 | Project: DEF19009
Coordinate System: GDA 1994 MGA Zone 50
Map: DEF19009_WA_0960-GS-003_GroundwaterElevationContoursMay24 01.mxd
Aerial Imagery Supplied by Google Earth



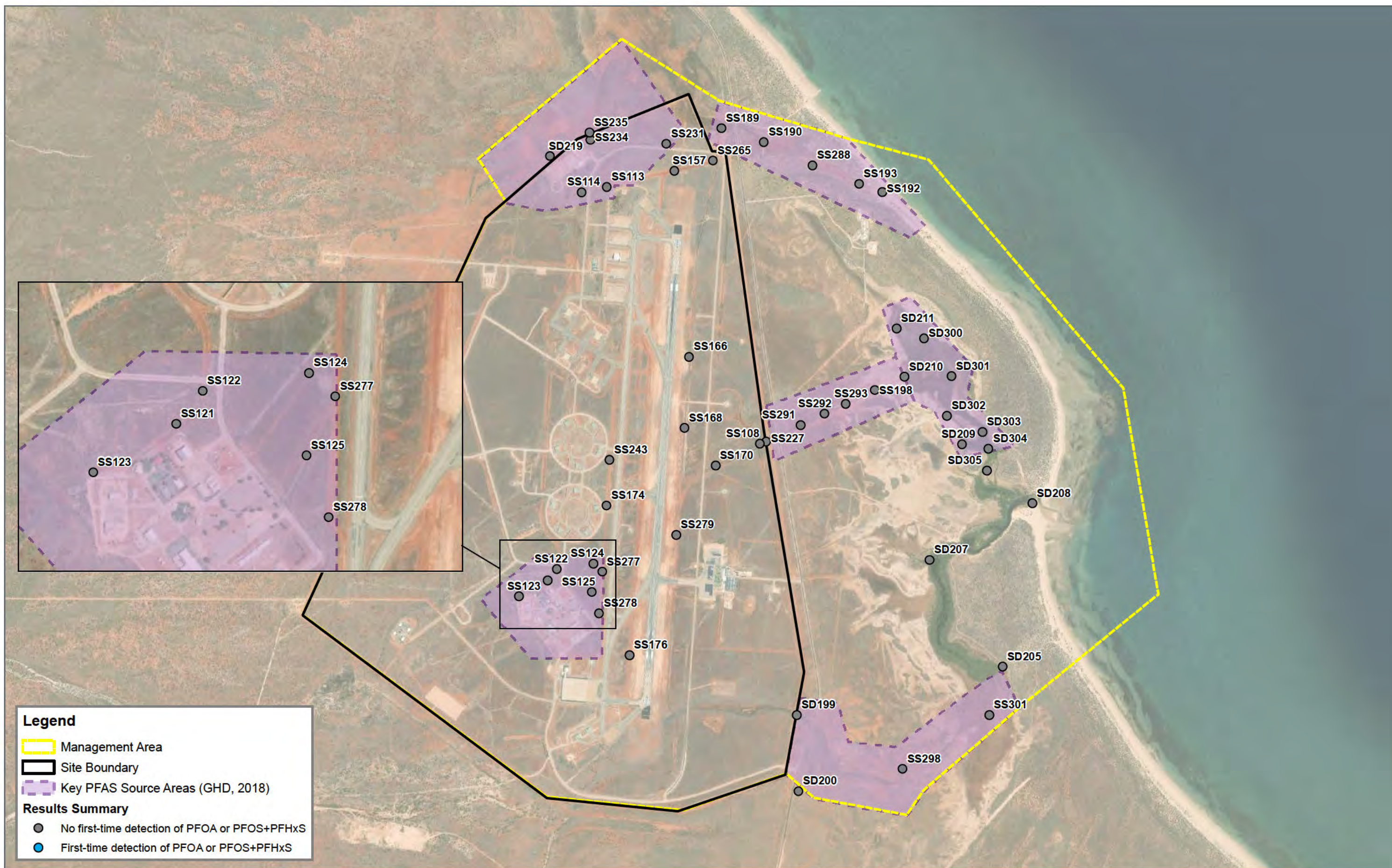
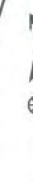


FIGURE 6
1:25,000 Scale at A3

Metres
0 1,000 2,000

Sediment Monitoring Locations and Results

MAY 2024 BIENNIAL MONITORING EVENT
RAAF BASE LEARMONTH
DEPARTMENT OF DEFENCE



Map Produced by Cardno WA
Date: 2024-06-18 | Project: DEF19009
Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Map: DEF19009_WA_0960-GS-006_SDRResults_May24 01.mxd

APPENDIX

B

DATA ASSESSMENT TABLES



now



[illegible]

					PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids										PFAS - (n:2) Fluorotelomer Sulfonic Acids							
					Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecane sulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
LOR - Limit of Reporting					0.0005	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	0.001
PFAS NEMP 2020 Interim Marine 99%									0.00023*						19													
PFAS NEMP 2020 Recreational Water														10														
Location Code	Date	Field ID	Sample Type	Lab Report Number																								
MW164	22 May 2024	0960_MW164_240522	Normal	EP2407055	0.08	0.11	0.81	0.03	0.86	<0.01	<0.01	0.07	0.25	0.04	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW164	22 May 2024	0960_QC131_240522	Field Duplicate	EP2407055	0.42	0.53	3.27	0.16	1.26	<0.01	<0.01	0.1	0.33	0.12	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW164	22 May 2024	0960_QC231_240522	Interlab Duplicate	1101229	1.8	2.8	15	0.62	4.9	<0.01	<0.01	0.46	1.00	0.51	0.67	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.20	<0.01	<0.01	<0.01	<0.01	
MW165	22 May 2024	0960_MW165_240522	Normal	EP2407055	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW166	22 May 2024	0960_MW166_240522	Normal	EP2407055	0.03	0.03	0.20	<0.01	0.21	<0.01	0.1	0.17	0.19	0.17	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW167	22 May 2024	0960_MW167_240522	Normal	EP2407055	0.02	0.04	0.53	0.02	0.66	<0.01	<0.01	0.07	0.17	0.11	0.16	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW168	22 May 2024	0960_MW168_240522	Normal	EP2407045	0.08	0.09	0.77	<0.01	0.15	<0.01	<0.01	0.05	0.21	0.02	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW168	22 May 2024	0960_QC119_240522	Field Duplicate	EP2407045	0.08	0.09	0.81	<0.01	0.16	<0.01	<0.01	0.06	0.21	0.02	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW168	22 May 2024	0960_QC219_240522	Interlab Duplicate	1101229	0.11	0.19	1.6	0.03	0.26	<0.01	<0.01	0.06	0.37	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW170	23 May 2024	0960_MW170_240523	Normal	EP2407163	0.05	0.05	0.41	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW172	23 May 2024	0960_MW172_240523	Normal	EP2407163	0.50	0.77	5.34	0.22	1.38	<0.01	<0.01	0.2	0.45	1.74	0.22	0.30	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW175	22 May 2024	0960_MW175_4.0-4.5_240522	Normal	EP2407045	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.06	0.03	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW176	23 May 2024	0960_MW176_1.5-2.0_240523	Normal	EP2407165	<0.01	<0.01	<0.01	<0.01	0.0003	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW176	23 May 2024	0960_MW176_3.5-4.0_240523	Normal	EP2407165	<0.01	<0.01	0.0031	<0.01	0.0030	<0.01	0.008	0.0060	0.0165	0.120	0.0006	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW176	23 May 2024	0960_MW176_6.0-6.5_240523	Normal	EP2407165	0.0006	<0.01	0.0030	<0.01	0.0035	<0.01	0.008	0.0199	0.0429	0.213	0.0008	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.002	<0.01	<0.01	<0.01	
MW176	23 May 2024	0960_MW176_8.5-9.0_240523	Normal	EP2407165	<0.01	<0.01	<0.01	<0.01	0.0005	<0.01	<0.01	0.0005	0.0009	0.0054	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW177	23 May 2024	0960_MW177_1.5-2.0_240523	Normal	EP2407165	<0.01	<0.01	0.0008	<0.01	0.0005	<0.01	0.006	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW177	23 May 2024	0960_MW177_3.5-4.0_240523	Normal	EP2407165	<0.01	<0.01	0.0015	<0.01	0.0015	<0.01	<0.01	<0.01	<0.01	0.0032	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW177	23 May 2024	0960_MW177_6.0-6.5_240523	Normal	EP2407165	<0.01	<0.01	0.0015	<0.01	0.0014	<0.01	<0.01	0.0035	0.0063	0.0710	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW177	23 May 2024	0960_MW177_8.5-9.0_240523	Normal	EP2407165	0.0005	<0.01	0.0026	<0.01	0.0023	<0.01	0.006	0.0070	0.0269	0.221	0.0005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW178	23 May 2024	0960_MW178_4.0-4.5_240523	Normal	EP2407165	<0.01	<0.01	<0.01	<0.01	0.0007	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW178	23 May 2024	0960_MW178_7.0-7.5_240523	Normal	EP2407165	<0.01	<0.01	0.0032	<0.01	0.0043	<0.01	0.010	0.0273	0.0179	0.0234	0.0005	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW178	23 May 2024	0960_MW178_9.0-9.5_240523	Normal	EP2407165	<0.01	<0.01	0.0023	<0.01	0.0029	<0.01	0.0053	0.0053	0.0201	0.170	0.0006	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MW178	23 May 2024	0960_QC134_240523	Field Duplicate	EP2407165	<0.01	<0.01</																						

LOR - Limit of Reporting
PFAS NEMP 2020 Interim Marine 99%
PFAS NEMP 2020 Recreational Water

[illegible]

	PFAS - Perfluoroalkyl Sulfonamides					PFAS			Inorganics							Metals				
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOGAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOEE)	N-Ethyl perfluorooctane sulfonamide (EtFOGA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOGAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	Sum of PFHxS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS	Carbonate Alkalinity (as CaCO3)	Alkalinity Bicarbonate as (CaCO3)	Alkalinity (Hydroxide) as CaCO3	Alkalinity (total) as CaCO3	Anions Total	Cations Total	Chloride	Ionic Balance	Sulphate as SO4 - Turbidimetric (filtered)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	mg/L	%	mg/L	mg/L	mg/L	mg/L
LOR - Limit of Reporting	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	1	1	1	1	0.01	0.01	1	0.01	1	1	1	1
PFAS NEMP 2020 Interim Marine 99%																				
PFAS NEMP 2020 Recreational Water						2														

Location Code	Date	Field ID	Sample Type	Lab Report Number	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOGAA)	N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOGAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOGAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	Sum of PFAS and PFOS	Sum of PFAS (WA DER List)	Sum of PFAS	Carbonate Alkalinity (as CaCO ₃)	Alkalinity (Carbonate as CaCO ₃)	Alkalinity (Hydroxide) as CaCO ₃	Alkalinity (Total) as CaCO ₃	Anions Total	Cations Total	Chloride	Ionic Balance	Sulphate as SO ₄ - Turbidimetric (filtered)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)		
MW164	22 May 2024	0960 MW164_240522	Normal	EP2407055	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	1	1	1	1	0.01	0.01	1	0.01	528	124	135	98	1,880		
MW164	22 May 2024	0960 QC131_240522	Field Duplicate	EP2407055	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	1	1	1	1	0.01	0.01	1	0.01	705	174	185	100	2,260		
MW164	22 May 2024	0960 QC231_240522	Interlab Duplicate	1101229	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	1	1	1	1	0.01	0.01	1	0.01	705	174	185	100	2,260		
MW165	22 May 2024	0960 MW165_240522	Normal	EP2407055	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	15	733	748	748	22.0	19.9	224	5.09	36	5	6	17	430		
MW166	22 May 2024	0960 MW166_240522	Normal	EP2407055	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	902	902	902	902	29.0	27.0	352	3.62	50	8	9	25	579		
MW167	22 May 2024	0960 MW167_240522	Normal	EP2407055	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	934	934	934	934	48.4	46.2	818	2.38	322	29	28	40	952		
MW168	22 May 2024	0960 MW168_240522	Normal	EP2407045	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	660	660	660	660	123	114	3,400	3.71	687	86	180	127	2,120		
MW168	22 May 2024	0960 QC119_240522	Field Duplicate	EP2407045	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	664	664	664	664	128	114	3,580	5.79	684	85	179	127	2,120		
MW168	22 May 2024	0960 QC219_240522	Interlab Duplicate	1101229	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	664	664	664	664	128	114	3,580	5.79	684	85	179	127	2,120		
MW170	23 May 2024	0960 MW170_240523	Normal	EP2407163	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	702	702	702	702	370	404	11,900	4.41	964	603	753	185	7,060		
MW172	23 May 2024	0960 MW172_240523	Normal	EP2407163	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	538	538	538	538	318	366	9,480	7.02	1,920	403	548	204	6,800		
MW175	22 May 2024	0960 MW175_4.0-4.5_240522	Normal	EP2407045	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	945	945	945	945	272	250	8,290	4.27	935	162	694	198	4,130		
MW176	23 May 2024	0960 MW176_1.5-2.0_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	1,300	1,300	1,300	1,300	626	618	19,000	0.61	3,080	668	1,520	640	10,200		
MW176	23 May 2024	0960 MW176_3.5-4.0_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0061	0.157	0.157	0.157											
MW176	23 May 2024	0960 MW176_6.0-6.5_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0065	0.294	0.294	0.294											
MW176	23 May 2024	0960 MW176_8.5-9.0_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0005	0.0073	0.0073	0.0073											
MW177	23 May 2024	0960 MW177_1.5-2.0_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0013	0.0073	0.0073	0.0073	1,020	1,020	1,050	1,160	33,100	4.96	4,590	894	2,660	1,010	20,000
MW177	23 May 2024	0960 MW177_3.5-4.0_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0030	0.0062	0.0062	0.0062											
MW177	23 May 2024	0960 MW177_6.0-6.5_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0029	0.0837	0.0837	0.0837											
MW177	23 May 2024	0960 MW177_8.5-9.0_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0049	0.267	0.267	0.267											
MW178	23 May 2024	0960 MW178_4.0-4.5_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0007	0.0007	0.0007	0.0007	162	162	1,090	1,160	34,500	3.13	5,290	1,100	2,600	1,040	19,800
MW178	23 May 2024	0960 MW178_7.0-7.5_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0075	0.0896	0.0896	0.0896											
MW178	23 May 2024	0960 MW178_9.0-9.5_240523	Normal	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0052	0.201	0.201	0.201											
MW178	23 May 2024	0960 QC134_240523	Field Duplicate	EP2407165	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0012	0.0012	0.0012	0.0012	150	150	1,080	1,170	34,300	3.84	5,400	1,110	2,640	1,050	20,000
MW178	23 May 2024	0960 QC234_240523	Interlab Duplicate	1101229	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0012	0.0012	0.0012	0.0012	150	150	1,080	1,170	34,300	3.84	5,400	1,110	2,640	1,050	20,000
MW179	22 May 2024	0960 MW179_1.0-1.5_240522	Normal	EP2407047	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0014	0.0014	0.0014	0.0014	1,200	1,200	1,060	975	33,900	4.32	3,990	649	2,210	1,010	16,900
MW179	22 May 2024	0960 MW179_3.2-3.7_240522	Normal	EP2407047	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0014	0.0014	0.0014	0.0014											
MW179	22 May 2024	0960 MW179_5.9-6.4_240522	Normal	EP2407047	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0008	0.0106	0.0106	0.0106											
MW179	22 May 2024	0960 MW179_8.5-9.0_240522	Normal	EP2407047	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0052	0.0154	0.0154	0.0154											
MW180	23 May 2024	0960 MW180_1.0-1.5_240523	Normal	EP2407103	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0005	0.0154	0.0154	0.0154	146	146	919	1,020	29,200	5.00	4,450	740	2,300	1,120	17,500
MW181	23 May 2024	0960 MW181_1.5-2.0_240523	Normal	EP2407103	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0005	0.0154	0.0154	0.0154	146	146	919	1,020	29,200	5.00	4,450	740	2,300	1,120	17,500
MW211	22 May 2024	0960 MW211_240522	Normal	EP2407055	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	6.51	7.10	7.24	19	719	738	17.6	15.1	72	3	5	15	326		
MW233	22 May 2024	0960 MW233_240522	Normal	EP2407055	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	30.8	39.1	43.0	71	390	390	117	120	3,520	1.07	497	159	211	113	2,110
MW238	22 May 2024	0960 MW238_240522	Normal	EP2407045	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	18.4	26.7	29.6	10	729	740	62.2	57.4	1,060	4.00	840	20	33	75	1,190
MW238	22 May 2024	0960 QC129_240522	Field Duplicate	EP2407045	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	15.4	23.3	25.5	10	737	737	60.8	56.2	1,050	3.93	788	18	31	71	1,170
MW238	22 May 2024	0960 QC229_240522	Interlab Duplicate	1101229	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	31	43.41	48.73	48.73											
OTH103	23 May 2024	0960 OTH103_240523	Normal	EP2407105	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0009	0.0049	0.0056	0.0056	173	173	681	654	21,800	2.06	3,020	479	1,510	549	11,300
OTH106	22 May 2024	0960 OTH106_240522	Normal	EP2407043	0.0005	0.001	0.001	0.0005	0.001	0.0003	0.0003	0.0003	0.0005	0.0049	0.0056	0.											

Notes:
First-time detection of PFOA or PFOS+PFHxS

Notes:
First-time detection of PFOA or PFOS+PFHxS:

Date Field ID Matrix Type Lab Report Number			22 May 2024		RPD	22 May 2024		RPD	22 May 2024		RPD	22 May 2024		RPD	22 May 2024		RPD
			0960_MW168_240522	0960_QC119_240522		0960_MW168_240522	0960_QC219_240522		0960_SW210_240522	0960_QC124_240522		0960_SW210_240522	0960_QC224_240522				
			Water	Water		Water	Water		Water	Water		Water	Water				
			EP2407045	EP2407045		EP2407045	1101229		EP2407043	EP2407043		EP2407043	1101229				
	Unit	LOR															
PFAS - Perfluoroalkyl Sulfonic Acids																	
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005	0.08	0.08	0	0.08	0.11	32	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.0005	0.09	0.09	0	0.09	0.19	71	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005	0.77	0.81	5	0.77	1.6	70	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.0005	<0.01	<0.01	0	<0.01	0.03	40	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0003	0.15	0.16	6	0.15	0.26	54	0.0005	0.0010	67	0.0005	<0.005	0	0.0005	<0.005	
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
PFAS - Perfluoroalkyl Carboxylic Acids																	
Perfluorobutanoic acid (PFBA)	µg/L	0.002	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	0.05	0.06	18	0.05	0.06	18	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	0.21	0.21	0	0.21	0.37	55	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	0.02	0.02	0	0.02	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	0.03	0.03	0	0.03	0.04	29	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorononanoic acid (PFNA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorodecanoic acid (PFDA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorododecanoic acid (PFDoDA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
PFAS - (n:2) Fluorotelomer Sulfonic Acids																	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001	<0.05	<0.05	0	<0.05	<0.05	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.001	<0.05	<0.05	0	<0.05	<0.05	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001	<0.05	<0.05	0	<0.05	<0.05	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001	<0.05	<0.05	0	<0.05	<0.05	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
PFAS - Perfluoroalkyl Sulfonamides																	
Perfluorooctane sulfonamide (FOSA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.001	<0.05	<0.05	0	<0.05	<0.05	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.001	<0.05	<0.05	0	<0.05	<0.05	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.001	<0.05	<0.05	0	<0.05	<0.05	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.0005	<0.01	<0.01	0	<0.01	<0.01	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.001	<0.05	<0.05	0	<0.05	<0.05	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	
PFAS																	
Sum of PFHxS and PFOS	µg/L	0.0003	0.92	0.97	5	0.92	1.86	68	0.0005	0.0010	67	0.0005	<0.005	0	0.0005	<0.005	
Sum of PFAS (WA DER List)	µg/L	0.0003	1.31	1.37	4	1.31	2.44	60	0.0005	0.0010	67	0.0005	<0.005	0	0.0005	<0.005	
Sum of PFAS	µg/L	0.0003	1.40	1.46	4	1.40	2.71	64	0.0005	0.0010	67	0.0005	<0.005	0	0.0005	<0.005	

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

**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each LOR multiplier range are: No Limit (1 - 10 x LOR); 50 (10 - 20 x LOR); 20 (> 20 x LOR))

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

Date			22 May 2024	22 May 2024	RPD	22 May 2024	22 May 2024	RPD	22 May 2024	22 May 2024	RPD	22 May 2024	22 May 2024	RPD	22 May 2024	22 May 2024	RPD	22 May 2024	22 May 2024
Field ID	0960_MW137_0.8-1.3_240522	0960_QC125_240522	Field ID	0960_MW137_0.8-1.3_240522		0960_QC225_240522	Field ID		0960_MW1485_240522	0960_QC126_240522		Field ID	0960_MW1485_240522		0960_QC226_240522	Field ID		0960_MW127_240522	0960_QC127_240522
Matrix Type	Water	Water	Matrix Type	Water		Water	Matrix Type		Water	Water		Matrix Type	Water		Water	Matrix Type		Water	Water
Lab Report Number	EP2407047	EP2407047	Lab Report Number	EP2407047		1101229	Lab Report Number		EP2407045	EP2407045		Lab Report Number	EP2407045		1101229	Lab Report Number		EP2407055	EP2407055
	Unit	LOR																	
PFAS - Perfluoroalkyl Sulfonic Acids																			
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	5.77	4.18	32	5.77	6.3	9	<0.03	<0.03			
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	4.70	3.51	29	4.70	6.8	37	<0.02	<0.02			
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005	0.0009	0.0011	20	0.0009	0.002	76	22.5	15.8	35	22.5	31	32	0.01	<0.01			
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	2.69	2.18	21	2.69	2.8	4	<0.02	<0.02			
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0003	0.0015	0.0016	6	0.0015	0.002	29	24.8	16.4	41	24.8	37	39	<0.03	<0.03			
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005			
PFAS - Perfluoroalkyl Carboxylic Acids																			
Perfluorobutanoic acid (PFBA)	µg/L	0.002	<0.0005	<0.0005	0	<0.0005	<0.0005	0	1.3	1.0	26	1.3	1.1	17	<0.02	<0.02			
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	1.88	1.32	35	1.88	1.5	22	0.03	<0.03			
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	7.64	5.51	32	7.64	8.8	14	0.03	<0.03			
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	0.78	0.60	26	0.78	1.1	34	0.02	<0.02			
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	1.26	1.03	20	1.26	2.1	50	<0.02	<0.02			
Perfluorononanoic acid (PFNA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	0.01	0	<0.02	<0.02			
Perfluorodecanoic acid (PFDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.02	<0.02			
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.02	<0.02			
Perfluorododecanoic acid (PFDoDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
Perfluorotridecanoic acid (PFTriDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
PFAS - (n:2) Fluorotelomer Sulfonic Acids																			
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005			
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.001	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005			
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	0.01	0	<0.0005	<0.0005			
PFAS - Perfluoroalkyl Sulfonamides																			
Perfluorooctane sulfonamide (FOSA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.001	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.001	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.001	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.001	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.03	<0.03			
PFAS																			
Sum of PFHxS and PFOS	µg/L	0.0003	0.0024	0.0027	12	0.0024	0.004	50	47.3	32.2	38	47.3	68	36	0.01	<0.01			
Sum of PFAS (WA DER List)	µg/L	0.0003	0.0024	0.0027	12	0.0024		0	65.9	45.8	36	65.9	88.91	30	0.09	<0.09			
Sum of PFAS	µg/L	0.0003	0.0024	0.0027	12	0.0024		0	73.4	51.6	35	73.4	101.74	32	0.09	<0.09			

Date Field ID Matrix Type Lab Report Number			RPD	22 May 2024		RPD	22 May 2024		RPD	22 May 2024		RPD	22 May 2024		RPD	22 May 2024		RPD
				0960_MW122_240522	0960_QC227_240522		0960_MW238_240522	0960_QC129_240522		0960_MW238_240522	0960_QC229_240522		0960_MW021_240522	0960_QC130_240522		0960_MW021_240522	0960_QC230_240522	
				Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	
				EP2407055	1101229		EP2407045	EP2407045		EP2407045	1101229		EP2407055	EP2407055		EP2407055	1101229	
	Unit	LOR																
PFAS - Perfluoroalkyl Sulfonic Acids																		
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005	0	<0.01	<0.01	0	1.38	1.29	7	1.38	2.4	54	0.11	0.14	24	0.11	0.25	78
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.0005	0	<0.01	<0.01	0	1.26	1.16	8	1.26	2.8	76	0.15	0.17	13	0.15	0.36	82
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005	0	0.01	<0.01	0	9.80	8.23	17	9.80	17	54	0.86	1.12	26	0.86	2.1	84
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.0005	0	<0.01	<0.01	0	1.05	1.04	1	1.05	1.6	42	<0.01	0.03	40	<0.01	0.04	67
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0003	0	<0.01	<0.01	0	8.56	7.14	18	8.56	14	48	0.26	0.93	113	0.26	1.4	137
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
PFAS - Perfluoroalkyl Carboxylic Acids																		
Perfluorobutanoic acid (PFBA)	µg/L	0.002	0	<0.01	<0.01	0	0.5	0.5	0	0.5	0.74	39	<0.01	<0.01	0	<0.01	0.09	0
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	40	0.03	<0.01	100	1.05	0.97	8	1.05	1.2	13	0.08	0.09	12	0.08	0.13	48
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	40	0.03	<0.01	100	4.42	4.26	4	4.42	6.3	35	0.30	0.32	6	0.30	0.53	55
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	0	0.02	<0.01	0	0.34	0.34	0	0.34	0.54	45	0.04	0.04	0	0.04	0.06	40
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	0	<0.01	<0.01	0	0.61	0.57	7	0.61	1.2	65	0.01	0.03	100	0.01	0.06	143
Perfluorononanoic acid (PFNA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluorodecanoic acid (PFDA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluorotridecanoic acid (PFTriDA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
PFAS - (n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.001	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	0.03	0	<0.01	<0.01	0	<0.01	<0.01	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
PFAS - Perfluoroalkyl Sulfonamides																		
Perfluorooctane sulfonamide (FOSA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.001	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.001	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.001	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.0005	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.001	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
PFAS																		
Sum of PFHxS and PFOS	µg/L	0.0003	0	0.01	<0.01	0	18.4	15.4	18	18.4	31	51	1.12	2.05	59	1.12	3.5	103
Sum of PFAS (WA DER List)	µg/L	0.0003	160	0.09	<0.01	57	26.7	23.3	14	26.7	43.41	48	1.66	2.67	47	1.66	4.62	94
Sum of PFAS	µg/L	0.0003	160	0.09	<0.01	0	29.6	25.5	15	29.6	48.73	49	1.81	2.87	45	1.81	5.12	96

Date Field ID Matrix Type Lab Report Number			22 May 2024		22 May 2024		22 May 2024		22 May 2024		22 May 2024		22 May 2024		22 May 2024		22 May 2024	
			0960_MW164_240522	0960_QC131_240522	RPD	0960_MW164_240522	0960_QC231_240522	RPD	0960_OTH107_240522	0960_QC132_240522	RPD	0960_OTH107_240522	0960_QC232_240522	RPD	0960_SW192_240522	0960_QC133_240522	RPD	
			Water	Water		Water	Water		Water	Water		Water	Water					
			EP2407055	EP2407055		EP2407055	1101229		EP2407043	EP2407043		EP2407043	1101229		EP2407048	EP2407048		
	Unit	LOR																
PFAS - Perfluoroalkyl Sulfonic Acids																		
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005	0.08	0.42	136	0.08	1.8	183	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.0005	0.11	0.53	131	0.11	2.8	185	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005	0.81	3.27	121	0.81	15	180	<0.01	<0.01	0	<0.005	<0.005	0	<0.01	<0.01	0	
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.0005	0.03	0.16	137	0.03	0.62	182	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0003	0.86	1.26	38	0.86	4.9	140	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
PFAS - Perfluoroalkyl Carboxylic Acids																		
Perfluorobutanoic acid (PFBA)	µg/L	0.002		0.1	0		0.46	129	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	0.07	0.33	130	0.07	1.00	174	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	0.25	1.21	132	0.25	5.3	182	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	0.04	0.12	100	0.04	0.51	171	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	0.03	0.13	125	0.03	0.67	183	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorononanoic acid (PFNA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorodecanoic acid (PFDA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorododecanoic acid (PFDoDA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorotridecanoic acid (PFTriDA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
PFAS - (n:2) Fluorotelomer Sulfonic Acids																		
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.001			0		0.20	120	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
PFAS - Perfluoroalkyl Sulfonamides																		
Perfluorooctane sulfonamide (FOSA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.001			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.001			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.001			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.0005			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.001			0			0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
PFAS																		
Sum of PFHxS and PFOS	µg/L	0.0003	1.67	4.53	92	1.67	19.9	169	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Sum of PFAS (WA DER List)	µg/L	0.0003	2.14	6.84	105	2.14	29.84	173	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	
Sum of PFAS	µg/L	0.0003	2.28	7.53	107	2.28	34.2	175	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	

Date			22 May 2024		23 May 2024		23 May 2024		23 May 2024		23 May 2024		23 May 2024		23 May 2024		23 May 2024			
Field ID	Matrix Type	Lab Report Number	0960_SW192_240522	0960_QC233_240522	RPD	0960_MW178_4.0-4.5_240523	0960_QC134_240523	RPD	0960_MW178_4.0-4.5_240523	0960_QC134_240523	RPD	0960_SW304_240523	0960_QC135_240523	RPD	0960_SW304_240523	0960_QC235_240523	RPD			
			Water	Water		Water	Water		Water	Water		Water	Water		Water	Water		Water	Water	Water
			EP2407048	1101229		EP2407165	EP2407165		EP2407165	1101229		EP2407105	EP2407105		EP2407105	1101229		EP2407105	1101229	EP2407105
	Unit	LOR																		
PFAS - Perfluoroalkyl Sulfonic Acids																				
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0003	<0.003	<0.003	0	0.0007	0.0012	53	0.0007	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorodecane sulfonic acid (PFDS)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
PFAS - Perfluoroalkyl Carboxylic Acids																				
Perfluorobutanoic acid (PFBA)	µg/L	0.002	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	0.001	67	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorononanoic acid (PFNA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorodecanoic acid (PFDA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorododecanoic acid (PFDoDA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorotridecanoic acid (PFTriDA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
PFAS - (n:2) Fluorotelomer Sulfonic Acids																				
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.001	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	0.012	169	<0.005	<0.005	0	<0.005	<0.005	0			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
PFAS - Perfluoroalkyl Sulfonamides																				
Perfluorooctane sulfonamide (FOSA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.001	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	µg/L	0.001	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.001	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.0005	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.001	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
PFAS																				
Sum of PFHxS and PFOS	µg/L	0.0003	<0.003	<0.003	0	0.0007	0.0012	53	0.0007	<0.005	0	<0.005	<0.005	0	<0.005	<0.005	0			
Sum of PFAS (WA DER List)	µg/L	0.0003	<0.003	<0.003	0	0.0007	0.0012	53	0.0007	0.013	180	<0.005	<0.005	0	<0.005	<0.005	0			
Sum of PFAS	µg/L	0.0003	<0.003	<0.003	0	0.0007	0.0012	53	0.0007	0.013	180	<0.005	<0.005	0	<0.005	<0.005	0			

Date Field ID Matrix Type Lab Report Number			22 May 2024 0960_SS291_240522 Soil EP2407044	22 May 2024 0960_QC120_240522 Soil EP2407044	RPD	22 May 2024 0960_SS291_240522 Soil EP2407044	22 May 2024 0960_QC220_240522 Soil 1101229	RPD	22 May 2024 0960_SS122_240522 Soil EP2407046	22 May 2024 0960_QC121_240522 Soil EP2407046	RPD	22 May 2024 0960_SS122_240522 Soil EP2407046	22 May 2024 0960_QC221_240522 Soil 1101229	RPD	22 May 2024 0960_SS114_240522 Soil EP2407046	22 May 2024 0960_QC122_240522 Soil EP2407046	RPD
	Unit	LOR															
PFAS - Perfluoroalkyl Sulfonic Acids																	
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002			0			0			0			0			0
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002			0			0			0			0			0
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002			0			0			0			0			0
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002			0			0			0			0			0
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	0.0043	0.0040	7	0.0043	0.011	88	0.0124	0.0134	8	0.0124	0.016	25	0.0216	0.0276	24
Perfluorodecane sulfonic acid (PFDS)	mg/kg	0.0002	0.0003	0.0002	40	0.0003		0	0.0063	0.0071	12	0.0063	0.011	54	0.0009	0.0012	29
PFAS - Perfluoroalkyl Carboxylic Acids																	
Perfluorobutanoic acid (PFBA)	mg/kg	0.001			0			0			0			0			0
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002			0			0			0			0			0
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002			0			0			0			0			0
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002			0			0			0			0			0
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002			0			0			0			0			0
Perfluorononanoic acid (PFNA)	mg/kg	0.0002			0			0			0			0			0
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002			0			0	0.0004	0.0004	0	0.0004		0			0
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002			0			0	0.0006	0.0007	15	0.0006		0			0
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002			0			0	0.0004	0.0005	22	0.0004		0			0
Perfluorotridecanoic acid (PFTriDA)	mg/kg	0.0002			0			0			0			0			0
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005			0			0			0			0			0
PFAS - (n:2) Fluorotelomer Sulfonic Acids																	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005			0			0			0			0			0
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	mg/kg	0.0005			0			0			0			0			0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005			0			0			0			0			0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005			0			0			0			0			0
PFAS - Perfluoroalkyl Sulfonamides																	
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002			0			0			0			0			0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005			0			0			0			0			0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002			0			0			0			0			0
N-methyl perfluorooctane sulfonamidoethanol (MeFOSE)	mg/kg	0.0005			0			0			0			0			0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005			0			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002			0			0			0			0			0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005			0			0			0			0			0
PFAS																	
Sum of PFHxS and PFOS	mg/kg	0.0002	0.0043	0.0040	7	0.0043	0.011	88	0.0124	0.0134	8	0.0124	0.016	25	0.0216	0.0276	24
Sum of PFAS (WA DER List)	mg/kg	0.0002	0.0043	0.0040	7	0.0043	0.011	88	0.0124	0.0134	8	0.0124	0.016	25	0.0216	0.0276	24
Sum of PFAS	mg/kg	0.0002	0.0046	0.0042	9	0.0046		0	0.0201	0.0221	9	0.0201		0	0.0225	0.0288	25

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

**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each LOR multiplier range are: No Limit (1 - 10 x LOR); 50 (10 - 20 x LOR); 20 (> 20 x LOR)

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

APPENDIX

C

LABORATORY CERTIFICATES



now





Custody Document for Submissions via ALS Compass App

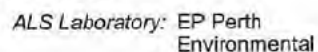
Project: WA-0960-PE/50MP-24 Client: Stantec Project Manager: _____
Phone: _____
ALS Compass COC Reference: 68063 # Samples: _____
68075; 68062; 68071; 68090; 68080 Sampler: _____
Phone: _____
Turnaround Requirements: Standard

Special Instructions:

Custody:

Relinquished by:  Date / Time: <u>22/5/24</u>	Received by:  Date / Time:  <u>1/6/24</u>	Relinquished by: Date / Time:	Received by: Date / Time:
--	---	--------------------------------------	----------------------------------

CHAIN OF CUSTODY COC#: 68061 ALS Laboratory: EP Perth Environmental		RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:			
		DATE TIME:		DATE TIME:		DATE TIME:		DATE TIME:			
CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD		TURNAROUND REQUIREMENTS : 5 Days				LABORATORY USE ONLY (Circle)					
PROJECT: WA_0960_PFASOMP_24											
SITE: Learmonth SW/OTH - SC		Biohazard info:				Custody Seal intact? Yes No N/A					
ORDER NO: pfas-omp Learmonth						Free ice / frozen ice bricks present upon receipt? Yes No N/A					
PROJECT MANAGER: [REDACTED]		CONTACT PH: [REDACTED]		SAMPLER MOBILE: [REDACTED]		Random Sample Temperature on Receipt: °C					
PRIMARY SAMPLER: [REDACTED]		QUOTE NO: SY/139/19 B		/ ES2022MWHAUS0002		Other comments:					
EMAIL REPORTS TO: [REDACTED]											
EMAIL INVOICES TO: [REDACTED]											
SAMPLE DETAILS							ANALYSIS REQUIRED				
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS WATERS - ST WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS		ADDITIONAL INFORMATION
001	0960_SW302		22/05/2024 07:55 AM	WATER	ALS: 3 Non ALS: 0	No		X			
002	0960_SW210		22/05/2024 08:54 AM	WATER	ALS: 3 Non ALS: 0	No	X	Partial 1/2			
003	0960_QC124		22/05/2024 09:01 AM	WATER	ALS: 3 Non ALS: 0	No	X	Partial 1/2			
004	0960_SW209		22/05/2024 10:59 AM	WATER	ALS: 4 Non ALS: 0	No	X	Partial 1/2			
005	0960_SW305		22/05/2024 11:44 AM	WATER	ALS: 3 Non ALS: 0	No	X	Partial 1/2			
006	0960_SW207	Lab QC bottles added	22/05/2024 11:59 AM	WATER	ALS: 5 Non ALS: 0	No		X			
007	0960_OTH107		22/05/2024 01:22 PM	WATER	ALS: 3 Non ALS: 0	No	X	Partial 1/2			



RECEIVED BY:

DATE TIME:

EMAIL INVOICES TO:

/ ES2022MWHHAUS0002

Biohazard info:

C

Other comments:

ANALYSIS REQUIRED



ALS Laboratory: EP Perth
Environmental

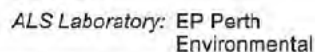
RECEIVED BY:

DATE TIME:

EMAIL INVOICES TO:

/ ES2022MWHAUS0002

Other comments:



RECEIVED BY:

DATE TIME:

EMAIL INVOICES TO:

Biohazard info:

C

Other comments:

4 of 4



CHAIN OF CUSTODY

COC#: 68061

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

Other comments:

008	0960_QC132	Clear Plastic Bottle - Natural	125 mL	00071121181854	Green	No	
009	0960_OTH106	Clear Plastic Bottle - Natural	125 mL	00071121181801	Green	No	
009	0960_OTH106	HDPE (no PTFE)	125 mL	00350423000345	Grey	No	
009	0960_OTH106	HDPE (no PTFE)	125 mL	00350423000330	Grey	No	
010	0960_SW208	Clear Plastic Bottle - Natural	125 mL	00071121181556	Green	No	
010	0960_SW208	HDPE (no PTFE)	125 mL	00350121019509	Grey	No	
010	0960_SW208	HDPE (no PTFE)	125 mL	00350121019538	Grey	No	
011	0960_SW205	Clear Plastic Bottle - Natural	125 mL	00071121181899	Green	No	
011	0960_SW205	HDPE (no PTFE)	20 mL	00352312011883	Grey	No	
011	0960_SW205	HDPE (no PTFE)	20 mL	00352312011911	Grey	No	
012	0960_SW301	Clear Plastic Bottle - Natural	125 mL	00071121181875	Green	No	
012	0960_SW301	HDPE (no PTFE)	125 mL	00352106002080	Grey	No	
012	0960_SW301	HDPE (no PTFE)	125 mL	00352106002048	Grey	No	

Total Bottle Count: ALS: 39, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407043

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

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

E-mail :
stantec.com
Telephone :
Facsimile :

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68061
Site : Learmonth SW/OTH - SC
Sampler :

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

Dates

Date Samples Received : 24-May-2024 11:00
Client Requested Due : 06-Jun-2024
Date

Issue Date : 29-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 3
Receipt Detail :

Security Seal : Not Available
Temperature : 17.1 - Ice present
No. of samples received / analysed : 12 / 12

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2407043	Page	: 1 of 18
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68061	Issue Date	: 06-Jun-2024 19:02
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SW/OTH - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Inorganics Analyst	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X: High matrix spike recovery deemed acceptable as all associated analyte results are less than LOR.
- 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 or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW302_240522	0960_SW210_240522	0960_QC124_240522	0960_SW209_240522	0960_SW305_240522
Sampling date / time				22-May-2024 07:55	22-May-2024 08:54	22-May-2024 09:01	22-May-2024 10:59	22-May-2024 11:44
Compound	CAS Number	LOR	Unit	EP2407043-001	EP2407043-002	EP2407043-003	EP2407043-004	EP2407043-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	196	182	182	138	130
Total Alkalinity as CaCO ₃	----	1	mg/L	196	182	182	138	130
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	3230	3280	3280	2800	2780
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	24100	25200	27700	18800	22400
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	557	550	555	486	490
Magnesium	7439-95-4	1	mg/L	1740	1740	1740	1490	1500
Sodium	7440-23-5	1	mg/L	13000	13000	13000	11100	11200
Potassium	7440-09-7	1	mg/L	731	723	728	630	632
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	751	783	853	591	692
☐ Total Cations	----	0.01	meq/L	755	755	755	646	651
☐ Ionic Balance	----	0.01	%	0.28	1.83	6.11	4.40	3.06
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW302_240522	0960_SW210_240522	0960_QC124_240522	0960_SW209_240522	0960_SW305_240522
Sampling date / time					22-May-2024 07:55	22-May-2024 08:54	22-May-2024 09:01	22-May-2024 10:59	22-May-2024 11:44
Compound	CAS Number	LOR	Unit	EP2407043-001	EP2407043-002	EP2407043-003	EP2407043-004	EP2407043-005	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	----	0.0005	0.0010	0.0003	0.0003	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	----	0.0005	0.0005	0.0005	0.0005	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.01	----	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.02	----	----	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	----	<0.002	<0.002	<0.002	<0.002	
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	----	0.0005	0.0005	0.0005	0.0005	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW302_240522	0960_SW210_240522	0960_QC124_240522	0960_SW209_240522	0960_SW305_240522
Sampling date / time					22-May-2024 07:55	22-May-2024 08:54	22-May-2024 09:01	22-May-2024 10:59	22-May-2024 11:44
Compound	CAS Number	LOR	Unit	EP2407043-001	EP2407043-002	EP2407043-003	EP2407043-004	EP2407043-005	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW302_240522	0960_SW210_240522	0960_QC124_240522	0960_SW209_240522	0960_SW305_240522
Sampling date / time					22-May-2024 07:55	22-May-2024 08:54	22-May-2024 09:01	22-May-2024 10:59	22-May-2024 11:44
Compound	CAS Number	LOR	Unit	EP2407043-001	EP2407043-002	EP2407043-003	EP2407043-004	EP2407043-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001
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	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001
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	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L	----	0.0005	0.0010	<0.0003	<0.0003	<0.0003
Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	----	0.0005	0.0010	<0.0003	<0.0003	<0.0003
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	----	0.0005	0.0010	<0.0003	<0.0003	<0.0003



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW302_240522	0960_SW210_240522	0960_QC124_240522	0960_SW209_240522	0960_SW305_240522
Sampling date / time					22-May-2024 07:55	22-May-2024 08:54	22-May-2024 09:01	22-May-2024 10:59	22-May-2024 11:44
Compound	CAS Number	LOR	Unit		EP2407043-001	EP2407043-002	EP2407043-003	EP2407043-004	EP2407043-005
				Result	Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued									
Sum of PFAS (WA DER List)	---	0.01	µg/L		<0.01	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0005	%		----	88.9	92.3	96.7	111
13C4-PFOS	---	0.02	%		92.4	----	----	----	----
13C8-PFOA	----	0.0005	%		----	108	96.3	95.0	99.5
13C8-PFOA	---	0.02	%		100	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW207_240522	0960_OTH107_240522 2	0960_QC132_240522	0960_OTH106_240522 2	0960_SW208_240522
Sampling date / time				22-May-2024 11:59	22-May-2024 13:22	22-May-2024 13:23	22-May-2024 13:45	22-May-2024 14:06
Compound	CAS Number	LOR	Unit	EP2407043-006	EP2407043-007	EP2407043-008	EP2407043-009	EP2407043-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	126	144	138	183	126
Total Alkalinity as CaCO ₃	---	1	mg/L	126	144	138	183	126
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	2790	2670	2670	2660	2660
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	24100	23200	22200	22000	22200
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	485	454	456	459	452
Magnesium	7439-95-4	1	mg/L	1480	1460	1440	1450	1420
Sodium	7440-23-5	1	mg/L	11100	10800	10700	10900	10600
Potassium	7440-09-7	1	mg/L	627	601	599	609	596
EN055: Ionic Balance								
☐ Total Anions	---	0.01	meq/L	740	713	684	680	684
☐ Total Cations	---	0.01	meq/L	645	628	622	632	616
☐ Ionic Balance	---	0.01	%	6.90	6.34	4.79	3.64	5.26
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	---	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	---	---	---	---
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	---	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	---	---	---	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	---	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	---	---	---	---



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW207_240522	0960_OTH107_24052 2	0960_QC132_240522	0960_OTH106_24052 2	0960_SW208_240522
Sampling date / time					22-May-2024 11:59	22-May-2024 13:22	22-May-2024 13:23	22-May-2024 13:45	22-May-2024 14:06
Compound	CAS Number	LOR	Unit	EP2407043-006	EP2407043-007	EP2407043-008	EP2407043-009	EP2407043-010	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	----	<0.002	<0.002	<0.002	<0.002	
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoropentanoic acid (PFPeA)	2706 90 3	0.02	µg/L	<0.02	----	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW207_240522	0960_OTH107_240522 2	0960_QC132_240522	0960_OTH106_240522 2	0960_SW208_240522
Sampling date / time					22-May-2024 11:59	22-May-2024 13:22	22-May-2024 13:23	22-May-2024 13:45	22-May-2024 14:06
Compound	CAS Number	LOR	Unit	EP2407043-006	EP2407043-007	EP2407043-008	EP2407043-009	EP2407043-010	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW207_240522	0960_OTH107_24052 2	0960_QC132_240522	0960_OTH106_24052 2	0960_SW208_240522
Sampling date / time					22-May-2024 11:59	22-May-2024 13:22	22-May-2024 13:23	22-May-2024 13:45	22-May-2024 14:06
Compound	CAS Number	LOR	Unit	EP2407043-006	EP2407043-007	EP2407043-008	EP2407043-009	EP2407043-010	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	----	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001
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	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001
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	0.001	µg/L	----	<0.001	<0.001	<0.001	<0.001	<0.001
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	----	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW207_240522	0960_OTH107_240522 2	0960_QC132_240522	0960_OTH106_240522 2	0960_SW208_240522
Sampling date / time					22-May-2024 11:59	22-May-2024 13:22	22-May-2024 13:23	22-May-2024 13:45	22-May-2024 14:06
Compound	CAS Number	LOR	Unit	EP2407043-006	EP2407043-007	EP2407043-008	EP2407043-009	EP2407043-010	
				Result	Result	Result	Result	Result	
EP231P: PFAS Sums - Continued									
Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.01	----	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0005	%	----	91.4	96.4	104	92.2	
13C4-PFOS	---	0.02	%	92.3	----	----	----	----	
13C8-PFOA		0.0005	%	----	94.6	94.6	96.5	93.5	
13C8-PFOA	----	0.02	%	109	----	----	----	----	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW205_240522	0960_SW301_240522	----	----	----
Sampling date / time				22-May-2024 14:29	22-May-2024 14:45	----	----	----
Compound	CAS Number	LOR	Unit	EP2407043-011	EP2407043-012	-----	-----	-----
				Result	Result	---	---	---
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	188	200	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	188	200	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3280	3480	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	25300	26200	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	583	630	----	----	----
Magnesium	7439-95-4	1	mg/L	1690	1790	----	----	----
Sodium	7440-23-5	1	mg/L	12600	13400	----	----	----
Potassium	7440-09-7	1	mg/L	726	779	----	----	----
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	786	816	----	----	----
☐ Total Cations	----	0.01	meq/L	735	782	----	----	----
☐ Ionic Balance	----	0.01	%	3.35	2.13	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	----	<0.0005	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

0960_SW205_240522	0960_SW301_240522	----	----	----
22-May-2024 14:29	22-May-2024 14:45	----	----	----
EP2407043-011	EP2407043-012	-----	-----	-----
Result	Result	---	---	---

Compound	CAS Number	LOR	Unit
----------	------------	-----	------

EP231A: Perfluoroalkyl Sulfonic Acids - Continued

Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	----	<0.0005	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	----	<0.0003	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.02	----	----	----	----

EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	----	<0.002	----	----	----
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	----	0.0005	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	----	<0.0005	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	----	<0.0005	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

0960_SW205_240522	0960_SW301_240522	----	----	----
22-May-2024 14:29	22-May-2024 14:45	----	----	----
Compound	CAS Number	LOR	Unit	
	EP2407043-011		EP2407043-012	
	Result		Result	

EP231B: Perfluoroalkyl Carboxylic Acids - Continued

Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	----	<0.0005	----	----	----
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	----	<0.001	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	----	<0.001	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	----	<0.001	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	----	<0.001	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	----	<0.0005	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW205_240522	0960_SW301_240522	----	----	----
Sampling date / time				22-May-2024 14:29	22-May-2024 14:45	----	----	----	
Compound	CAS Number	LOR	Unit	EP2407043-011	EP2407043-012	-----	-----	-----	
				Result	Result	---	---	---	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	----	<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	----	<0.001	----	----	----	----
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	0.001	µg/L	----	<0.001	----	----	----	----
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	0.001	µg/L	----	<0.001	----	----	----	----
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	0.001	µg/L	----	<0.001	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0003	µg/L	----	<0.0003	----	----	----	----
Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	----	<0.0003	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	----	<0.0003	----	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW205_240522	0960_SW301_240522	----	----	----
Sampling date / time					22-May-2024 14:29	22-May-2024 14:45	----	----	----
Compound	CAS Number	LOR	Unit		EP2407043-011	EP2407043-012	-----	-----	-----
				Result	Result		---	---	---
EP231P: PFAS Sums - Continued									
Sum of PFAS (WA DER List)	---	0.01	µg/L		<0.01	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0005	%		----	98.8	----	----	----
13C4-PFOS	---	0.02	%		93.5	----	----	----	----
13C8-PFOA	----	0.0005	%		----	94.9	----	----	----
13C8-PFOA	---	0.02	%		111	----	----	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407043	Page	: 1 of 10
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68061	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SW/OTH - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 12		
No. of samples analysed	: 12		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Inorganics Analyst	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5825131)									
EP2407043-002	0960_SW210_240522	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	182	182	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	182	182	0.0	0% - 20%
EP2407043-010	0960_SW208_240522	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	126	126	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	126	126	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5823559)									
EP2407043-001	0960_SW302_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3230	3230	0.1	0% - 20%
EP2407043-011	0960_SW205_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3280	3310	0.9	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5823560)									
EP2407043-001	0960_SW302_240522	ED045G: Chloride	16887-00-6	1	mg/L	24100	23300	3.6	0% - 20%
EP2407043-011	0960_SW205_240522	ED045G: Chloride	16887-00-6	1	mg/L	25300	24600	3.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5825042)									
EP2407043-001	0960_SW302_240522	ED093F: Calcium	7440-70-2	1	mg/L	557	561	0.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1740	1740	0.4	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	13000	13000	0.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	731	735	0.6	0% - 20%
EP2407043-011	0960_SW205_240522	ED093F: Calcium	7440-70-2	1	mg/L	583	581	0.3	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1690	1680	0.7	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	12600	12500	1.2	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 (%)		
ED093F: Dissolved Major Cations (QC Lot: 5825042) - continued											
EP2407043-011	0960_SW205_240522	ED093F: Potassium	7440-09-7	1	mg/L	726	724	0.2	0% - 20%		
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838657)											
EP2407043-006	0960_SW207_240522	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		
EP2407045-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	3.88	3.67	5.3	0% - 20%		
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.95	2.05	5.1	0% - 20%		
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.02	1.04	1.8	0% - 20%		
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.71	0.73	3.2	0% - 20%		
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.32	0.28	11.8	0% - 50%		
		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: 5838657)											
EP2407043-006	0960_SW207_240522	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		
		EP2407045-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.23	0.21	6.4	0% - 20%
				EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.28	0.30	6.1	0% - 50%
				EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.18	1.27	6.8	0% - 20%
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9			0.02	µg/L	0.15	0.14	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	0.2	0.3	0.0	No Limit				



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838657)									
EP2407043-006	0960_SW207_240522	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
EP2407045-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5838657)									
EP2407043-006	0960_SW207_240522	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
EP2407045-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5838657) - continued									
EP2407045-005	Anonymous	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: 5838657)									
EP2407043-006	0960_SW207_240522	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
EP2407045-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	9.92	9.99	0.7	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	5.83	5.72	1.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	8.89	8.98	1.0	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5825131)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	93.1	85.1	126
				<1	200 mg/L	97.2	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5823559)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	89.9	112
				<1	500 mg/L	100	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5823560)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	94.8	88.6	113
				<1	1000 mg/L	102	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5825042)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	101	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.9	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.1	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	95.4	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5837016)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	105	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	97.4	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	101	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	106	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	91.8	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
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657)								
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	95.7	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	98.4	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	106	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	91.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	101	53.0	142



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5837016)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	99.4	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	112	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	113	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	109	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	107	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	110	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	115	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	114	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	128	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	101	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838657)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	91.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	97.2	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	111	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	111	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	94.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	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	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	104	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5837016)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	117	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	101	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	101	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	111	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	112	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	93.2	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	95.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	116	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	102	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	97.2	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	116	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	110	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	103	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5837016)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	91.6	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	102	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	105	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: 5838657)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	102	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	104	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	102	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	108	64.2	133
EP231P: PFAS Sums (QCLot: 5837016)								
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: 5838657)								
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**

Matrix Spike (MS) Report



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5823559)							
EP2407043-001	0960_SW302_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5823560)							
EP2407043-001	0960_SW302_240522	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	96.8	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	98.8	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	# Not Determined	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	99.6	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	95.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	105	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	85.9	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	88.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	92.1	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	93.0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	105	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	97.3	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	102	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	90.9	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.25 µg/L	108	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	104	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	95.4	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	98.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	100.0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	107	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	102	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	101	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	101	61.0	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	99.7	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	107	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	126	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	# 143	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407043	Page	: 1 of 8
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Site	: Learmonth SW/OTH - SC	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 12
Order number	: pfas-omp Learmonth	No. of samples analysed	: 12

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

- 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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO ₄ 2- by DA	EP2407043--001	0960_SW302_240522	Sulfate as SO ₄ - 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	EP2407043--001	0960_SW302_240522	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407045--003	Anonymous	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231D: (n:2) Fluorotelomer Sulfonic Acids	EP2407045--003	Anonymous	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	143 %	70.0-130%	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural							
0960_SW302_240522,	0960_SW210_240522,	---	---	---	31-May-2024	29-May-2024	2
0960_QC124_240522,	0960_SW209_240522,						
0960_SW305_240522,	0960_SW207_240522,						
0960_OTH107_240522,	0960_QC132_240522,						
0960_OTH106_240522,	0960_SW208_240522,						
0960_SW205_240522,	0960_SW301_240522						

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

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

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

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

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		22-May-2024	---	---	---	30-May-2024	05-Jun-2024	✓
0960_SW302_240522,	0960_SW210_240522,							
0960_QC124_240522,	0960_SW209_240522,							
0960_SW305_240522,	0960_SW207_240522,							
0960_OTH107_240522,	0960_QC132_240522,							
0960_OTH106_240522,	0960_SW208_240522,							
0960_SW205_240522,	0960_SW301_240522							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)		22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✓
0960_SW302_240522,	0960_SW210_240522,							
0960_QC124_240522,	0960_SW209_240522,							
0960_SW305_240522,	0960_SW207_240522,							
0960_OTH107_240522,	0960_QC132_240522,							
0960_OTH106_240522,	0960_SW208_240522,							
0960_SW205_240522,	0960_SW301_240522							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)		22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✓
0960_SW302_240522,	0960_SW210_240522,							
0960_QC124_240522,	0960_SW209_240522,							
0960_SW305_240522,	0960_SW207_240522,							
0960_OTH107_240522,	0960_QC132_240522,							
0960_OTH106_240522,	0960_SW208_240522,							
0960_SW205_240522,	0960_SW301_240522							
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)		22-May-2024	---	---	---	31-May-2024	29-May-2024	✗
0960_SW302_240522,	0960_SW210_240522,							
0960_QC124_240522,	0960_SW209_240522,							
0960_SW305_240522,	0960_SW207_240522,							
0960_OTH107_240522,	0960_QC132_240522,							
0960_OTH106_240522,	0960_SW208_240522,							
0960_SW205_240522,	0960_SW301_240522							



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X-ST) 0960_SW210_240522, 0960_SW209_240522, 0960_OTH107_240522, 0960_OTH106_240522, 0960_SW301_240522	0960_QC124_240522, 0960_SW305_240522, 0960_QC132_240522, 0960_SW208_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_SW302_240522, 0960_SW205_240522	0960_SW207_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X-ST) 0960_SW210_240522, 0960_SW209_240522, 0960_OTH107_240522, 0960_OTH106_240522, 0960_SW301_240522	0960_QC124_240522, 0960_SW305_240522, 0960_QC132_240522, 0960_SW208_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_SW302_240522, 0960_SW205_240522	0960_SW207_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X-ST) 0960_SW210_240522, 0960_SW209_240522, 0960_OTH107_240522, 0960_OTH106_240522, 0960_SW301_240522	0960_QC124_240522, 0960_SW305_240522, 0960_QC132_240522, 0960_SW208_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_SW302_240522, 0960_SW205_240522	0960_SW207_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X-ST) 0960_SW210_240522, 0960_SW209_240522, 0960_OTH107_240522, 0960_OTH106_240522, 0960_SW301_240522	0960_QC124_240522, 0960_SW305_240522, 0960_QC132_240522, 0960_SW208_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_SW302_240522, 0960_SW205_240522	0960_SW207_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X-ST) 0960_SW210_240522, 0960_SW209_240522, 0960_OTH107_240522, 0960_OTH106_240522, 0960_SW301_240522	0960_QC124_240522, 0960_SW305_240522, 0960_QC132_240522, 0960_SW208_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	05-Jun-2024	18-Nov-2024	✔
HDPE (no PTFE) (EP231X) 0960_SW302_240522, 0960_SW205_240522	0960_SW207_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	20	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	20	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

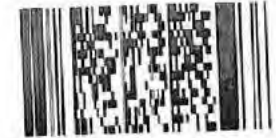
The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, 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 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
---------------------	--------	--------	---------------------



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.



Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASDMP-24 Client: Stantec

Project Manager:

Phone:

ALS Compass COC Reference: 68063; 68071; 68072; 68073; 68074; 68075; 68076; 68077; 68078; 68079; 68080 # Samples:

Sampler:

Phone:

Turnaround Requirements: Standard

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Date / Time:

Date / Time:



CHAIN OF CUSTODY

COC#: 68062 ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth SD - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

CONTACT PH:

SAMPLER MOBILE:

PRIMARY SAMPLER:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SS227		22/05/2024 07:55 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_SS291		22/05/2024 08:23 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
003	0960_QC120		22/05/2024 08:23 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
004	0960_SS292		22/05/2024 08:32 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
005	0960_SS293		22/05/2024 08:38 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
006	0960_SS198		22/05/2024 08:43 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
007	0960_SD210		22/05/2024 08:50 AM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 68062

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth SD - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

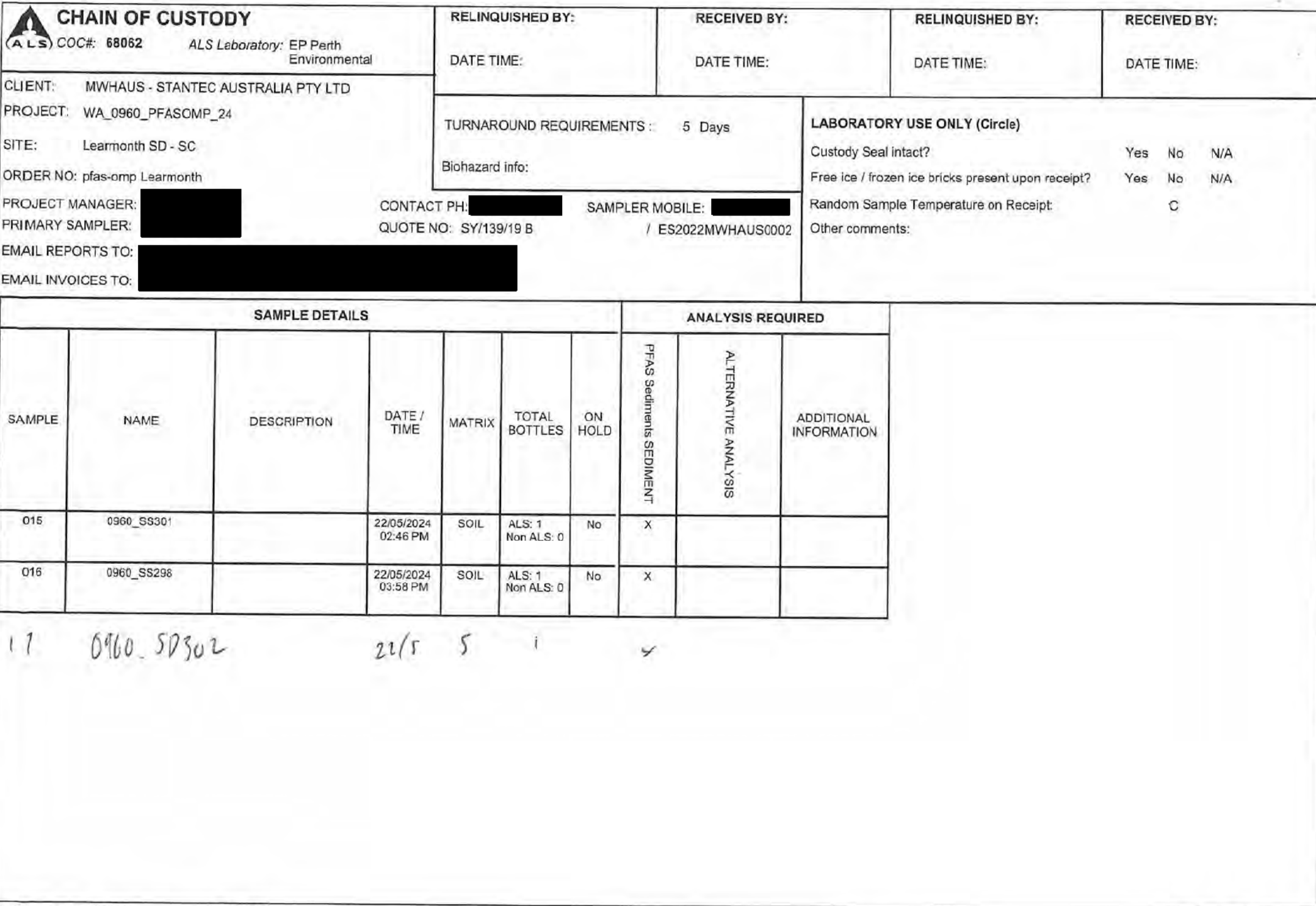
°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_QC123		22/05/2024 08:51 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
009	0960_SD209		22/05/2024 10:59 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
010	0960_QC128		22/05/2024 10:59 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
011	0960_SD305		22/05/2024 11:46 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
012	0960_SD207		22/05/2024 11:58 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
013	0960_SD208		22/05/2024 02:07 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
014	0960_SD205		22/05/2024 02:28 PM	SOIL	ALS: 1 Non ALS: 0	No	X		





CHAIN OF CUSTODY

COC#: 68062

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth SD - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SS227	HDPE Soil Jar	200 mL	00621222053686	Grey	No	
002	0960_SS291	HDPE Soil Jar	200 mL	00620322054936	Grey	No	
003	0960_QC120	HDPE Soil Jar	200 mL	00621122048934	Grey	No	
004	0960_SS292	HDPE Soil Jar	200 mL	00620322054926	Grey	No	
005	0960_SS293	HDPE Soil Jar	200 mL	00620322054927	Grey	No	
006	0960_SS198	HDPE Soil Jar	200 mL	00621122003342	Grey	No	
007	0960_SD210	HDPE Soil Jar	200 mL	00621122003387	Grey	No	
008	0960_QC123	HDPE Soil Jar	200 mL	00620322054950	Grey	No	
009	0960_SD209	HDPE Soil Jar	200 mL	00620322054921	Grey	No	
010	0960_QC128	HDPE Soil Jar	200 mL	00621222067117	Grey	No	
011	0960_SD305	HDPE Soil Jar	200 mL	00620322054958	Grey	No	
012	0960_SD207	HDPE Soil Jar	200 mL	00621122003380	Grey	No	
013	0960_SD208	HDPE Soil Jar	200 mL	00621222053654	Grey	No	
014	0960_SD205	HDPE Soil Jar	200 mL	00620322054854	Grey	No	
015	0960_SS301	HDPE Soil Jar	200 mL	00621222053582	Grey	No	
016	0960_SS298	HDPE Soil Jar	200 mL	00620322054867	Grey	No	

Total Bottle Count: ALS: 16, Non ALS: 0





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 (30 analytes)
EP2407044-001	22-May-2024 07:55	0960_SS227_240522	✓	✓
EP2407044-002	22-May-2024 08:23	0960_SS291_240522	✓	✓
EP2407044-003	22-May-2024 08:23	0960_QC120_240522	✓	✓
EP2407044-004	22-May-2024 08:32	0960_SS292_240522	✓	✓
EP2407044-005	22-May-2024 08:38	0960_SS293_240522	✓	✓
EP2407044-006	22-May-2024 08:43	0960_SS198_240522	✓	✓
EP2407044-007	22-May-2024 08:50	0960_SD210_240522	✓	✓
EP2407044-008	22-May-2024 08:51	0960_QC123_240522	✓	✓
EP2407044-009	22-May-2024 10:59	0960_SD209_240522	✓	✓
EP2407044-010	22-May-2024 10:59	0960_QC128_240522	✓	✓
EP2407044-011	22-May-2024 11:46	0960_SD305_240522	✓	✓
EP2407044-012	22-May-2024 11:58	0960_SD207_240522	✓	✓
EP2407044-013	22-May-2024 14:07	0960_SD208_240522	✓	✓
EP2407044-014	22-May-2024 14:28	0960_SD205_240522	✓	✓
EP2407044-015	22-May-2024 14:46	0960_SS301_240522	✓	✓
EP2407044-016	22-May-2024 15:58	0960_SS298_240522	✓	✓
EP2407044-017	22-May-2024 00:00	0967_SD302_240522	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

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



CERTIFICATE OF ANALYSIS

Work Order	: EP2407044	Page	: 1 of 11
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 04-Jun-2024
C-O-C number	: 68062	Issue Date	: 05-Jun-2024 16:19
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 17		
No. of samples analysed	: 17		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SS227_240522	0960_SS291_240522	0960_QC120_240522	0960_SS292_240522	0960_SS293_240522
Sampling date / time				22-May-2024 07:55	22-May-2024 08:23	22-May-2024 08:23	22-May-2024 08:32	22-May-2024 08:38
Compound	CAS Number	LOR	Unit	EP2407044-001	EP2407044-002	EP2407044-003	EP2407044-004	EP2407044-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	0.5	1.6	1.5	0.5	3.8
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	0.0027	0.0043	0.0040	0.0004	0.0025
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0003	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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS227_240522	0960_SS291_240522	0960_QC120_240522	0960_SS292_240522	0960_SS293_240522
Sampling date / time					22-May-2024 07:55	22-May-2024 08:23	22-May-2024 08:23	22-May-2024 08:32	22-May-2024 08:38
Compound	CAS Number	LOR	Unit	EP2407044-001	EP2407044-002	EP2407044-003	EP2407044-004	EP2407044-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0027	0.0046	0.0042	0.0004	0.0025	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0027	0.0043	0.0040	0.0004	0.0025	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0027	0.0043	0.0040	0.0004	0.0025	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	122	116	111	112	115	
13C8-PFOA	---	0.0002	%	125	114	113	112	119	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SS198_240522	0960_SD210_240522	0960_QC123_240522	0960_SD209_240522	0960_QC128_240522
Sampling date / time				22-May-2024 08:43	22-May-2024 08:50	22-May-2024 08:51	22-May-2024 10:59	22-May-2024 10:59
Compound	CAS Number	LOR	Unit	EP2407044-006	EP2407044-007	EP2407044-008	EP2407044-009	EP2407044-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	13.2	20.6	20.1	25.8	25.8
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	0.0031	0.0008	0.0011	<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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS198_240522	0960_SD210_240522	0960_QC123_240522	0960_SD209_240522	0960_QC128_240522
Sampling date / time					22-May-2024 08:43	22-May-2024 08:50	22-May-2024 08:51	22-May-2024 10:59	22-May-2024 10:59
Compound	CAS Number	LOR	Unit	EP2407044-006	EP2407044-007	EP2407044-008	EP2407044-009	EP2407044-010	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0031	0.0008	0.0011	<0.0002	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0031	0.0008	0.0011	<0.0002	<0.0002	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0031	0.0008	0.0011	<0.0002	<0.0002	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	114	120	111	113	110	
13C8-PFOA	---	0.0002	%	127	117	124	116	119	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SD305_240522	0960_SD207_240522	0960_SD208_240522	0960_SD205_240522	0960_SS301_240522
Sampling date / time				22-May-2024 11:46	22-May-2024 11:58	22-May-2024 14:07	22-May-2024 14:28	22-May-2024 14:46
Compound	CAS Number	LOR	Unit	EP2407044-011	EP2407044-012	EP2407044-013	EP2407044-014	EP2407044-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	16.3	24.2	24.6	29.3	35.0
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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SD305_240522	0960_SD207_240522	0960_SD208_240522	0960_SD205_240522	0960_SS301_240522
Sampling date / time					22-May-2024 11:46	22-May-2024 11:58	22-May-2024 14:07	22-May-2024 14:28	22-May-2024 14:46
Compound	CAS Number	LOR	Unit	EP2407044-011	EP2407044-012	EP2407044-013	EP2407044-014	EP2407044-015	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	—	0.0002	mg/kg	<0.0002	<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	%	113	112	116	114	109	
13C8-PFOA	—	0.0002	%	122	116	126	124	118	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS298_240522	0967_SD302_240522	----	----	----
Sampling date / time				22-May-2024 15:58	22-May-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EP2407044-016	EP2407044-017	-----	-----	-----
				Result	Result	---	---	---
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	14.1	26.6	----	----	----
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	<0.0002	<0.0002	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS298_240522	0967_SD302_240522	----	----	----
Sampling date / time				22-May-2024 15:58	22-May-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EP2407044-016	EP2407044-017	-----	-----	-----
				Result	Result	---	---	---
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	---	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
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	%	109	116	----	----	----
13C8-PFOA	---	0.0002	%	113	128	----	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407044	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 04-Jun-2024
C-O-C number	: 68062	Issue Date	: 05-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 17		
No. of samples analysed	: 17		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 5825082)									
EP2407044-001	0960_SS227_240522	EA055: Moisture Content	----	0.1	%	0.5	0.4	26.1	No Limit
EP2407044-011	0960_SD305_240522	EA055: Moisture Content	----	0.1	%	16.3	17.5	6.9	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5823458)									
EP2407044-001	0960_SS227_240522	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	0.0027	0.0027	0.0	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2407044-011	0960_SD305_240522	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: 5823458)									
EP2407044-001	0960_SS227_240522	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



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: 5823458) - continued											
EP2407044-001	0960_SS227_240522	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		
EP2407044-011	0960_SD305_240522	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: 5823458)									
		EP2407044 001	0960 SS227 240522	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		
EP2407044-011	0960_SD305_240522	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		



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5823458) - continued									
EP2407044-011	0960_SD305_240522	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5823458)									
EP2407044-001	0960_SS227_240522	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
EP2407044-011	0960_SD305_240522	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5823458)									
EP2407044-001	0960_SS227_240522	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0027	0.0027	0.0	0% - 50%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0027	0.0027	0.0	0% - 50%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0027	0.0027	0.0	0% - 50%
EP2407044-011	0960_SD305_240522	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	---	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit

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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
		LCS	Low	High
Result				
<0.0002	0.0011 mg/kg	98.2	72.0	128
<0.0002	0.00125 mg/kg	78.4	73.0	123
<0.0002	0.00118 mg/kg	87.7	67.0	130
<0.0002	0.00119 mg/kg	105	70.0	132
<0.0002	0.00116 mg/kg	94.8	68.0	136
<0.0002	0.0012 mg/kg	96.2	59.0	134
<0.001	0.00625 mg/kg	107	71.0	135
<0.0002	0.00125 mg/kg	102	69.0	132
<0.0002	0.00125 mg/kg	102	70.0	132
<0.0002	0.00125 mg/kg	87.2	71.0	131
<0.0002	0.00125 mg/kg	91.6	69.0	133
<0.0002	0.00125 mg/kg	94.4	72.0	129
<0.0002	0.00125 mg/kg	102	69.0	133
<0.0002	0.00125 mg/kg	97.6	64.0	136
<0.0002	0.00125 mg/kg	99.6	69.0	135
<0.0002	0.00125 mg/kg	84.0	66.0	139
<0.0005	0.00125 mg/kg	103	69.0	133
<0.0002	0.00125 mg/kg	93.6	67.0	137
<0.0005	0.00312 mg/kg	111	59.6	143
<0.0005	0.00312 mg/kg	99.7	62.8	140
<0.0005	0.00312 mg/kg	102	61.5	139
<0.0005	0.00312 mg/kg	109	61.9	139
<0.0002	0.00125 mg/kg	92.8	63.0	144
<0.0002	0.00125 mg/kg	92.4	61.0	139

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823458) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	102	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	104	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	115	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	111	54.8	124
EP231P: PFAS Sums (QCLot: 5823458)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	---	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	---	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	---	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823458)							
EP2407044-002	0960_SS291_240522	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	94.1	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	77.8	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	83.5	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	109	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	113	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	101	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823458)							
EP2407044-002	0960_SS291_240522	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	110	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	95.2	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	103	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	88.4	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	95.6	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	90.8	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	90.0	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	91.5	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	89.6	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	92.4	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	105	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5823458)							



Sub-Matrix: **SOIL**

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: 5823458) - continued							
EP2407044-002	0960_SS291_240522	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	97.2	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	90.4	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	96.6	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	88.1	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	104	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	98.8	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	86.0	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823458)							
EP2407044-002	0960_SS291_240522	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	100	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	95.8	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	99.2	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	86.2	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407044	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Site	: Learmonth SD - SC	Issue Date	: 05-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 17
Order number	: pfas-omp Learmonth	No. of samples analysed	: 17

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, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055)	22-May-2024	---	---	---	04-Jun-2024	05-Jun-2024	✔	
0960_SS227_240522,								0960_SS291_240522,
0960_QC120_240522,								0960_SS292_240522,
0960_SS293_240522,								0960_SS198_240522,
0960_SD210_240522,								0960_QC123_240522,
0960_SD209_240522,								0960_QC128_240522,
0960_SD305_240522,								0960_SD207_240522,
0960_SD208_240522,								0960_SD205_240522,
0960_SS301_240522,								0960_SS298_240522,
0967_SD302_240522								
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔	
0960 SS227 240522,								0960 SS291 240522,
0960 QC120 240522,								0960 SS292 240522,
0960 SS293 240522,								0960 SS198 240522,
0960 SD210 240522,								0960 QC123 240522,
0960 SD209 240522,								0960 QC128 240522,
0960 SD305 240522,								0960 SD207 240522,
0960 SD208 240522,								0960 SD205 240522,
0960 SS301 240522,								0960 SS298 240522,
0967 SD302 240522								



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X)	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔	
0960_SS227_240522,								0960_SS291_240522,
0960_QC120_240522,								0960_SS292_240522,
0960_SS293_240522,								0960_SS198_240522,
0960_SD210_240522,								0960_QC123_240522,
0960_SD209_240522,								0960_QC128_240522,
0960_SD305_240522,								0960_SD207_240522,
0960_SD208_240522,								0960_SD205_240522,
0960_SS301_240522,								0960_SS298_240522,
0967_SD302_240522								
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X)	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔	
0960_SS227_240522,								0960_SS291_240522,
0960_QC120_240522,								0960_SS292_240522,
0960_SS293_240522,								0960_SS198_240522,
0960_SD210_240522,								0960_QC123_240522,
0960_SD209_240522,								0960_QC128_240522,
0960_SD305_240522,								0960_SD207_240522,
0960_SD208_240522,								0960_SD205_240522,
0960_SS301_240522,								0960_SS298_240522,
0967_SD302_240522								
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X)	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔	
0960_SS227_240522,								0960_SS291_240522,
0960_QC120_240522,								0960_SS292_240522,
0960_SS293_240522,								0960_SS198_240522,
0960_SD210_240522,								0960_QC123_240522,
0960_SD209_240522,								0960_QC128_240522,
0960_SD305_240522,								0960_SD207_240522,
0960_SD208_240522,								0960_SD205_240522,
0960_SS301_240522,								0960_SS298_240522,
0967_SD302_240522								



Matrix: SOIL

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X)								
0960_SS227_240522,	0960_SS291_240522,	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔
0960_QC120_240522,	0960_SS292_240522,							
0960_SS293_240522,	0960_SS198_240522,							
0960_SD210_240522,	0960_QC123_240522,							
0960_SD209_240522,	0960_QC128_240522,							
0960_SD305_240522,	0960_SD207_240522,							
0960_SD208_240522,	0960_SD205_240522,							
0960_SS301_240522,	0960_SS298_240522,							
0967_SD302_240522								



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	17	11.76	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 5.4, 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.



CERTIFICATE OF ANALYSIS

Work Order	: EP2407045	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68063	Issue Date	: 07-Jun-2024 16:27
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 13		
No. of samples analysed	: 13		



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

This 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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X: High matrix spike recovery deemed acceptable as all associated analyte results are less than LOR.
- ED037-P (Alkalinity): Sample EP2407045-008 and 010 was filtered (0.45um) prior to analysis due to the presence of solids which might consume additional titrant.
- EP231X: Sample EP2407045-06 shows poor duplicate precision due to sample heterogeneity. confirmed by re-extraction and re-analysis.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0960_MW168_240522	0960_QC119_240522	0960_MW105_240522	0960_MW148S_24052 2	0960_MW148D_24052 2
Sampling date / time				22-May-2024 07:58	22-May-2024 08:00	22-May-2024 09:09	22-May-2024 09:38	22-May-2024 09:58
Compound	CAS Number	LOR	Unit	EP2407045-001	EP2407045-002	EP2407045-003	EP2407045-004	EP2407045-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	660	664	400	432	151
Total Alkalinity as CaCO3	----	1	mg/L	660	664	400	432	151
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	687	684	1630	1580	3560
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	3400	3580	17600	17200	34700
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	86	85	522	538	870
Magnesium	7439-95-4	1	mg/L	180	179	1060	956	1820
Sodium	7440-23-5	1	mg/L	2120	2120	8050	8000	16300
Potassium	7440-09-7	1	mg/L	127	127	430	368	786
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	123	128	538	527	1060
ø Total Cations	----	0.01	meq/L	114	114	474	463	922
ø Ionic Balance	----	0.01	%	3.71	5.79	6.32	6.45	6.76
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.08	0.08	0.20	5.77	1.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.09	0.09	0.24	4.70	0.71
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.77	0.81	1.12	22.5	3.88
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	2.69	0.32
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.15	0.16	0.06	24.8	1.95
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW168_240522	0960_QC119_240522	0960_MW105_240522	0960_MW148S_24052 2	0960_MW148D_24052 2
Sampling date / time				22-May-2024 07:58	22-May-2024 08:00	22-May-2024 09:09	22-May-2024 09:38	22-May-2024 09:58	
Compound	CAS Number	LOR	Unit	EP2407045-001	EP2407045-002	EP2407045-003	EP2407045-004	EP2407045-005	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	1.3	0.2	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.05	0.06	0.06	1.88	0.28	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.21	0.21	0.26	7.64	1.18	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.02	0.02	<0.02	0.78	0.15	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	0.03	0.02	1.26	0.23	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
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									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW168_240522	0960_QC119_240522	0960_MW105_240522	0960_MW148S_24052 2	0960_MW148D_24052 2
Sampling date / time					22-May-2024 07:58	22-May-2024 08:00	22-May-2024 09:09	22-May-2024 09:38	22-May-2024 09:58
Compound	CAS Number	LOR	Unit	EP2407045-001	EP2407045-002	EP2407045-003	EP2407045-004	EP2407045-005	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	---	0.01	µg/L	1.40	1.46	1.96	73.4	9.92	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.92	0.97	1.18	47.3	5.83	
Sum of PFAS (WA DER List)	---	0.01	µg/L	1.31	1.37	1.72	65.9	8.89	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	101	99.3	99.1	89.7	99.8	
13C8-PFOA	---	0.02	%	113	103	108	100	108	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW151_240522	0960_MW238_240522	0960_QC129_240522	0960_MW104_240522	0960_MW144_3.0-3.5_240522
Sampling date / time				22-May-2024 11:14	22-May-2024 11:15	22-May-2024 11:16	22-May-2024 12:14	22-May-2024 12:57
Compound	CAS Number	LOR	Unit	EP2407045-006	EP2407045-007	EP2407045-008	EP2407045-009	EP2407045-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	10	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	1180	729	737	232	183
Total Alkalinity as CaCO ₃	---	1	mg/L	1180	740	737	232	183
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	506	840	788	4300	3310
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	2410	1060	1050	35900	15100
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	26	20	18	774	866
Magnesium	7439-95-4	1	mg/L	109	33	31	2160	933
Sodium	7440-23-5	1	mg/L	1750	1190	1170	16700	6890
Potassium	7440-09-7	1	mg/L	123	75	71	1050	435
EN055: Ionic Balance								
∅ Total Anions	---	0.01	meq/L	102	62.2	60.8	1110	498
∅ Total Cations	---	0.01	meq/L	89.5	57.4	56.2	970	431
∅ Ionic Balance	---	0.01	%	6.55	4.00	3.93	6.61	7.28
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	4.13	1.38	1.29	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	4.52	1.26	1.16	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	34.5	9.80	8.23	0.02	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	5.19	1.05	1.04	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	25.7	8.56	7.14	<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

EP231D: (n:2) Fluorotelomer Sulfonic Acids



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW151_240522	0960_MW238_240522	0960_QC129_240522	0960_MW104_240522	0960_MW144_3.0-3.5_240522
Sampling date / time				22-May-2024 11:14	22-May-2024 11:15	22-May-2024 11:16	22-May-2024 12:14	22-May-2024 12:57
Compound	CAS Number	LOR	Unit	EP2407045-006	EP2407045-007	EP2407045-008	EP2407045-009	EP2407045-010
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	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	0.35	<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	98.2	29.6	25.5	0.02	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	60.2	18.4	15.4	0.02	<0.01
Sum of PFAS (WA DER List)	—	0.01	µg/L	88.2	26.7	23.3	0.02	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	—	0.02	%	95.8	94.6	99.8	94.9	98.4
13C8-PFOA	—	0.02	%	90.7	101	105	106	98.7



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW134_240522	0960_MW175_4.0-4.5_240522	0960_QC126_240522	---	---
Sampling date / time				22-May-2024 13:27	22-May-2024 15:32	22-May-2024 16:48	---	---
Compound	CAS Number	LOR	Unit	EP2407045-011	EP2407045-012	EP2407045-013	-----	-----
				Result	Result	Result	---	---
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	---	---
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	---	---
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	199	945	422	---	---
Total Alkalinity as CaCO ₃	---	1	mg/L	199	945	422	---	---
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	3330	935	1520	---	---
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	23400	8290	16000	---	---
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	602	162	484	---	---
Magnesium	7439-95-4	1	mg/L	1410	694	873	---	---
Sodium	7440-23-5	1	mg/L	12100	4130	7210	---	---
Potassium	7440-09-7	1	mg/L	728	198	338	---	---
EN055: Ionic Balance								
∅ Total Anions	---	0.01	meq/L	733	272	491	---	---
∅ Total Cations	---	0.01	meq/L	691	250	418	---	---
∅ Ionic Balance	---	0.01	%	2.97	4.27	8.04	---	---
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	4.18	---	---
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	3.51	---	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	15.8	---	---
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	2.18	---	---
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.02	16.4	---	---
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	---	---

EP231D: (n:2) Fluorotelomer Sulfonic Acids



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW134_240522	0960_MW175_4.0-4.5_240522	0960_QC126_240522	---	---
Sampling date / time				22-May-2024 13:27	22-May-2024 15:32	22-May-2024 16:48	---	---
Compound	CAS Number	LOR	Unit	EP2407045-011	EP2407045-012	EP2407045-013	-----	-----
				Result	Result	Result	---	---
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	---	---
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	---	---
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	---	---
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	---	---
EP231P: PFAS Sums								
Sum of PFAS	---	0.01	µg/L	<0.01	0.17	51.6	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.02	32.2	---	---
Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.01	0.17	45.8	---	---
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	95.6	102	95.1	---	---
13C8-PFOA	---	0.02	%	105	101	104	---	---



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407045	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68063	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 13		
No. of samples analysed	: 13		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5825131)									
EP2407043-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	182	182	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	182	182	0.0	0% - 20%
EP2407043-010	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	126	126	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	126	126	0.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5825725)									
EP2407045-008	0960_QC129_240522	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	737	734	0.4	0% - 20%
		ED037 P: Total Alkalinity as CaCO3	----	1	mg/L	737	734	0.4	0% - 20%
EP2407048-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	127	127	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	127	127	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5827141)									
EP2407045-001	0960_MW168_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	687	681	0.9	0% - 20%
EP2407045-011	0960_MW134_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3330	3310	0.8	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 (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 5827142)									
EP2407045-001	0960_MW168_240522	ED045G: Chloride	16887-00-6	1	mg/L	3400	3670	7.5	0% - 20%
EP2407045-011	0960_MW134_240522	ED045G: Chloride	16887-00-6	1	mg/L	23400	24000	2.7	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5825042)									
EP2407043-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	557	561	0.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1740	1740	0.4	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	13000	13000	0.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	731	735	0.6	0% - 20%
EP2407043 011	Anonymous	ED093F: Calcium	7440 70 2	1	mg/L	583	581	0.3	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1690	1680	0.7	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	12600	12500	1.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	726	724	0.2	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5825043)									
EP2407045-009	0960_MW104_240522	ED093F: Calcium	7440-70-2	1	mg/L	774	771	0.4	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2160	2150	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	16700	16600	0.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1050	1040	0.2	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838657)									
EP2407043-006	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375 73 5	0.02	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2407045-005	0960_MW148D_240522	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	3.88	3.67	5.3	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.95	2.05	5.1	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.02	1.04	1.8	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.71	0.73	3.2	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.32	0.28	11.8	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838659)									
EP2407045-006	0960_MW151_240522	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01 (0.04)*	µg/L	34.5	36.0	4.4	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01 (0.04)*	µg/L	25.7	# 18.5	32.3	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	4.13	4.05	2.2	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	4.52	4.36	3.4	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	5.19	4.83	7.2	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5838657)									



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: 5838657) - continued									
EP2407043-006	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2407045-005	0960_MW148D_240522	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.23	0.21	6.4	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.28	0.30	6.1	0% - 50%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.18	1.27	6.8	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.15	0.14	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	0.2	0.3	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5838659)									
EP2407045-006	0960_MW151_240522	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	1.98	1.85	6.8	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	2.67	2.50	6.5	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02 (0.04)*	µg/L	16.4	15.9	3.6	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.97	0.95	1.8	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375 95 1	0 02	µg/L	0 03	0 02	50 9	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.04	<0.02	64.1	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	0.03	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	0.06	<0.02	101	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376 06 7	0 05	µg/L	0 05	0 05	0 0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	1.5	1.3	13.8	0% - 50%
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838657)									
EP2407043-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X N Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838657) - continued									
EP2407043-006	Anonymous	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
EP2407045-005	0960_MW148D_240522	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838659)									
EP2407045-006	0960_MW151_240522	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: 5838657)									
EP2407043-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5838657) - continued									
EP2407043-006	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407045-005	0960_MW148D_240522	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5838659)									
EP2407045-006	0960_MW151_240522	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	0.35	<0.05	150	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: 5838657)									
EP2407043-006	Anonymous	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
EP2407045-005	0960_MW148D_240522	EP231X: Sum of PFAS	----	0.01	µg/L	9.92	9.99	0.7	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	5.83	5.72	1.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	8.89	8.98	1.0	0% - 20%
EP231P: PFAS Sums (QC Lot: 5838659)									
EP2407045-006	0960_MW151_240522	EP231X: Sum of PFAS	----	0.01 (0.04)*	µg/L	98.2	90.3	8.4	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01 (0.04)*	µg/L	60.2	54.5	9.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01 (0.04)*	µg/L	88.2	81.0	8.4	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 5825131)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	93.1	85.1	126
				<1	200 mg/L	97.2	90.5	111
ED037P: Alkalinity by PC Titrator (QCLot: 5825725)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	95.9	85.1	126
				<1	200 mg/L	101	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5827141)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	89.9	112
				<1	500 mg/L	102	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5827142)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	98.0	88.6	113
				<1	1000 mg/L	109	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5825042)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	101	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.9	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.1	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	95.4	84.6	108
ED093F: Dissolved Major Cations (QCLot: 5825043)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	100	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.8	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	98.7	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	95.2	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	98.1	72.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657) - continued								
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	95.7	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	98.4	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	106	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	91.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	101	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838659)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	90.6	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	93.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	100	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	91.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	97.3	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838657)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	91.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	97.2	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	111	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	111	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	94.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	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 (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	104	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838659)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	92.4	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	99.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	91.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	95.6	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	94.6	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	100	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	106	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	100	72.0	134



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838659) - continued								
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	103	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	95.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	116	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	102	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	97.2	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	116	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	110	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	103	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838659)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	92.2	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	91.0	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	106	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	100	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	109	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838657)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	102	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	104	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	102	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	108	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838659)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	95.0	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	100	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	107	64.2	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike	Spike Recovery (%)	Acceptable Limits (%)
				Concentration		LCS	Low	High
EP231P: PFAS Sums (QCLot: 5838657)								
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: 5838659)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5827141)							
EP2407045-001	0960_MW168_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5827142)							
EP2407045-001	0960_MW168_240522	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657)							
EP2407045-003	0960_MW105_240522	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	96.8	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	98.8	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	# Not Determined	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	99.6	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	95.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	105	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838659)							
EP2407047-010	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	97.0	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	98.5	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	95.7	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	105	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	90.4	65.0	140



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838659) - continued							
EP2407047-010	Anonymous	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	84.6	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838657)							
EP2407045-003	0960_MW105_240522	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	85.9	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	88.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	92.1	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	93.0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	105	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	97.3	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	102	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	90.9	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	108	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	104	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838659)							
EP2407047-010	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	90.7	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	94.7	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	102	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	95.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	91.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	92.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	95.7	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.8	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	107	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	89.8	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	129	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657)							
EP2407045-003	0960_MW105_240522	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	95.4	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	98.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	100.0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	107	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	102	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	101	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	101	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838659)							
EP2407047-010	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	92.4	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	99.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	101	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	120	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	103	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	110	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	106	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838657)							
EP2407045-003	0960_MW105_240522	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	99.7	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	107	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	126	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	# 143	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838659)							
EP2407047-010	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	104	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	115	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	92.6	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	73.4	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407045	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Site	: Learmonth GW - JS	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 13
Order number	: pfas-omp Learmonth	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** Laboratory Control outliers occur.
- Duplicate outliers exist - please see following pages for full details.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

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

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: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407045--006	0960_MW151_240522	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	32.3 %	0% - 20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2407045--001	0960_MW168_240522	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	EP2407045--001	0960_MW168_240522	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407045--003	0960_MW105_240522	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231D: (n:2) Fluorotelomer Sulfonic Acids	EP2407045--003	0960_MW105_240522	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	143 %	70.0-130%	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
ED093F: Dissolved Major Cations						
Clear Plastic Bottle - Natural 0960_MW168_240522, 0960_MW105_240522, 0960_MW148D_240522, 0960_MW238_240522, 0960_MW104_240522, 0960_MW134_240522, 0960_QC126_240522	0960_QC119_240522, 0960_MW148S_240522, 0960_MW151_240522, 0960_QC129_240522, 0960_MW144_3.0-3.5_240522, 0960_MW175_4.0-4.5_240522,	---	---	---	31-May-2024	29-May-2024
						2

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.

Page : 3 of 7
 Work Order : EP2407045
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_24



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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) 0960_MW168_240522, 0960_QC119_240522, 0960_MW105_240522, 0960_MW148S_240522, 0960_MW148D_240522, 0960_MW151_240522, 0960_MW238_240522, 0960_QC129_240522, 0960_MW104_240522, 0960_MW144_3.0-3.5_240522, 0960_MW134_240522, 0960_MW175_4.0-4.5_240522, 0960_QC126_240522	22-May-2024	---	---	---	30-May-2024	05-Jun-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) 0960_MW168_240522, 0960_QC119_240522, 0960_MW105_240522, 0960_MW148S_240522, 0960_MW148D_240522, 0960_MW151_240522, 0960_MW238_240522, 0960_QC129_240522, 0960_MW104_240522, 0960_MW144_3.0-3.5_240522, 0960_MW134_240522, 0960_MW175_4.0-4.5_240522, 0960_QC126_240522	22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) 0960_MW168_240522, 0960_QC119_240522, 0960_MW105_240522, 0960_MW148S_240522, 0960_MW148D_240522, 0960_MW151_240522, 0960_MW238_240522, 0960_QC129_240522, 0960_MW104_240522, 0960_MW144_3.0-3.5_240522, 0960_MW134_240522, 0960_MW175_4.0-4.5_240522, 0960_QC126_240522	22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) 0960_MW168_240522, 0960_QC119_240522, 0960_MW105_240522, 0960_MW148S_240522, 0960_MW148D_240522, 0960_MW151_240522, 0960_MW238_240522, 0960_QC129_240522, 0960_MW104_240522, 0960_MW144_3.0-3.5_240522, 0960_MW134_240522, 0960_MW175_4.0-4.5_240522, 0960_QC126_240522	22-May-2024	---	---	---	31-May-2024	29-May-2024	✗



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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW168_240522, 0960_MW105_240522, 0960_MW148D_240522, 0960_MW238_240522, 0960_MW104_240522, 0960_MW134_240522, 0960_QC126_240522	0960_QC119_240522, 0960_MW148S_240522, 0960_MW151_240522, 0960_QC129_240522, 0960_MW144_3.0-3.5_240522, 0960_MW175_4.0-4.5_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0960_MW168_240522, 0960_MW105_240522, 0960_MW148D_240522, 0960_MW238_240522, 0960_MW104_240522, 0960_MW134_240522, 0960_QC126_240522	0960_QC119_240522, 0960_MW148S_240522, 0960_MW151_240522, 0960_QC129_240522, 0960_MW144_3.0-3.5_240522, 0960_MW175_4.0-4.5_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_MW168_240522, 0960_MW105_240522, 0960_MW148D_240522, 0960_MW238_240522, 0960_MW104_240522, 0960_MW134_240522, 0960_QC126_240522	0960_QC119_240522, 0960_MW148S_240522, 0960_MW151_240522, 0960_QC129_240522, 0960_MW144_3.0-3.5_240522, 0960_MW175_4.0-4.5_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW168_240522, 0960_MW105_240522, 0960_MW148D_240522, 0960_MW238_240522, 0960_MW104_240522, 0960_MW134_240522, 0960_QC126_240522	0960_QC119_240522, 0960_MW148S_240522, 0960_MW151_240522, 0960_QC129_240522, 0960_MW144_3.0-3.5_240522, 0960_MW175_4.0-4.5_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔	
0960_MW168_240522,								0960_QC119_240522,
0960_MW105_240522,								0960_MW148S_240522,
0960_MW148D_240522,								0960_MW151_240522,
0960_MW238_240522,								0960_QC129_240522,
0960_MW104_240522,								0960_MW144_3.0-3.5_240522,
0960_MW134_240522,								0960_MW175_4.0-4.5_240522,
0960_QC126_240522								



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 Auto Titrator	ED037-P	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	3	30	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	27	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	30	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	30	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, 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.



Custody Document for Submissions via ALS Compass App

Project: WA-0960-PF/SDMP-24 Client: Stantec

Project Manager:

Phone:

ALS Compass COC Reference: 68061, 68061 # Samples:

Sampler:

Phone:

68063; 68075; 68062; 68101; 68071; 68090; 68080

Turnaround Requirements: Standard

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

22/5/24

24/5

11am



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407046

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

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

E-mail :
stantec.com
Telephone :
Facsimile :

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68064
Site : Learmonth SD - JS
Sampler :

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

Dates

Date Samples Received : 24-May-2024 11:00
Client Requested Due : 06-Jun-2024
Date

Issue Date : 29-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 3
Receipt Detail :

Security Seal : Not Available
Temperature : 17.1 - Ice present
No. of samples received / analysed : 11 / 11

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

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

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (30 analytes)
EP2407046-001	22-May-2024 08:25	0960_SS122_240522	✓	✓
EP2407046-002	22-May-2024 08:25	0960_QC121_240522	✓	✓
EP2407046-003	22-May-2024 08:39	0960_SS114_240522	✓	✓
EP2407046-004	22-May-2024 08:41	0960_QC122_240522	✓	✓
EP2407046-005	22-May-2024 08:59	0960_SS113_240522	✓	✓
EP2407046-006	22-May-2024 11:43	0960_SS234_240522	✓	✓
EP2407046-007	22-May-2024 12:03	0960_SS231_240522	✓	✓
EP2407046-008	22-May-2024 13:30	0960_SS189_240522	✓	✓
EP2407046-009	22-May-2024 14:02	0960_SS190_240522	✓	✓
EP2407046-010	22-May-2024 14:46	0960_SS192_240522	✓	✓
EP2407046-011	22-May-2024 15:17	0960_SS193_240522	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

- A4 - AU Tax Invoice (INV)

Email [REDACTED]@cardno.com.au

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]@esdat.com.au

- *AU Certificate of Analysis - NATA (COA)

Email [REDACTED]@stantec.com

- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)

Email [REDACTED]@stantec.com

- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)

Email [REDACTED]@stantec.com

- A4 - AU Sample Receipt Notification - Environmental HT (SRN)

Email [REDACTED]@stantec.com

- Chain of Custody (CoC) (COC)

Email [REDACTED]@stantec.com

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]@stantec.com

- EDI Format - XTab (XTAB)

Email [REDACTED]@stantec.com



CERTIFICATE OF ANALYSIS

Work Order	: EP2407046	Page	: 1 of 9
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68064	Issue Date	: 06-Jun-2024 13:45
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 11		
No. of samples analysed	: 11		



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

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SS122_240522	0960_QC121_240522	0960_SS114_240522	0960_QC122_240522	0960_SS113_240522
Sampling date / time				22-May-2024 08:25	22-May-2024 08:25	22-May-2024 08:39	22-May-2024 08:41	22-May-2024 08:59
Compound	CAS Number	LOR	Unit	EP2407046-001	EP2407046-002	EP2407046-003	EP2407046-004	EP2407046-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	2.5	2.4	1.3	1.3	1.4
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	0.0124	0.0134	0.0216	0.0276	0.0020
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0063	0.0071	0.0009	0.0012	0.0004
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	0.0004	0.0004	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0006	0.0007	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0004	0.0005	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS122_240522	0960_QC121_240522	0960_SS114_240522	0960_QC122_240522	0960_SS113_240522
Sampling date / time					22-May-2024 08:25	22-May-2024 08:25	22-May-2024 08:39	22-May-2024 08:41	22-May-2024 08:59
Compound	CAS Number	LOR	Unit	EP2407046-001	EP2407046-002	EP2407046-003	EP2407046-004	EP2407046-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0201	0.0221	0.0225	0.0288	0.0024	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0124	0.0134	0.0216	0.0276	0.0020	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0124	0.0134	0.0216	0.0276	0.0020	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	120	114	100	102	106	
13C8-PFOA	---	0.0002	%	127	117	104	103	102	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS234_240522	0960_SS231_240522	0960_SS189_240522	0960_SS190_240522	0960_SS192_240522
Sampling date / time				22-May-2024 11:43	22-May-2024 12:03	22-May-2024 13:30	22-May-2024 14:02	22-May-2024 14:46
Compound	CAS Number	LOR	Unit	EP2407046-006	EP2407046-007	EP2407046-008	EP2407046-009	EP2407046-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	2.5	1.4	18.1	17.6	26.6
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	0.0546	0.0206	0.0062	0.0094	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0020	0.0010	0.0003	0.0006	<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	0.0006	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0015	0.0004	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0005	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0004	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS234_240522	0960_SS231_240522	0960_SS189_240522	0960_SS190_240522	0960_SS192_240522
Sampling date / time					22-May-2024 11:43	22-May-2024 12:03	22-May-2024 13:30	22-May-2024 14:02	22-May-2024 14:46
Compound	CAS Number	LOR	Unit	EP2407046-006	EP2407046-007	EP2407046-008	EP2407046-009	EP2407046-010	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	0.0010	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0613	0.0220	0.0065	0.0100	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0546	0.0206	0.0062	0.0094	<0.0002	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0556	0.0206	0.0062	0.0094	<0.0002	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	99.5	106	95.0	115	101	
13C8-PFOA	---	0.0002	%	97.0	104	99.5	102	110	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

0960_SS193_240522

Sampling date / time

22-May-2024 15:17

Compound	CAS Number	LOR	Unit	Result				
				EP2407046-011	-----	-----	-----	-----
				Result	---	---	---	---

EA055: Moisture Content (Dried @ 105-110°C)

Moisture Content	---	0.1	%	29.3	---	---	---	---
------------------	-----	-----	---	------	-----	-----	-----	-----

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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

0960_SS193_240522

Sampling date / time

22-May-2024 15:17

Compound

CAS Number

LOR

Unit

EP2407046-011

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	----	----	----
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	%	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



QUALITY CONTROL REPORT

Work Order	: EP2407046	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68064	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 11		
No. of samples analysed	: 11		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 5825083)									
EP2407046-001	0960_SS122_240522	EA055: Moisture Content	----	0.1	%	2.5	2.8	11.5	0% - 20%
EP2407046-011	0960_SS193_240522	EA055: Moisture Content	----	0.1	%	29.3	28.1	4.4	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5823458)									
EP2407044-001	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	0.0027	0.0027	0.0	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2407044-011	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
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5823461)									
EP2407046-003	0960_SS114_240522	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 0216	0 0241	11 1	0% 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0009	0.0010	12.8	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5823461) - continued									
EP2407057-002	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	0.0457	0.0434	5.3	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0056	0.0048	16.1	0% - 20%
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5823458)									
EP2407044-001	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
EP2407044-011	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
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5823461)									
EP2407046-003	0960_SS114_240522	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



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: 5823461) - continued									
EP2407046-003	0960_SS114_240522	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
EP2407057-002	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	<0.0002	<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	0.0011	0.0010	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0006	0.0006	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0003	<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: 5823458)							
EP2407044-001	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
EP2407044-011	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



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5823458) - continued									
EP2407044-011	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5823461)									
EP2407046-003	0960_SS114_240522	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
EP2407057-002	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5823458)									
EP2407044-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit



Sub-Matrix: 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: 5823458) - continued									
EP2407044-011	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5823461)									
EP2407046-003	0960_SS114_240522	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
EP2407057-002	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
EP231P: PFAS Sums (QC Lot: 5823458)									
EP2407044-001	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0027	0.0027	0.0	0% - 50%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0027	0.0027	0.0	0% - 50%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0027	0.0027	0.0	0% - 50%
EP2407044-011	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5823461)									
EP2407046-003	0960_SS114_240522	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0225	0.0251	10.9	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0216	0.0241	10.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0216	0.0241	10.9	0% - 20%
EP2407057-002	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0533	0.0498	6.8	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 (%)
EP231P: PFAS Sums (QC Lot: 5823461) - continued									
EP2407057-002	Anonymous	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0457	0.0434	5.2	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0457	0.0434	5.2	0% - 20%



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823458)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	98.2	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.4	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	87.7	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	105	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	94.8	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	96.2	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823461)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0011 mg/kg	101	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.8	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	98.3	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	112	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	93.1	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0012 mg/kg	96.2	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823458)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	107	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.2	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.6	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.4	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.6	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.6	69.0	135
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.0	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	103	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823461)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	95.1	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.6	71.0	131



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823461) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.6	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	113	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00125 mg/kg	111	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5823458)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	111	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	99.7	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	102	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	109	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.8	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5823461)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.0	59.6	143
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.6	62.8	140
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	113	61.5	139
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	112	61.9	139
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823458)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	102	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	104	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	115	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	111	54.8	124



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823461)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	113	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	110	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
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	88.8	54.8	124
EP231P: PFAS Sums (QCLot: 5823458)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	---	---	---
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	---	---	---
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	---	---	---
EP231P: PFAS Sums (QCLot: 5823461)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	---	---	---
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	---	---	---
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	---	---	---

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823458)							
EP2407044-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	94.1	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	77.8	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	83.5	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	109	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	113	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	101	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823461)							
EP2407046-004	0960_QC122_240522	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	103	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	80.8	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	99.2	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	116	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	61.9	59.0	134



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823458)							
EP2407044-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	110	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	95.2	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	103	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	88.4	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	95.6	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	90.8	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	90.0	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	91.5	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	89.6	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	92.4	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	105	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823461)							
EP2407046-004	0960_QC122_240522	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	90.2	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	96.4	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	114	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	97.6	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	102	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	102	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	110	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	103	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	105	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	107	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	108	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5823458)							
EP2407044-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	97.2	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	90.4	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	96.6	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	88.1	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	104	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	98.8	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	86.0	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5823461)							
EP2407046-004	0960_QC122_240522	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	95.6	48.0	128



Sub-Matrix: **SOIL**

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: 5823461) - continued							
EP2407046-004	0960_QC122_240522	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	110	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	97.6	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	105	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	111	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	111	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	96.8	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823458)							
EP2407044-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	100	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	95.8	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	99.2	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	86.2	60.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823461)							
EP2407046-004	0960_QC122_240522	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	106	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	106	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	109	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	99.6	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order : EP2407046

Page : 1 of 5

Client : STANTEC AUSTRALIA PTY LTD

Laboratory : Environmental Division Perth

Contact : [REDACTED]

Telephone : +61-8-9406 1301

Project : WA_0960_PFASOMP_24

Date Samples Received : 24-May-2024

Site : Learmonth SD - JS

Issue Date : 06-Jun-2024

Sampler : [REDACTED]

No. of samples received : 11

Order number : pfas-omp Learmonth

No. of samples analysed : 11

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407046--004	0960_QC122_240522	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	—	MS recovery not determined, background level greater than or equal to 4x spike level.

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

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

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

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055)	22-May-2024	---	---	---	30-May-2024	05-Jun-2024	✓	
0960_SS122_240522,								0960_QC121_240522,
0960_SS114_240522,								0960_QC122_240522,
0960_SS113_240522,								0960_SS234_240522,
0960_SS231_240522,								0960_SS189_240522,
0960_SS190_240522,								0960_SS192_240522,
0960_SS193_240522								
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)	22-May-2024	04-Jun-2024	18-Nov-2024	✓	04-Jun-2024	14-Jul-2024	✓	
0960_SS122_240522,								0960_QC121_240522
HDPE Soil Jar (EP231X)	22-May-2024	04-Jun-2024	18-Nov-2024	✓	05-Jun-2024	14-Jul-2024	✓	
0960_SS114_240522,								0960_QC122_240522,
0960_SS113_240522,								0960_SS234_240522,
0960_SS231_240522,								0960_SS189_240522,
0960_SS190_240522,								0960_SS192_240522,
0960_SS193_240522								



Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) 0960_SS122_240522,	0960_QC121_240522	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔
HDPE Soil Jar (EP231X) 0960_SS114_240522, 0960_SS113_240522, 0960_SS231_240522, 0960_SS190_240522, 0960_SS193_240522	0960_QC122_240522, 0960_SS234_240522, 0960_SS189_240522, 0960_SS192_240522,	22-May-2024	04-Jun-2024	18-Nov-2024	✔	05-Jun-2024	14-Jul-2024	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) 0960_SS122_240522,	0960_QC121_240522	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔
HDPE Soil Jar (EP231X) 0960_SS114_240522, 0960_SS113_240522, 0960_SS231_240522, 0960_SS190_240522, 0960_SS193_240522	0960_QC122_240522, 0960_SS234_240522, 0960_SS189_240522, 0960_SS192_240522,	22-May-2024	04-Jun-2024	18-Nov-2024	✔	05-Jun-2024	14-Jul-2024	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SS122_240522,	0960_QC121_240522	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔
HDPE Soil Jar (EP231X) 0960_SS114_240522, 0960_SS113_240522, 0960_SS231_240522, 0960_SS190_240522, 0960_SS193_240522	0960_QC122_240522, 0960_SS234_240522, 0960_SS189_240522, 0960_SS192_240522,	22-May-2024	04-Jun-2024	18-Nov-2024	✔	05-Jun-2024	14-Jul-2024	✔
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) 0960_SS122_240522,	0960_QC121_240522	22-May-2024	04-Jun-2024	18-Nov-2024	✔	04-Jun-2024	14-Jul-2024	✔
HDPE Soil Jar (EP231X) 0960_SS114_240522, 0960_SS113_240522, 0960_SS231_240522, 0960_SS190_240522, 0960_SS193_240522	0960_QC122_240522, 0960_SS234_240522, 0960_SS189_240522, 0960_SS192_240522,	22-May-2024	04-Jun-2024	18-Nov-2024	✔	05-Jun-2024	14-Jul-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **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	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.
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.



Custody Document for Submissions via ALS Compass App

Project: WA_0960_PFA50MD_24 Client: Stantec

Project Manager:

Phone:

ALS Compass COC Reference: 68066, 68061 # Samples:

Sampler:

Phone:

68063, 68075, 68062, 68104, 68071, 68090, 68080

Turnaround Requirements: Standard

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

22/5/24

24/5 11am



CHAIN OF CUSTODY

COC#: 68071

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

CONTACT PH:

SAMPLER MOBILE:

PRIMARY SAMPLER:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS WATERS - ST WATER	Rinsate WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_MW137_0.8-1.3		22/05/2024 09:34 AM	WATER	ALS: 3 Non ALS: 0	No	X		Partial 1/2		
002	0960_QC125		22/05/2024 09:35 AM	WATER	ALS: 3 Non ALS: 0	No	X		Partial 1/2		
003	0960_MW137_2.5-3.0		22/05/2024 09:36 AM	WATER	ALS: 3 Non ALS: 0	No	X				
004	0960_MW137_4.5-5.0		22/05/2024 09:37 AM	WATER	ALS: 3 Non ALS: 0	No	X				
005	0960_MW137_6.5-7.0		22/05/2024 09:38 AM	WATER	ALS: 3 Non ALS: 0	No	X				
006	0960_MW179_1.0-1.5		22/05/2024 11:14 AM	WATER	ALS: 3 Non ALS: 0	No	X		Partial 1/2		
007	0960_MW179_3.2-3.7		22/05/2024 11:14 AM	WATER	ALS: 2 Non ALS: 0	No	X				



CHAIN OF CUSTODY

COC#: 68071

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS WATERS - ST WATER	Rinsate WATER	WA OMP water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_MW179_5.9-6.4		22/05/2024 11:15 AM	WATER	ALS: 2 Non ALS: 0	No	X				
009	0960_MW179_8.5-9.0		22/05/2024 11:16 AM	WATER	ALS: 2 Non ALS: 0	No	X				
010	0960_MW145_3.0-3.5	Lab QC bottles added	22/05/2024 12:12 PM	WATER	ALS: 5 Non ALS: 0	No			X		
011	0960_MW141_1.5-2.0	Lab QC bottle added	22/05/2024 03:10 PM	WATER	ALS: 4 Non ALS: 0	No	X		Partial 1/2		
012	0960_MW141_3.0-3.5		22/05/2024 03:11 PM	WATER	ALS: 2 Non ALS: 0	No	X				
013	0960_MW141_5.0-5.5		22/05/2024 03:11 PM	WATER	ALS: 2 Non ALS: 0	No	X				
014	0960_MW141_7.0-7.5		22/05/2024 03:12 PM	WATER	ALS: 2 Non ALS: 0	No	X				



CHAIN OF CUSTODY

COC#: 68071 ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS WATERS - ST WATER	Rinsate WATER	WA OMP water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
015	0960_QC301		22/05/2024 04:47 PM	WATER	ALS: 2 Non ALS: 0	No		X			
016	0960_QC302		22/05/2024 04:48 PM	WATER	ALS: 2 Non ALS: 0	No		X			
017	0960_QC303		22/05/2024 04:50 PM	WATER	ALS: 2 Non ALS: 0	No		X			
018	0960_QC401		22/05/2024 04:51 PM	WATER	ALS: 2 Non ALS: 0	No		X			
019	0960_QC402		22/05/2024 04:52 PM	WATER	ALS: 2 Non ALS: 0	No		X			
020	0960_QC403		22/05/2024 04:52 PM	WATER	ALS: 2 Non ALS: 0	No		X			



CHAIN OF CUSTODY

COC#: 68071

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

CONTACT PH:

SAMPLER MOBILE:

PRIMARY SAMPLER:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE	SAMPLE NAME	PARTIAL ANALYSIS GROUP NAME	MATRIX	SELECTED ANALYSIS NAME
001	0960_MW137_0.8-1.3	WA OMP Water Suite WATER	WATER	- NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
002	0960_QC125	WA OMP Water Suite WATER	WATER	- NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
006	0960_MW179_1.0-1.5	WA OMP Water Suite WATER	WATER	- NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
011	0960_MW141_1.5-2.0	WA OMP Water Suite WATER	WATER	- NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity

**CHAIN OF CUSTODY**

COC#: 68071

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

CONTACT PH:

SAMPLER MOBILE:

PRIMARY SAMPLER:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_MW137_0.8-1.3	Clear Plastic Bottle - Natural	125 mL	00070522145079	Green	No	
001	0960_MW137_0.8-1.3	HDPE (no PTFE)	125 mL	00352106002054	Grey	No	
001	0960_MW137_0.8-1.3	HDPE (no PTFE)	125 mL	00352106002075	Grey	No	
002	0960_QC125	Clear Plastic Bottle - Natural	125 mL	00070522145158	Green	No	
002	0960_QC125	HDPE (no PTFE)	125 mL	00352106002110	Grey	No	
002	0960_QC125	HDPE (no PTFE)	125 mL	00352106001953	Grey	No	
003	0960_MW137_2.5-3.0	Clear Plastic Bottle - Natural	125 mL	00071121129622	Green	No	
003	0960_MW137_2.5-3.0	HDPE (no PTFE)	125 mL	00352106001837	Grey	No	
003	0960_MW137_2.5-3.0	HDPE (no PTFE)	125 mL	00352106001936	Grey	No	
004	0960_MW137_4.5-5.0	HDPE (no PTFE)	125 mL	00352106002087	Grey	No	
004	0960_MW137_4.5-5.0	HDPE (no PTFE)	125 mL	00352106001938	Grey	No	
004	0960_MW137_4.5-5.0	Clear Plastic Bottle - Natural	125 mL	00070522075419	Green	No	
005	0960_MW137_6.5-7.0	Clear Plastic Bottle - Natural	125 mL	00071121181603	Green	No	
005	0960_MW137_6.5-7.0	HDPE (no PTFE)	125 mL	00352106001886	Grey	No	
005	0960_MW137_6.5-7.0	HDPE (no PTFE)	125 mL	00352106001941	Grey	No	
006	0960_MW179_1.0-1.5	HDPE (no PTFE)	125 mL	00350423000326	Grey	No	
006	0960_MW179_1.0-1.5	HDPE (no PTFE)	125 mL	00350423000310	Grey	No	
006	0960_MW179_1.0-1.5	Clear Plastic Bottle - Natural	125 mL	00070621191171	Green	No	
007	0960_MW179_3.2-3.7	HDPE (no PTFE)	125 mL	00350121012835	Grey	No	
007	0960_MW179_3.2-3.7	HDPE (no PTFE)	125 mL	00350121012891	Grey	No	
008	0960_MW179_5.9-6.4	HDPE (no PTFE)	125 mL	00350121019496	Grey	No	
008	0960_MW179_5.9-6.4	HDPE (no PTFE)	125 mL	00350121019645	Grey	No	
009	0960_MW179_8.5-9.0	HDPE (no PTFE)	125 mL	00350121012925	Grey	No	
009	0960_MW179_8.5-9.0	HDPE (no PTFE)	125 mL	00350121012902	Grey	No	
010	0960_MW145_3.0-3.5	HDPE (no PTFE)	20 mL	00352312012015	Grey	No	
010	0960_MW145_3.0-3.5	HDPE (no PTFE)	20 mL	00352312011881	Grey	No	



CHAIN OF CUSTODY

COC#: 68071

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

010	0960_MW145_3.0-3.5	Clear Plastic Bottle - Natural	125 mL	00071121181583	Green	No	
010	0960_MW145_3.0-3.5	HDPE (no PTFE)	20 mL	00352312011864	Grey	No	
010	0960_MW145_3.0-3.5	HDPE (no PTFE)	20 mL	00352312011941	Grey	No	
011	0960_MW141_1.5-2.0	HDPE (no PTFE)	125 mL	00350423000322	Grey	No	
011	0960_MW141_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00070822327202	Green	No	
011	0960_MW141_1.5-2.0	HDPE (no PTFE)	125 mL	00350423000324	Grey	No	
011	0960_MW141_1.5-2.0	HDPE (no PTFE)	125 mL	00350423000314	Grey	No	
012	0960_MW141_3.0-3.5	HDPE (no PTFE)	125 mL	00350121019561	Grey	No	
012	0960_MW141_3.0-3.5	HDPE (no PTFE)	125 mL	00350121019663	Grey	No	
013	0960_MW141_5.0-5.5	HDPE (no PTFE)	125 mL	00352106002051	Grey	No	
013	0960_MW141_5.0-5.5	HDPE (no PTFE)	125 mL	00352106001999	Grey	No	
014	0960_MW141_7.0-7.5	HDPE (no PTFE)	125 mL	00350121012650	Grey	No	
014	0960_MW141_7.0-7.5	HDPE (no PTFE)	125 mL	00350121012868	Grey	No	
015	0960_QC301	HDPE (no PTFE)	20 mL	00350822007785	Grey	No	
015	0960_QC301	HDPE (no PTFE)	20 mL	00352309014820	Grey	No	
016	0960_QC302	HDPE (no PTFE)	20 mL	00352309015087	Grey	No	
016	0960_QC302	HDPE (no PTFE)	20 mL	00350821000179	Grey	No	
017	0960_QC303	HDPE (no PTFE)	20 mL	00350821000446	Grey	No	
017	0960_QC303	HDPE (no PTFE)	20 mL	00351221005771	Grey	No	
018	0960_QC401	HDPE (no PTFE)	20 mL	00352309015204	Grey	No	
018	0960_QC401	HDPE (no PTFE)	20 mL	00352309015069	Grey	No	
019	0960_QC402	HDPE (no PTFE)	20 mL	00350821000470	Grey	No	
019	0960_QC402	HDPE (no PTFE)	20 mL	00351221005703	Grey	No	
020	0960_QC403	HDPE (no PTFE)	20 mL	00352312003897	Grey	No	
020	0960_QC403	HDPE (no PTFE)	20 mL	00352312003900	Grey	No	

Total Bottle Count: ALS: 51, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407047

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

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

E-mail :
stantec.com
Telephone :
Facsimile :

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68071
Site : Learmonth GW - SC
Sampler :

Page : 1 of 3
Quote number : ES2022MWH AUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 24-May-2024 11:00
Client Requested Due : 06-Jun-2024
Date

Issue Date : 29-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 3
Receipt Detail :

Security Seal : Not Available
Temperature : 17.1 - Ice present
No. of samples received / analysed : 20 / 20

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EP2407047-001	22-May-2024 09:34	0960_MW137_0.8-1.3_240522
EP2407047-003	22-May-2024 09:36	0960_MW137_2.5-3.0_240522
EP2407047-004	22-May-2024 09:37	0960_MW137_4.5-5.0_240522
EP2407047-005	22-May-2024 09:38	0960_MW137_6.5-7.0_240522
EP2407047-006	22-May-2024 11:14	0960_MW179_1.0-1.5_240522
EP2407047-007	22-May-2024 11:14	0960_MW179_3.2-3.7_240522
EP2407047-008	22-May-2024 11:15	0960_MW179_5.9-6.4_240522
EP2407047-009	22-May-2024 11:16	0960_MW179_8.5-9.0_240522
EP2407047-010	22-May-2024 12:12	0960_MW145_3.0-3.5_240522 - Lab QC bottles added
EP2407047-011	22-May-2024 15:10	0960_MW141_1.5-2.0_240522 - Lab QC bottle added
EP2407047-012	22-May-2024 15:11	0960_MW141_3.0-3.5_240522
EP2407047-013	22-May-2024 15:11	0960_MW141_5.0-5.5_240522
EP2407047-014	22-May-2024 15:12	0960_MW141_7.0-7.5_240522

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 (30 analytes)	WATER - EP231X-ST PFAS - Full Suite (30 analytes) Super Trace	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO ₄ , Alkalinity
EP2407047-001	22-May-2024 09:34	0960_MW137_0.8-1.3_2...		✓	✓
EP2407047-002	22-May-2024 09:35	0960_QC125_240522		✓	✓
EP2407047-003	22-May-2024 09:36	0960_MW137_2.5-3.0_2...		✓	
EP2407047-004	22-May-2024 09:37	0960_MW137_4.5-5.0_2...		✓	
EP2407047-005	22-May-2024 09:38	0960_MW137_6.5-7.0_2...		✓	
EP2407047-006	22-May-2024 11:14	0960_MW179_1.0-1.5_2...		✓	✓
EP2407047-007	22-May-2024 11:14	0960_MW179_3.2-3.7_2...		✓	
EP2407047-008	22-May-2024 11:15	0960_MW179_5.9-6.4_2...		✓	
EP2407047 009	22 May 2024 11 16	0960 MW179 8 5 9 0 2		✓	
EP2407047-010	22-May-2024 12:12	0960_MW145_3.0-3.5_2...	✓		✓
EP2407047-011	22-May-2024 15:10	0960_MW141_1.5-2.0_2...		✓	✓
EP2407047-012	22-May-2024 15:11	0960_MW141_3.0-3.5_2...		✓	
EP2407047-013	22-May-2024 15:11	0960_MW141_5.0-5.5_2...		✓	
EP2407047-014	22-May-2024 15:12	0960_MW141_7.0-7.5_2...		✓	
EP2407047-015	22-May-2024 16:47	0960_QC301_240522	✓		
EP2407047-016	22-May-2024 16:48	0960_QC302_240522	✓		
EP2407047-017	22-May-2024 16:50	0960_QC303_240522	✓		
EP2407047-018	22-May-2024 16:51	0960_QC401_240522	✓		
EP2407047 019	22 May 2024 16 52	0960 QC402 240522	✓		
EP2407047-020	22-May-2024 16:52	0960_QC403_240522	✓		

Proactive Holding Time Report

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



Requested Deliverables

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



CERTIFICATE OF ANALYSIS

Work Order	: EP2407047	Page	: 1 of 18
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68071	Issue Date	: 07-Jun-2024 16:29
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 20		
No. of samples analysed	: 20		



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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X: High matrix spike recovery deemed acceptable as all associated analyte results are less than LOR.
- EP231X: Sample EP2407045-06 shows poor duplicate precision due to sample heterogeneity. confirmed by re-extraction and re-analysis.
- 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 or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW137_0.8-1.3_240522	0960_QC125_240522	0960_MW137_2.5-3.0_240522	0960_MW137_4.5-5.0_240522	0960_MW137_6.5-7.0_240522
Sampling date / time				22-May-2024 09:34	22-May-2024 09:35	22-May-2024 09:36	22-May-2024 09:37	22-May-2024 09:38
Compound	CAS Number	LOR	Unit	EP2407047-001	EP2407047-002	EP2407047-003	EP2407047-004	EP2407047-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	552	668	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	552	668	----	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	4150	3930	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	33100	35700	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	650	660	----	----	----
Magnesium	7439-95-4	1	mg/L	2180	2220	----	----	----
Sodium	7440-23-5	1	mg/L	16700	17000	----	----	----
Potassium	7440-09-7	1	mg/L	1000	1020	----	----	----
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	1030	1100	----	----	----
☐ Total Cations	----	0.01	meq/L	964	981	----	----	----
☐ Ionic Balance	----	0.01	%	3.37	5.81	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0010	0.0006
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	0.0009	0.0011	0.0022	0.0125	0.0073
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0014	0.0007
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	0.0015	0.0016	0.0028	0.0121	0.0096
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW137_0.8-1.3_240522	0960_QC125_240522	0960_MW137_2.5-3.0_240522	0960_MW137_4.5-5.0_240522	0960_MW137_6.5-7.0_240522
Sampling date / time				22-May-2024 09:34	22-May-2024 09:35	22-May-2024 09:36	22-May-2024 09:37	22-May-2024 09:38	
Compound	CAS Number	LOR	Unit	EP2407047-001	EP2407047-002	EP2407047-003	EP2407047-004	EP2407047-005	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	<0.002	<0.002	0.003	0.003	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0015	0.0008	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0045	0.0023	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0031	0.0030	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0015	0.0011	
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW137_0.8-1.3_240522	0960_QC125_240522	0960_MW137_2.5-3.0_240522	0960_MW137_4.5-5.0_240522	0960_MW137_6.5-7.0_240522
Sampling date / time					22-May-2024 09:34	22-May-2024 09:35	22-May-2024 09:36	22-May-2024 09:37	22-May-2024 09:38
Compound	CAS Number	LOR	Unit	EP2407047-001	EP2407047-002	EP2407047-003	EP2407047-004	EP2407047-005	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	<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	<0.001	<0.001	<0.001	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0003	µg/L	0.0024	0.0027	0.0070	0.0426	0.0294	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	0.0024	0.0027	0.0050	0.0246	0.0169	
Sum of PFAS (WA DER List)	---	0.0003	µg/L	0.0024	0.0027	0.0070	0.0402	0.0281	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0005	%	102	98.8	86.6	107	98.1	
13C8-PFOA	---	0.0005	%	88.5	89.2	89.0	86.1	89.1	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW179_1.0-1.5 _240522	0960_MW179_3.2-3.7 _240522	0960_MW179_5.9-6.4 _240522	0960_MW179_8.5-9.0 _240522	0960_MW145_3.0-3.5 _240522 Lab QC bottles added
Sampling date / time				22-May-2024 11:14	22-May-2024 11:14	22-May-2024 11:15	22-May-2024 11:16	22-May-2024 12:12
Compound	CAS Number	LOR	Unit	EP2407047-006	EP2407047-007	EP2407047-008	EP2407047-009	EP2407047-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	1200	----	----	----	984
Total Alkalinity as CaCO ₃	----	1	mg/L	1200	----	----	----	984
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	3990	----	----	----	5390
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	33900	----	----	----	44400
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	649	----	----	----	1020
Magnesium	7439-95-4	1	mg/L	2210	----	----	----	2650
Sodium	7440-23-5	1	mg/L	16900	----	----	----	20800
Potassium	7440-09-7	1	mg/L	1010	----	----	----	1040
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	1060	----	----	----	1380
☐ Total Cations	----	0.01	meq/L	975	----	----	----	1200
☐ Ionic Balance	----	0.01	%	4.32	----	----	----	7.12
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	<0.0005	0.0006	<0.0005	----
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	----	----	----	----	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	----	----	----	----	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	0.0006	0.0006	0.0014	0.0024	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW179_1.0-1.5 _240522	0960_MW179_3.2-3.7 _240522	0960_MW179_5.9-6.4 _240522	0960_MW179_8.5-9.0 _240522	0960_MW145_3.0-3.5 _240522 Lab QC bottles added
Sampling date / time				22-May-2024 11:14	22-May-2024 11:14	22-May-2024 11:15	22-May-2024 11:16	22-May-2024 12:12
Compound	CAS Number	LOR	Unit	EP2407047-006	EP2407047-007	EP2407047-008	EP2407047-009	EP2407047-010
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	----	----	----	----	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	----	----	----	----	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763 23 1	0.0003	µg/L	0.0008	0.0008	0.0014	0.0028	----
Perfluorodecane sulfonic acid (PFDS)	335 77 3	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorooctane sulfonic acid (PFOS)	1763 23 1	0.01	µg/L	----	----	----	----	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	----	----	----	----	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	<0.002	0.004	0.006	----
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	----	----	----	----	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	<0.0005	0.0008	0.0009	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	----	----	----	----	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	<0.0005	0.0008	0.0009	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	----	----	----	----	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	<0.0005	0.0008	0.0012	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	----	----	----	----	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	<0.0005	0.0008	0.0012	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	----	----	----	----	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	----	----	----	----	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	----	----	----	----	<0.02



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW179_1.0-1.5 _240522	0960_MW179_3.2-3.7 _240522	0960_MW179_5.9-6.4 _240522	0960_MW179_8.5-9.0 _240522	0960_MW145_3.0-3.5 _240522 Lab QC bottles added
Sampling date / time				22-May-2024 11:14	22-May-2024 11:14	22-May-2024 11:15	22-May-2024 11:16	22-May-2024 12:12
Compound	CAS Number	LOR	Unit	EP2407047-006	EP2407047-007	EP2407047-008	EP2407047-009	EP2407047-010
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	----	----	----	----	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	----	----	----	----	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	----	----	----	----	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	----	----	----	----	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	----	----	----	----	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	----	----	----	----	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	----	----	----	----	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	----	----	----	----	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW179_1.0-1.5 _240522	0960_MW179_3.2-3.7 _240522	0960_MW179_5.9-6.4 _240522	0960_MW179_8.5-9.0 _240522	0960_MW145_3.0-3.5 _240522 Lab QC bottles added
Sampling date / time				22-May-2024 11:14	22-May-2024 11:14	22-May-2024 11:15	22-May-2024 11:16	22-May-2024 12:12
Compound	CAS Number	LOR	Unit	EP2407047-006	EP2407047-007	EP2407047-008	EP2407047-009	EP2407047-010
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	----	----	----	----	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	----	----	----	----	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991 50 6	0.02	µg/L	----	----	----	----	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
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	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
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	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
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	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	----	----	----	----	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.0003	µg/L	0.0014	0.0014	0.0106	0.0154	----
Sum of PFAS	----	0.01	µg/L	----	----	----	----	<0.01



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW179_1.0-1.5 _240522	0960_MW179_3.2-3.7 _240522	0960_MW179_5.9-6.4 _240522	0960_MW179_8.5-9.0 _240522	0960_MW145_3.0-3.5 _240522 Lab QC bottles added
Sampling date / time				22-May-2024 11:14	22-May-2024 11:14	22-May-2024 11:15	22-May-2024 11:16	22-May-2024 12:12
Compound	CAS Number	LOR	Unit	EP2407047-006	EP2407047-007	EP2407047-008	EP2407047-009	EP2407047-010
				Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued								
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	0.0014	0.0014	0.0028	0.0052	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	----	----	----	----	<0.01
Sum of PFAS (WA DER List)	---	0.0003	µg/L	0.0014	0.0014	0.0106	0.0154	----
Sum of PFAS (WA DER List)	---	0.01	µg/L	----	----	----	----	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.0005	%	102	92.2	103	95.2	----
13C4-PFOS	---	0.02	%	----	----	----	----	99.9
13C8-PFOA	---	0.0005	%	90.7	86.7	89.3	93.9	----
13C8-PFOA	---	0.02	%	----	----	----	----	108



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW141_1.5-2.0 _240522 Lab QC bottle added	0960_MW141_3.0-3.5 _240522	0960_MW141_5.0-5.5 _240522	0960_MW141_7.0-7.5 _240522	----
Sampling date / time				22-May-2024 15:10	22-May-2024 15:11	22-May-2024 15:11	22-May-2024 15:12	---
Compound	CAS Number	LOR	Unit	EP2407047-011	EP2407047-012	EP2407047-013	EP2407047-014	-----
				Result	Result	Result	Result	---
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	710	----	----	----	----
Total Alkalinity as CaCO ₃	---	1	mg/L	710	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	1750	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	14400	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	419	----	----	----	----
Magnesium	7439-95-4	1	mg/L	958	----	----	----	----
Sodium	7440-23-5	1	mg/L	6780	----	----	----	----
Potassium	7440-09-7	1	mg/L	377	----	----	----	----
EN055: Ionic Balance								
☐ Total Anions	---	0.01	meq/L	457	----	----	----	----
☐ Total Cations	---	0.01	meq/L	404	----	----	----	----
☐ Ionic Balance	---	0.01	%	6.10	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0005	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0008	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	0.0005	0.0004	0.0005	0.0015	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

0960_MW141_1.5-2.0 _240522 Lab QC bottle added	0960_MW141_3.0-3.5 _240522	0960_MW141_5.0-5.5 _240522	0960_MW141_7.0-7.5 _240522	----
22-May-2024 15:10	22-May-2024 15:11	22-May-2024 15:11	22-May-2024 15:12	—
EP2407047-011	EP2407047-012	EP2407047-013	EP2407047-014	-----
Result	Result	Result	Result	—

EP231A: Perfluoroalkyl Sulfonic Acids - Continued

Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
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EP231B: Perfluoroalkyl Carboxylic Acids

Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	<0.002	<0.002	0.004	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	0.0012	<0.0005	<0.0005	0.0007	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0010	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	0.0006	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW141_1.5-2.0 _240522 Lab QC bottle added	0960_MW141_3.0-3.5 _240522	0960_MW141_5.0-5.5 _240522	0960_MW141_7.0-7.5 _240522	----
Sampling date / time				22-May-2024 15:10	22-May-2024 15:11	22-May-2024 15:11	22-May-2024 15:12	---
Compound	CAS Number	LOR	Unit	EP2407047-011	EP2407047-012	EP2407047-013	EP2407047-014	-----
				Result	Result	Result	Result	---
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	----
EP231P: PFAS Sums								
Sum of PFAS	---	0.0003	µg/L	0.0017	0.0004	0.0005	0.0091	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	0.0005	0.0004	0.0005	0.0023	----
Sum of PFAS (WA DER List)	---	0.0003	µg/L	0.0017	0.0004	0.0005	0.0091	----
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.0005	%	103	94.6	93.6	96.5	----
13C8-PFOA	---	0.0005	%	91.2	81.8	84.3	94.6	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0960_QC301_240522	0960_QC302_240522	0960_QC303_240522	0960_QC401_240522	0960_QC402_240522
Sampling date / time					22-May-2024 16:47	22-May-2024 16:48	22-May-2024 16:50	22-May-2024 16:51	22-May-2024 16:52
Compound	CAS Number	LOR	Unit	EP2407047-015	EP2407047-016	EP2407047-017	EP2407047-018	EP2407047-019	
				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	



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)				Sample ID	0960_QC301_240522	0960_QC302_240522	0960_QC303_240522	0960_QC401_240522	0960_QC402_240522
Sampling date / time					22-May-2024 16:47	22-May-2024 16:48	22-May-2024 16:50	22-May-2024 16:51	22-May-2024 16:52
Compound	CAS Number	LOR	Unit	EP2407047-015	EP2407047-016	EP2407047-017	EP2407047-018	EP2407047-019	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<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	<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	%	99.5	107	99.2	97.5	98.9	
13C8-PFOA	---	0.02	%	101	99.8	102	105	106	



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

0960_QC403_240522

Sampling date / time

22-May-2024 16:52

Compound

CAS Number

LOR

Unit

EP2407047-020

Result

EP231A: Perfluoroalkyl Sulfonic Acids

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

EP231B: Perfluoroalkyl Carboxylic Acids

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

EP231C: Perfluoroalkyl Sulfonamides

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



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

0960_QC403_240522

Sampling date / time

22-May-2024 16:52

Compound

CAS Number

LOR

Unit

EP2407047-020

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

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

EP231D: (n:2) Fluorotelomer Sulfonic Acids

4:2 Fluorotelomer sulfonic acid
(4:2 FTS)

757124-72-4

0.05

µg/L

<0.05

6:2 Fluorotelomer sulfonic acid
(6:2 FTS)

27619-97-2

0.05

µg/L

<0.05

8:2 Fluorotelomer sulfonic acid
(8:2 FTS)

39108-34-4

0.05

µg/L

<0.05

10:2 Fluorotelomer sulfonic acid
(10:2 FTS)

120226-60-0

0.05

µg/L

<0.05

EP231P: PFAS Sums

Sum of PFAS

0.01

µg/L

<0.01

Sum of PFHxS and PFOS

355-46-4/1763-23-1

0.01

µg/L

<0.01

Sum of PFAS (WA DER List)

0.01

µg/L

<0.01

EP231S: PFAS Surrogate

13C4-PFOS

0.02

%

99.7

13C8-PFOA

0.02

%

104



Surrogate Control Limits

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

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



QUALITY CONTROL REPORT

Work Order	: EP2407047	Page	: 1 of 14
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68071	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 20		
No. of samples analysed	: 20		



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

This 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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA

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 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.

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

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 (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5825725)									
EP2407045-008	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	737	734	0.4	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	737	734	0.4	0% - 20%
EP2407048-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	127	127	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	127	127	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5827141)									
EP2407045-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	687	681	0.9	0% - 20%
EP2407045-011	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3330	3310	0.8	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5827142)									
EP2407045-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3400	3670	7.5	0% - 20%
EP2407045-011	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	23400	24000	2.7	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5825043)									
EP2407045-009	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	774	771	0.4	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2160	2150	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	16700	16600	0.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1050	1040	0.2	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838657)									



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: 5838657) - continued									
EP2407043-006	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2407045-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	3.88	3.67	5.3	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.95	2.05	5.1	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.02	1.04	1.8	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.71	0.73	3.2	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.32	0.28	11.8	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01 (0.04)*	µg/L	34.5	36.0	4.4	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01 (0.04)*	µg/L	25.7	# 18.5	32.3	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	4.13	4.05	2.2	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	4.52	4.36	3.4	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	5.19	4.83	7.2	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5838657)									
EP2407043-006	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTriDA)	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
		EP2407045-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.23	0.21
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3			0.02	µg/L	0.28	0.30	6.1	0% - 50%
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4			0.02	µg/L	1.18	1.27	6.8	0% - 20%
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9			0.02	µg/L	0.15	0.14	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



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: 5838657) - continued									
EP2407045-005	Anonymous	EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.2	0.3	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	1.98	1.85	6.8	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	2.67	2.50	6.5	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02 (0.04)*	µg/L	16.4	15.9	3.6	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.97	0.95	1.8	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.03	<0.02	50.9	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.04	<0.02	64.1	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	0.03	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	0.06	<0.02	101	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	1.5	1.3	13.8	0% - 50%
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838657)									
EP2407043-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407045-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838657) - continued									
EP2407045-005	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5838657)									
EP2407043-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407045-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2407047
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_24



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: 5838659) - continued									
EP2407045-006	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	0.35	<0.05	150	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: 5838657)									
EP2407043-006	Anonymous	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
EP2407045-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	9.92	9.99	0.7	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	5.83	5.72	1.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	8.89	8.98	1.0	0% - 20%
EP231P: PFAS Sums (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: Sum of PFAS	----	0.01 (0.04)*	µg/L	98.2	90.3	8.4	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01 (0.04)*	µg/L	60.2	54.5	9.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01 (0.04)*	µg/L	88.2	81.0	8.4	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5825725)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	<1	20 mg/L	95.9	85.1	126
				<1	200 mg/L	101	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5827141)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	89.9	112
				<1	500 mg/L	102	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5827142)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	98.0	88.6	113
				<1	1000 mg/L	109	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5825043)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	100	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.8	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	98.7	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	95.2	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5835412)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	89.7	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	92.3	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	92.0	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	102	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	84.8	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5837016)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	105	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	97.4	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	101	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	106	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	91.8	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



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657)								
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	95.7	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	98.4	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	106	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	91.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	101	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838659)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	90.6	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	93.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	100	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	91.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	97.3	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5835412)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	106	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	89.2	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	104	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	103	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	111	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	108	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	92.8	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 (PFTriDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	105	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	96.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5837016)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	99.4	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	112	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	113	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	109	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	107	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	110	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	115	69.0	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5837016) - continued								
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	114	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	128	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	101	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838657)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	91.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	97.2	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	111	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	111	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	94.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	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	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	104	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838659)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	92.4	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	99.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	91.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	95.6	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	94.6	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	100	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	106	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	100	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	103	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5835412)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	83.2	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	94.6	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	101	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	98.2	63.3	134



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5835412) - continued								
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	108	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	103	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	88.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5837016)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	117	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	101	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	101	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	111	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	112	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	93.2	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	95.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	116	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	102	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	97.2	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	116	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	110	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	103	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838659)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	92.2	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	91.0	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	106	68.3	134



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838659) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	100	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	109	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5835412)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	97.5	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	109	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	113	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	103	53.1	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5837016)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	91.6	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	102	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	105	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: 5838657)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	102	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	104	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	102	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	108	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838659)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	95.0	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	100	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	107	64.2	133
EP231P: PFAS Sums (QCLot: 5835412)								
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: 5837016)								
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	----	---	---	---



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231P: PFAS Sums (QCLot: 5837016) - continued								
EP231X-ST: Sum of PFAS (WA DER List)	----	0.0003	µg/L	<0.0003	----	----	----	----
EP231P: PFAS Sums (QCLot: 5838657)								
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: 5838659)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5827141)							
EP2407045-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5827142)							
EP2407045-001	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	96.8	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	98.8	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	# Not Determined	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	99.6	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	95.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	105	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838659)							
EP2407047-010	0960_MW145_3.0-3.5_240522 Lab QC bottles added	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	97.0	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	98.5	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	95.7	68.0	129



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838659) - continued							
EP2407047-010	0960_MW145_3.0-3.5_240522 Lab QC bottles added	EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	105	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	90.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	84.6	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	85.9	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	88.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	92.1	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	93.0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	105	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	97.3	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	102	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	90.9	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	108	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	104	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838659)							
EP2407047-010	0960_MW145_3.0-3.5_240522 Lab QC bottles added	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	90.7	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	94.7	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	102	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	95.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	91.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	92.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	95.7	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.8	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	107	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	89.8	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	129	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	95.4	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	98.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	100.0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	107	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	102	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	101	65.0	136



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657) - continued							
EP2407045-003	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	101	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838659)							
EP2407047-010	0960_MW145_3.0-3.5_240522 Lab QC bottles added	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	92.4	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	99.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	101	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	120	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	103	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	110	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	106	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	99.7	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	107	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	126	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	# 143	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838659)							
EP2407047-010	0960_MW145_3.0-3.5_240522 Lab QC bottles added	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	104	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	115	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	92.6	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	73.4	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407047	Page	: 1 of 8
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Site	: Learmonth GW - SC	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 20
Order number	: pfas-omp Learmonth	No. of samples analysed	: 20

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

- 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
Duplicate (DUP) RPDs							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407045--006	Anonymous	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	32.3 %	0% - 20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2407045--001	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	EP2407045--001	Anonymous	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407045--003	Anonymous	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231D: (n:2) Fluorotelomer Sulfonic Acids	EP2407045--003	Anonymous	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	143 %	70.0-130%	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural							
0960_MW137_0.8-1.3_240522,	0960_QC125_240522,	—	—	—	31-May-2024	29-May-2024	2
0960_MW179_1.0-1.5_240522,	0960_MW145_3.0-3.5_240522 - Lab QC bottles						
added,							
0960_MW141_1.5-2.0_240522 - Lab QC bottle added							

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	26	0.00	10.00	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



Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED037P: Alkalinity by PC Titrator									
Clear Plastic Bottle - Natural (ED037-P) 0960_MW137_0.8-1.3_240522, 0960_MW179_1.0-1.5_240522, added, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added		0960_QC125_240522, 0960_MW145_3.0-3.5_240522 - Lab QC bottles	22-May-2024	---	---	---	30-May-2024	05-Jun-2024	✔
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Clear Plastic Bottle - Natural (ED041G) 0960_MW137_0.8-1.3_240522, 0960_MW179_1.0-1.5_240522, added, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added		0960_QC125_240522, 0960_MW145_3.0-3.5_240522 - Lab QC bottles	22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✔
ED045G: Chloride by Discrete Analyser									
Clear Plastic Bottle - Natural (ED045G) 0960_MW137_0.8-1.3_240522, 0960_MW179_1.0-1.5_240522, added, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added		0960_QC125_240522, 0960_MW145_3.0-3.5_240522 - Lab QC bottles	22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✔
ED093F: Dissolved Major Cations									
Clear Plastic Bottle - Natural (ED093F) 0960_MW137_0.8-1.3_240522, 0960_MW179_1.0-1.5_240522, added, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added		0960_QC125_240522, 0960_MW145_3.0-3.5_240522 - Lab QC bottles	22-May-2024	---	---	---	31-May-2024	29-May-2024	✘



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST) 0960_MW137_0.8-1.3_240522, 0960_QC125_240522, 0960_MW137_2.5-3.0_240522, 0960_MW137_4.5-5.0_240522, 0960_MW137_6.5-7.0_240522, 0960_MW179_1.0-1.5_240522, 0960_MW179_3.2-3.7_240522, 0960_MW179_5.9-6.4_240522, 0960_MW179_8.5-9.0_240522, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added, 0960_MW141_3.0-3.5_240522, 0960_MW141_5.0-5.5_240522, 0960_MW141_7.0-7.5_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_MW145_3.0-3.5_240522 - Lab QC bottles added, 0960_QC301_240522, 0960_QC302_240522, 0960_QC303_240522, 0960_QC401_240522, 0960_QC402_240522, 0960_QC403_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-ST) 0960_MW137_0.8-1.3_240522, 0960_QC125_240522, 0960_MW137_2.5-3.0_240522, 0960_MW137_4.5-5.0_240522, 0960_MW137_6.5-7.0_240522, 0960_MW179_1.0-1.5_240522, 0960_MW179_3.2-3.7_240522, 0960_MW179_5.9-6.4_240522, 0960_MW179_8.5-9.0_240522, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added, 0960_MW141_3.0-3.5_240522, 0960_MW141_5.0-5.5_240522, 0960_MW141_7.0-7.5_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_MW145_3.0-3.5_240522 - Lab QC bottles added, 0960_QC301_240522, 0960_QC302_240522, 0960_QC303_240522, 0960_QC401_240522, 0960_QC402_240522, 0960_QC403_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-ST) 0960_MW137_0.8-1.3_240522, 0960_QC125_240522, 0960_MW137_2.5-3.0_240522, 0960_MW137_4.5-5.0_240522, 0960_MW137_6.5-7.0_240522, 0960_MW179_1.0-1.5_240522, 0960_MW179_3.2-3.7_240522, 0960_MW179_5.9-6.4_240522, 0960_MW179_8.5-9.0_240522, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added, 0960_MW141_3.0-3.5_240522, 0960_MW141_5.0-5.5_240522, 0960_MW141_7.0-7.5_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_MW145_3.0-3.5_240522 - Lab QC bottles added, 0960_QC301_240522, 0960_QC302_240522, 0960_QC303_240522, 0960_QC401_240522, 0960_QC402_240522, 0960_QC403_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓



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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-ST) 0960_MW137_0.8-1.3_240522, 0960_QC125_240522, 0960_MW137_2.5-3.0_240522, 0960_MW137_4.5-5.0_240522, 0960_MW137_6.5-7.0_240522, 0960_MW179_1.0-1.5_240522, 0960_MW179_3.2-3.7_240522, 0960_MW179_5.9-6.4_240522, 0960_MW179_8.5-9.0_240522, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added, 0960_MW141_3.0-3.5_240522, 0960_MW141_5.0-5.5_240522, 0960_MW141_7.0-7.5_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✔	05-Jun-2024	18-Nov-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW145_3.0-3.5_240522 - Lab QC bottles added, 0960_QC301_240522, 0960_QC302_240522, 0960_QC303_240522, 0960_QC401_240522, 0960_QC402_240522, 0960_QC403_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-ST) 0960_MW137_0.8-1.3_240522, 0960_QC125_240522, 0960_MW137_2.5-3.0_240522, 0960_MW137_4.5-5.0_240522, 0960_MW137_6.5-7.0_240522, 0960_MW179_1.0-1.5_240522, 0960_MW179_3.2-3.7_240522, 0960_MW179_5.9-6.4_240522, 0960_MW179_8.5-9.0_240522, 0960_MW141_1.5-2.0_240522 - Lab QC bottle added, 0960_MW141_3.0-3.5_240522, 0960_MW141_5.0-5.5_240522, 0960_MW141_7.0-7.5_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✔	05-Jun-2024	18-Nov-2024	✔
HDPE (no PTFE) (EP231X) 0960_MW145_3.0-3.5_240522 - Lab QC bottles added, 0960_QC301_240522, 0960_QC302_240522, 0960_QC303_240522, 0960_QC401_240522, 0960_QC402_240522, 0960_QC403_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	10	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	27	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	26	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	2	26	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	2	26	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	26	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, 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 5.4, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions



Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2407048



Telephone - 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PEASOM-24 Client: Stantec

Project Manager: _____

Phone: _____

ALS Compass COC Reference: 68064; 68061 # Samples: _____

Sampler: _____

Phone: _____

68063; 68075; 68062; 68072; 68071; 68090; 68080

Turnaround Requirements: Standard

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

22/5/24

24/5 11am



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



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 (30 analytes)	WATER - EP231X-ST PFAS - Full Suite (30 analytes) Super Trace	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EP2407048-001	22-May-2024 14:22	0960_OTH132_240522		✓	✓
EP2407048-002	22-May-2024 14:44	0960_SW192_240522	✓		✓
EP2407048-003	22-May-2024 15:04	0960_OTH134_240522		✓	✓
EP2407048-004	22-May-2024 15:16	0960_SW193_240522		✓	✓
EP2407048-005	22-May-2024 16:44	0960_QC133_240522	✓		✓

Proactive Holding Time Report

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

Requested Deliverables

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



CERTIFICATE OF ANALYSIS

Work Order	: EP2407048	Page	: 1 of 8
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68101	Issue Date	: 06-Jun-2024 18:18
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SW/OTH - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 5		
No. of samples analysed	: 5		



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

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	SENIOR LAB TECH	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X: High matrix spike recovery deemed acceptable as all associated analyte results are less than LOR.
- EP231X-ST: LOR raised for particular analytes on sample "EP2407048_003" due to matrix interferences.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH132_24052 2	0960_SW192_240522	0960_OTH134_24052 2	0960_SW193_240522	0960_QC133_240522
Sampling date / time				22-May-2024 14:22	22-May-2024 14:44	22-May-2024 15:04	22-May-2024 15:16	22-May-2024 16:44
Compound	CAS Number	LOR	Unit	EP2407048-001	EP2407048-002	EP2407048-003	EP2407048-004	EP2407048-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	146	127	233	130	127
Total Alkalinity as CaCO ₃	---	1	mg/L	146	127	233	130	127
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	2900	2890	2830	2910	2840
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	18800	19200	19800	19400	18500
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	464	434	452	464	449
Magnesium	7439-95-4	1	mg/L	1470	1390	1420	1480	1440
Sodium	7440-23-5	1	mg/L	11500	10900	11100	11600	11200
Potassium	7440-09-7	1	mg/L	544	514	533	553	534
EN055: Ionic Balance								
∅ Total Anions	---	0.01	meq/L	594	604	622	610	584
∅ Total Cations	---	0.01	meq/L	658	623	636	664	642
∅ Ionic Balance	---	0.01	%	5.16	1.55	1.09	4.18	4.75
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	---	<0.0005	<0.0005	---
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	<0.0005	---	<0.0005	<0.0005	---
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	<0.0005	---	<0.0005	<0.0005	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	---	<0.01	---	---	<0.01



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH132_24052 2	0960_SW192_240522	0960_OTH134_24052 2	0960_SW193_240522	0960_QC133_240522
Sampling date / time				22-May-2024 14:22	22-May-2024 14:44	22-May-2024 15:04	22-May-2024 15:16	22-May-2024 16:44
Compound	CAS Number	LOR	Unit	EP2407048-001	EP2407048-002	EP2407048-003	EP2407048-004	EP2407048-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	----	<0.0005	<0.0005	----
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	----	0.0017	0.0005	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	----	<0.0016	<0.0005	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	----	<0.01	----	----	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	----	<0.02	----	----	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	----	<0.002	0.002	----
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	----	<0.1	----	----	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	----	<0.0005	<0.0005	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	0.0005	----	0.0005	0.0005	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	----	0.0014	<0.0005	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	----	<0.0005	<0.0005	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	----	<0.01	----	----	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	----	<0.0005	<0.0005	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	----	<0.0016	<0.0005	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	----	<0.0016	<0.0005	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	----	<0.02	----	----	<0.02



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH132_24052 2	0960_SW192_240522	0960_OTH134_24052 2	0960_SW193_240522	0960_QC133_240522
Sampling date / time				22-May-2024 14:22	22-May-2024 14:44	22-May-2024 15:04	22-May-2024 15:16	22-May-2024 16:44
Compound	CAS Number	LOR	Unit	EP2407048-001	EP2407048-002	EP2407048-003	EP2407048-004	EP2407048-005
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	----	<0.0016	<0.0005	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	----	<0.0016	<0.0005	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	----	<0.02	----	----	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	----	<0.0039	<0.0005	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	----	<0.05	----	----	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	----	<0.0016	<0.0005	----
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	<0.001	----	<0.004	<0.001	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	----	<0.05	----	----	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	----	<0.004	<0.001	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	----	<0.05	----	----	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	----	<0.004	<0.001	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	----	<0.05	----	----	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	----	<0.004	<0.001	----
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	0.0005	µg/L	<0.0005	----	<0.0016	<0.0005	----



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH132_24052 2	0960_SW192_240522	0960_OTH134_24052 2	0960_SW193_240522	0960_QC133_240522
Sampling date / time				22-May-2024 14:22	22-May-2024 14:44	22-May-2024 15:04	22-May-2024 15:16	22-May-2024 16:44
Compound	CAS Number	LOR	Unit	EP2407048-001	EP2407048-002	EP2407048-003	EP2407048-004	EP2407048-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	<0.0005	----	<0.0016	<0.0005	----
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	<0.001	----	<0.001	<0.001	----
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	<0.001	----	<0.001	<0.001	----
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	<0.001	----	<0.002	<0.001	----
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	<0.001	----	<0.002	<0.001	----
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	0.0016	----	0.0031	0.0025	----
Sum of PFAS	----	0.01	µg/L	----	<0.01	----	----	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	0.0016	----	0.0017	0.0005	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	----	<0.01	----	----	<0.01
Sum of PFAS (WA DER List)	----	0.0003	µg/L	0.0016	----	0.0031	0.0025	----



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_OTH132_24052 2	0960_SW192_240522	0960_OTH134_24052 2	0960_SW193_240522	0960_QC133_240522
Sampling date / time					22-May-2024 14:22	22-May-2024 14:44	22-May-2024 15:04	22-May-2024 15:16	22-May-2024 16:44
Compound	CAS Number	LOR	Unit		EP2407048-001	EP2407048-002	EP2407048-003	EP2407048-004	EP2407048-005
				Result	Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued									
Sum of PFAS (WA DER List)	---	0.01	µg/L		----	<0.01	----	----	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0005	%		102	----	92.5	93.2	----
13C4-PFOS	---	0.02	%		----	97.2	----	----	103
13C8-PFOA	---	0.0005	%		89.9	----	90.0	88.1	----
13C8-PFOA	---	0.02	%		----	99.2	----	----	102



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407048	Page	: 1 of 10
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68101	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED]		
Site	: Learmonth SW/OTH - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 5		
No. of samples analysed	: 5		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	SENIOR LAB TECH	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5825725)									
EP2407045-008	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	12	16	26.6	0% - 50%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1270	1290	1.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1280	1310	2.2	0% - 20%
EP2407048-002	0960_SW192_240522	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	127	127	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	127	127	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5827144)									
EP2407030-023	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1110	1090	1.5	0% - 20%
EP2407273-004	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	286	286	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5827143)									
EP2407030-023	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	7320	7340	0.1	0% - 20%
EP2407273-004	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	908	900	0.9	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5825054)									
EP2407048-001	0960_OTH132_240522	ED093F: Calcium	7440-70-2	1	mg/L	464	452	2.6	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1470	1430	3.2	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	11500	11100	3.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	544	536	1.4	0% - 20%
EP2407055-006	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	159	160	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	211	212	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2110	2110	0.2	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 (%)
ED093F: Dissolved Major Cations (QC Lot: 5825054) - continued									
EP2407055-006	Anonymous	ED093F: Potassium	7440-09-7	1	mg/L	113	113	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838657)									
EP2407043-006	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2407045-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	3.88	3.67	5.3	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.95	2.05	5.1	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.02	1.04	1.8	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.71	0.73	3.2	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.32	0.28	11.8	0% - 50%
		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: 5838657)									
EP2407043-006	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
		EP2407045-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.23	0.21
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3			0.02	µg/L	0.28	0.30	6.1	0% - 50%
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4			0.02	µg/L	1.18	1.27	6.8	0% - 20%
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9			0.02	µg/L	0.15	0.14	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	0.2	0.3	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838657)									
EP2407043-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407045-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5838657)									
EP2407043-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407045-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit

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 Work Order : EP2407048
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_24



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: 5838657) - continued									
EP2407045-005	Anonymous	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: 5838657)									
EP2407043-006	Anonymous	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
EP2407045-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	9.92	9.99	0.7	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	5.83	5.72	1.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	8.89	8.98	1.0	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5825725)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	95.9	85.1	126
				<1	200 mg/L	101	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5827144)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	89.9	112
				<1	500 mg/L	97.7	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5827143)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	96.1	88.6	113
				<1	1000 mg/L	95.6	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5825054)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.1	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.2	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	96.3	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.0	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5837016)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	105	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	97.4	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	101	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	106	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	91.8	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
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657)								
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	95.7	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	98.4	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	106	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	91.4	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	101	53.0	142



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5837016)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	99.4	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	112	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	113	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	109	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	107	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	110	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	115	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	114	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	128	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	101	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838657)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	91.7	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	97.2	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	101	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	111	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	111	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	94.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	112	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	105	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	104	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5837016)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	97.2	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	117	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	101	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	101	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	111	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	112	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	93.2	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	95.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	116	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	102	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	97.2	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	116	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	110	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	103	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5837016)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	91.6	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	102	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	105	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: 5838657)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	102	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	104	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	102	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	108	64.2	133
EP231P: PFAS Sums (QCLot: 5837016)								
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: 5838657)								
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**

Matrix Spike (MS) Report



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5827144)							
EP2407030-023	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5827143)							
EP2407030-023	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	96.8	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	98.8	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	# Not Determined	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	99.6	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	95.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	105	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	85.9	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	88.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	106	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	92.1	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	93.0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	105	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	97.3	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	102	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	90.9	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	108	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	104	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	95.4	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	98.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	100.0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	107	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	102	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	101	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	101	61.0	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838657)							
EP2407045-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	99.7	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	107	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	126	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	# 143	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407048	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Site	: Learmonth SW/OTH - JS	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 5
Order number	: pfas-omp Learmonth	No. of samples analysed	: 5

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

- 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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO ₄ 2- by DA	EP2407030--023	Anonymous	Sulfate as SO ₄ - 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	EP2407030--023	Anonymous	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407045--003	Anonymous	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231D: (n:2) Fluorotelomer Sulfonic Acids	EP2407045--003	Anonymous	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	143 %	70.0-130%	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural							
0960_OTH132_240522,		0960_SW192_240522,					
0960_OTH134_240522,		0960_SW193_240522,					
0960_QC133_240522					31-May-2024	29-May-2024	2

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard



Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Evaluation	Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation		Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator									
Clear Plastic Bottle - Natural (ED037-P)		0960_SW192_240522, 0960_SW193_240522,	22-May-2024	---	---	---	30-May-2024	05-Jun-2024	✓
0960_OTH132_240522,									
0960_OTH134_240522,									
0960_QC133_240522									
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Clear Plastic Bottle - Natural (ED041G)		0960_SW192_240522, 0960_SW193_240522,	22-May-2024	---	---	---	05-Jun-2024	19-Jun-2024	✓
0960_OTH132_240522,									
0960_OTH134_240522,									
0960_QC133_240522									
ED045G: Chloride by Discrete Analyser									
Clear Plastic Bottle - Natural (ED045G)		0960_SW192_240522, 0960_SW193_240522,	22-May-2024	---	---	---	05-Jun-2024	19-Jun-2024	✓
0960_OTH132_240522,									
0960_OTH134_240522,									
0960_QC133_240522									
ED093F: Dissolved Major Cations									
Clear Plastic Bottle - Natural (ED093F)		0960_SW192_240522, 0960_SW193_240522,	22-May-2024	---	---	---	31-May-2024	29-May-2024	✗
0960_OTH132_240522,									
0960_OTH134_240522,									
0960_QC133_240522									
EP231A: Perfluoroalkyl Sulfonic Acids									
HDPE (no PTFE) (EP231X-ST)		0960_OTH134_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
0960_OTH132_240522,									
0960_SW193_240522									
HDPE (no PTFE) (EP231X)		0960_QC133_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids									
HDPE (no PTFE) (EP231X-ST)		0960_OTH134_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
0960_OTH132_240522,									
0960_SW193_240522									
HDPE (no PTFE) (EP231X)		0960_QC133_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓

Page : 4 of 7
 Work Order : EP2407048
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_24



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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X-ST) 0960_OTH132_240522, 0960_SW193_240522	0960_OTH134_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_SW192_240522,	0960_QC133_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X-ST) 0960_OTH132_240522, 0960_SW193_240522	0960_OTH134_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_SW192_240522,	0960_QC133_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X-ST) 0960_OTH132_240522, 0960_SW193_240522	0960_OTH134_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✓	05-Jun-2024	18-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_SW192_240522,	0960_QC133_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	20	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	20	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, 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 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
---------------------	--------	--------	---------------------



Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2407055



Custody Document for Submissions via ALS Compass App

Project: WA-0960-PEASOM-24 Client: Stantec

Project Manager:

Phone:

ALS Compass COC Reference: 68061, 68061 # Samples:

Sampler:

Phone:

68063, 68075, 68062, 68101, 68071, 68090, 68080

Turnaround Requirements: Standard

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

Right Solutions - Right Partner

alsglobal.com/als-compass



CHAIN OF CUSTODY

COC#: 68075

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PASOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_MW122		22/05/2024 10:39 AM	WATER	ALS: 3 Non ALS: 0	No	X		
002	0960_QC127		22/05/2024 10:40 AM	WATER	ALS: 3 Non ALS: 0	No	X		
003	0960_MW021		22/05/2024 11:29 AM	WATER	ALS: 3 Non ALS: 0	No	X		
004	0960_QC130		22/05/2024 11:30 AM	WATER	ALS: 3 Non ALS: 0	No	X		
005	0960_MW114		22/05/2024 11:49 AM	WATER	ALS: 3 Non ALS: 0	No	X		
006	0960_MW233		22/05/2024 12:13 PM	WATER	ALS: 3 Non ALS: 0	No	X		
007	0960_MW162		22/05/2024 12:29 PM	WATER	ALS: 3 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 68075

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

CONTACT PH:

SAMPLER MOBILE:

PRIMARY SAMPLER:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_MW113		22/05/2024 12:49 PM	WATER	ALS: 3 Non ALS: 0	No	X		
009	0960_MW164		22/05/2024 01:21 PM	WATER	ALS: 3 Non ALS: 0	No	X		
010	0960_QC131		22/05/2024 01:21 PM	WATER	ALS: 3 Non ALS: 0	No	X		
011	0960_MW211		22/05/2024 01:53 PM	WATER	ALS: 3 Non ALS: 0	No	X		
012	0960_MW018		22/05/2024 02:10 PM	WATER	ALS: 5 Non ALS: 0	No	X		Extra Lab QAQC PFAS
013	0960_MW165		22/05/2024 02:28 PM	WATER	ALS: 3 Non ALS: 0	No	X		
014	0960_MW166		22/05/2024 02:47 PM	WATER	ALS: 3 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 68075

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
015	0960_MW167		22/05/2024 03:09 PM	WATER	ALS: 3 Non ALS: 0	No	X		
016	0960_MW112		22/05/2024 03:22 PM	WATER	ALS: 3 Non ALS: 0	No	X		
017	0960_MW115		22/05/2024 04:00 PM	WATER	ALS: 3 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

COC#: 68075

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_MW122	HDPE (no PTFE)	20 mL	00352312011808	Grey	No	
001	0960_MW122	HDPE (no PTFE)	20 mL	00352312011948	Grey	No	
001	0960_MW122	Clear Plastic Bottle - Natural	125 mL	00071121181365	Green	No	
002	0960_QC127	HDPE (no PTFE)	20 mL	00351221020854	Grey	No	
002	0960_QC127	HDPE (no PTFE)	20 mL	00351221020458	Grey	No	
002	0960_QC127	Clear Plastic Bottle - Natural	125 mL	00071121128521	Green	No	
003	0960_MW021	HDPE (no PTFE)	20 mL	00352309015195	Grey	No	
003	0960_MW021	HDPE (no PTFE)	20 mL	00352309014954	Grey	No	
003	0960_MW021	Clear Plastic Bottle - Natural	125 mL	00071121181581	Green	No	
004	0960_QC130	Clear Plastic Bottle - Natural	125 mL	00071121181637	Green	No	
004	0960_QC130	HDPE (no PTFE)	20 mL	00352312004122	Grey	No	
004	0960_QC130	HDPE (no PTFE)	20 mL	00352312004056	Grey	No	
005	0960_MW114	HDPE (no PTFE)	20 mL	00351221020549	Grey	No	
005	0960_MW114	HDPE (no PTFE)	20 mL	00351221020525	Grey	No	
005	0960_MW114	Clear Plastic Bottle - Natural	125 mL	00071121128549	Green	No	
006	0960_MW233	HDPE (no PTFE)	20 mL	00351221020614	Grey	No	
006	0960_MW233	HDPE (no PTFE)	20 mL	00351221020754	Grey	No	
006	0960_MW233	Clear Plastic Bottle - Natural	125 mL	00070522075407	Green	No	
007	0960_MW162	HDPE (no PTFE)	20 mL	00350522042865	Grey	No	
007	0960_MW162	HDPE (no PTFE)	20 mL	00350522043157	Grey	No	
007	0960_MW162	Clear Plastic Bottle - Natural	125 mL	00070522144941	Green	No	
008	0960_MW113	HDPE (no PTFE)	20 mL	00352312011747	Grey	No	
008	0960_MW113	HDPE (no PTFE)	20 mL	00352312011980	Grey	No	
008	0960_MW113	Clear Plastic Bottle - Natural	125 mL	00071121181921	Green	No	
009	0960_MW164	HDPE (no PTFE)	20 mL	00352312011796	Grey	No	
009	0960_MW164	HDPE (no PTFE)	20 mL	00352312011928	Grey	No	



CHAIN OF CUSTODY

COC#: 68075

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

009	0960_MW164	Clear Plastic Bottle - Natural	125 mL	00071121181617	Green	No	
010	0960_QC131	HDPE (no PTFE)	20 mL	00350822000366	Grey	No	
010	0960_QC131	HDPE (no PTFE)	20 mL	00350822000597	Grey	No	
010	0960_QC131	Clear Plastic Bottle - Natural	125 mL	00070522162802	Green	No	
011	0960_MW211	HDPE (no PTFE)	20 mL	00351221020628	Grey	No	
011	0960_MW211	HDPE (no PTFE)	20 mL	00351221020509	Grey	No	
011	0960_MW211	Clear Plastic Bottle - Natural	125 mL	00070522075369	Green	No	
012	0960_MW018	HDPE (no PTFE)	20 mL	00350821001917	Grey	No	
012	0960_MW018	HDPE (no PTFE)	20 mL	00350821001706	Grey	No	
012	0960_MW018	HDPE (no PTFE)	20 mL	00351221006242	Grey	No	
012	0960_MW018	HDPE (no PTFE)	20 mL	00351221005799	Grey	No	
012	0960_MW018	Clear Plastic Bottle - Natural	125 mL	00070522144894	Green	No	
013	0960_MW165	Clear Plastic Bottle - Natural	125 mL	00071121181628	Green	No	
013	0960_MW165	HDPE (no PTFE)	20 mL	00352312004569	Grey	No	
013	0960_MW165	HDPE (no PTFE)	20 mL	00352312004509	Grey	No	
014	0960_MW166	HDPE (no PTFE)	20 mL	00350822000494	Grey	No	
014	0960_MW166	HDPE (no PTFE)	20 mL	00350822000459	Grey	No	
014	0960_MW166	Clear Plastic Bottle - Natural	125 mL	00071121129695	Green	No	
015	0960_MW167	HDPE (no PTFE)	20 mL	00352312011952	Grey	No	
015	0960_MW167	HDPE (no PTFE)	20 mL	00352312011812	Grey	No	
015	0960_MW167	Clear Plastic Bottle - Natural	125 mL	00071121181657	Green	No	
016	0960_MW112	HDPE (no PTFE)	20 mL	00350822082514	Grey	No	
016	0960_MW112	HDPE (no PTFE)	20 mL	00350822082404	Grey	No	
016	0960_MW112	Clear Plastic Bottle - Natural	125 mL	00070522054707	Green	No	
017	0960_MW115	HDPE (no PTFE)	20 mL	00350822007774	Grey	No	
017	0960_MW115	HDPE (no PTFE)	20 mL	00350822007877	Grey	No	
017	0960_MW115	Clear Plastic Bottle - Natural	125 mL	00070522068822	Green	No	



CHAIN OF CUSTODY

COC#: 68075

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

Total Bottle Count: ALS: 53, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407055

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

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

E-mail :
stantec.com
Telephone : ----
Facsimile : ----

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68075
Site : Learmonth GW - CG
Sampler :

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

Dates

Date Samples Received : 24-May-2024 11:00
Client Requested Due : 06-Jun-2024
Date :

Issue Date : 29-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 3
Receipt Detail :

Security Seal : Not Available
Temperature : 17.1 - Ice present
No. of samples received / analysed : 17 / 17

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

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

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

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (30 analytes)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EP2407055-001	22-May-2024 10:39	0960_MW122_240522	✓	✓
EP2407055-002	22-May-2024 10:40	0960_QC127_240522	✓	✓
EP2407055-003	22-May-2024 11:29	0960_MW021_240522	✓	✓
EP2407055-004	22-May-2024 11:30	0960_QC130_240522	✓	✓
EP2407055-005	22-May-2024 11:49	0960_MW114_240522	✓	✓
EP2407055-006	22-May-2024 12:13	0960_MW233_240522	✓	✓
EP2407055-007	22-May-2024 12:29	0960_MW162_240522	✓	✓
EP2407055-008	22-May-2024 12:49	0960_MW113_240522	✓	✓
EP2407055-009	22-May-2024 13:21	0960_MW164_240522	✓	✓
EP2407055-010	22-May-2024 13:21	0960_QC131_240522	✓	✓
EP2407055-011	22-May-2024 13:53	0960_MW211_240522	✓	✓
EP2407055-012	22-May-2024 14:10	0960_MW018_240522	✓	✓
EP2407055-013	22-May-2024 14:28	0960_MW165_240522	✓	✓
EP2407055-014	22-May-2024 14:47	0960_MW166_240522	✓	✓
EP2407055-015	22-May-2024 15:09	0960_MW167_240522	✓	✓
EP2407055-016	22-May-2024 15:22	0960_MW112_240522	✓	✓
EP2407055-017	22-May-2024 16:00	0960_MW115_240522	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

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



CERTIFICATE OF ANALYSIS

Work Order	: EP2407055	Page	: 1 of 15
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68075	Issue Date	: 07-Jun-2024 18:48
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 17		
No. of samples analysed	: 17		



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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X: Sample EP2407045-06 shows poor duplicate precision due to sample heterogeneity. confirmed by re-extraction and re-analysis.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW122_240522	0960_QC127_240522	0960_MW021_240522	0960_QC130_240522	0960_MW114_240522
Sampling date / time				22-May-2024 10:39	22-May-2024 10:40	22-May-2024 11:29	22-May-2024 11:30	22-May-2024 11:49
Compound	CAS Number	LOR	Unit	EP2407055-001	EP2407055-002	EP2407055-003	EP2407055-004	EP2407055-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	63	45	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	372	348	1110	975	452
Total Alkalinity as CaCO3	----	1	mg/L	372	348	1180	1020	452
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2100	2170	62	88	198
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	15800	17200	167	426	2640
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	370	412	6	12	159
Magnesium	7439-95-4	1	mg/L	977	1060	9	14	123
Sodium	7440-23-5	1	mg/L	9410	9980	600	662	1480
Potassium	7440-09-7	1	mg/L	555	587	21	24	57
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	497	537	29.6	34.2	87.6
☐ Total Cations	----	0.01	meq/L	522	557	27.7	31.2	83.9
☐ Ionic Balance	----	0.01	%	2.50	1.79	3.32	4.69	2.18
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.11	0.14	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.15	0.17	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.01	<0.01	0.86	1.12	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	0.03	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.26	0.93	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW122_240522	0960_QC127_240522	0960_MW021_240522	0960_QC130_240522	0960_MW114_240522
Sampling date / time					22-May-2024 10:39	22-May-2024 10:40	22-May-2024 11:29	22-May-2024 11:30	22-May-2024 11:49
Compound	CAS Number	LOR	Unit	EP2407055-001	EP2407055-002	EP2407055-003	EP2407055-004	EP2407055-005	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
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	0.09	<0.01	1.81	2.87	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.01	<0.01	1.12	2.05	<0.01	
Sum of PFAS (WA DER List)	---	0.01	µg/L	0.09	<0.01	1.66	2.67	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	100	105	103	102	101	
13C8-PFOA	---	0.02	%	86.5	83.5	84.7	90.1	85.7	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW233_240522	0960_MW162_240522	0960_MW113_240522	0960_MW164_240522	0960_QC131_240522
Sampling date / time				22-May-2024 12:13	22-May-2024 12:29	22-May-2024 12:49	22-May-2024 13:21	22-May-2024 13:21
Compound	CAS Number	LOR	Unit	EP2407055-006	EP2407055-007	EP2407055-008	EP2407055-009	EP2407055-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	390	506	423	661	569
Total Alkalinity as CaCO3	----	1	mg/L	390	506	423	661	569
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	497	353	274	528	705
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	3520	3720	3590	2810	3540
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	159	203	269	124	174
Magnesium	7439-95-4	1	mg/L	211	232	213	135	185
Sodium	7440-23-5	1	mg/L	2110	2140	1900	1880	2260
Potassium	7440-09-7	1	mg/L	113	123	80	98	100
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	117	122	115	103	126
☐ Total Cations	----	0.01	meq/L	120	125	116	102	125
☐ Ionic Balance	----	0.01	%	1.07	1.23	0.09	0.92	0.45
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.34	0.34	<0.02	0.08	0.42
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	1.90	0.38	<0.02	0.11	0.53
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	23.5	2.77	<0.01	0.81	3.27
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	1.95	0.06	<0.02	0.03	0.16
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	7.31	0.30	<0.01	0.86	1.26
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW233_240522	0960_MW162_240522	0960_MW113_240522	0960_MW164_240522	0960_QC131_240522
Sampling date / time				22-May-2024 12:13	22-May-2024 12:29	22-May-2024 12:49	22-May-2024 13:21	22-May-2024 13:21
Compound	CAS Number	LOR	Unit	EP2407055-006	EP2407055-007	EP2407055-008	EP2407055-009	EP2407055-010
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	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	0.51	<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	43.0	5.10	<0.01	2.28	7.53
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	30.8	3.07	<0.01	1.67	4.53
Sum of PFAS (WA DER List)	---	0.01	µg/L	39.1	4.66	<0.01	2.14	6.84
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	94.3	99.8	101	102	97.5
13C8-PFOA	---	0.02	%	99.1	85.9	87.0	97.7	92.8



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW211_240522	0960_MW018_240522	0960_MW165_240522	0960_MW166_240522	0960_MW167_240522
Sampling date / time				22-May-2024 13:53	22-May-2024 14:10	22-May-2024 14:28	22-May-2024 14:47	22-May-2024 15:09
Compound	CAS Number	LOR	Unit	EP2407055-011	EP2407055-012	EP2407055-013	EP2407055-014	EP2407055-015
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	19	<1	15	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	719	941	733	902	934
Total Alkalinity as CaCO ₃	----	1	mg/L	738	941	748	902	934
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	39	109	36	50	322
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	72	301	224	352	818
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	3	11	5	8	29
Magnesium	7439-95-4	1	mg/L	5	13	6	9	28
Sodium	7440-23-5	1	mg/L	326	607	430	579	952
Potassium	7440-09-7	1	mg/L	15	23	17	25	40
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	17.6	29.6	22.0	29.0	48.4
☐ Total Cations	----	0.01	meq/L	15.1	28.6	19.9	27.0	46.2
☐ Ionic Balance	----	0.01	%	7.53	1.64	5.09	3.62	2.38
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.08	0.06	<0.02	0.03	0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.07	0.08	<0.02	0.03	0.04
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.55	0.82	<0.01	0.20	0.53
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.03	0.03	<0.02	<0.02	0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	5.96	0.56	0.01	0.21	0.66
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW211_240522	0960_MW018_240522	0960_MW165_240522	0960_MW166_240522	0960_MW167_240522
Sampling date / time					22-May-2024 13:53	22-May-2024 14:10	22-May-2024 14:28	22-May-2024 14:47	22-May-2024 15:09
Compound	CAS Number	LOR	Unit	EP2407055-011	EP2407055-012	EP2407055-013	EP2407055-014	EP2407055-015	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
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	7.24	8.48	0.01	1.21	1.80	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	6.51	1.38	0.01	0.41	1.19	
Sum of PFAS (WA DER List)	---	0.01	µg/L	7.10	8.37	0.01	1.18	1.72	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	96.5	96.1	107	99.7	101	
13C8-PFOA	---	0.02	%	99.5	98.6	91.0	87.2	82.2	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW112_240522	0960_MW115_240522	----	----	----
Sampling date / time				22-May-2024 15:22	22-May-2024 16:00	----	----	----
Compound	CAS Number	LOR	Unit	EP2407055-016	EP2407055-017	-----	-----	-----
Result				Result	Result	---	---	---
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	748	364	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	748	364	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1030	1530	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	2740	10600	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	91	494	----	----	----
Magnesium	7439-95-4	1	mg/L	121	686	----	----	----
Sodium	7440-23-5	1	mg/L	2120	6150	----	----	----
Potassium	7440-09-7	1	mg/L	122	279	----	----	----
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	114	338	----	----	----
☐ Total Cations	----	0.01	meq/L	110	356	----	----	----
☐ Ionic Balance	----	0.01	%	1.72	2.54	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.02	0.20	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.03	0.22	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.38	1.52	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.04	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.48	0.42	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW112_240522	0960_MW115_240522	----	----	----
Sampling date / time					22-May-2024 15:22	22-May-2024 16:00	----	----	----
Compound	CAS Number	LOR	Unit	EP2407055-016	EP2407055-017	-----	-----	-----	
				Result	Result	---	---	---	
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	0.09	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.08	0.43	----	----	----	
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	0.04	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.02	0.02	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----	
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



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW112_240522	0960_MW115_240522	----	----	----
Sampling date / time				22-May-2024 15:22	22-May-2024 16:00	----	----	----
Compound	CAS Number	LOR	Unit	EP2407055-016	EP2407055-017	-----	-----	-----
				Result	Result	---	---	---
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
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	1.00	2.98	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.86	1.94	----	----	----
Sum of PFAS (WA DER List)	---	0.01	µg/L	0.97	2.72	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	107	100	----	----	----
13C8-PFOA	---	0.02	%	97.3	85.9	----	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407055	Page	: 1 of 11
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68075	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED]		
Site	: Learmonth GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 17		
No. of samples analysed	: 17		



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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5825725)									
EP2407045-008	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	737	734	0.4	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	737	734	0.4	0% - 20%
EP2407048-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	127	127	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	127	127	0.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5825727)									
EP2407055-005	0960_MW114_240522	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	452	453	0.0	0% - 20%
		ED037 P Total Alkalinity as CaCO3	----	1	mg/L	452	453	0.0	0% - 20%
EP2407055-015	0960_MW167_240522	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	934	932	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	934	932	0.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5827145)									
EP2407055-001	0960_MW122_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2100	2090	0.5	0% - 20%
EP2407055-011	0960_MW211_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	39	38	3.3	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 (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 5827146)									
EP2407055-001	0960_MW122_240522	ED045G: Chloride	16887-00-6	1	mg/L	15800	15700	0.9	0% - 20%
EP2407055-011	0960_MW211_240522	ED045G: Chloride	16887-00-6	1	mg/L	72	75	4.5	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5825054)									
EP2407048-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	464	452	2.6	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1470	1430	3.2	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	11500	11100	3.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	544	536	1.4	0% - 20%
EP2407055-006	0960_MW233_240522	ED093F: Calcium	7440-70-2	1	mg/L	159	160	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	211	212	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2110	2110	0.2	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	113	113	0.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5825055)									
EP2407055-016	0960_MW112_240522	ED093F: Calcium	7440-70-2	1	mg/L	91	92	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	121	122	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2120	2150	1.5	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	122	123	1.3	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838498)									
EP2407055-012	0960_MW018_240522	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.82	0.82	0.0	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.56	0.53	6.3	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	0.05	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.08	0.08	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.03	0.03	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01 (0.04)*	µg/L	34.5	36.0	4.4	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01 (0.04)*	µg/L	25.7	# 18.5	32.3	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	4.13	4.05	2.2	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	4.52	4.36	3.4	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	5.19	4.83	7.2	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5838498)									
EP2407055-012	0960_MW018_240522	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.16	0.17	0.0	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	2.19	2.37	8.0	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	2.14	2.09	2.4	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	1.44	1.72	18.2	0% - 20%
		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



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: 5838498) - continued									
EP2407055-012	0960_MW018_240522	EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	1.0	1.1	0.0	0% - 50%
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	1.98	1.85	6.8	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	2.67	2.50	6.5	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02 (0.04)*	µg/L	16.4	15.9	3.6	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.97	0.95	1.8	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.03	<0.02	50.9	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.04	<0.02	64.1	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	0.03	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	0.06	<0.02	101	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	1.5	1.3	13.8	0% - 50%
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838498)									
EP2407055-012	0960_MW018_240522	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355 31 9	0 02	µg/L	0 02	0 02	0 0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838659) - continued									
EP2407045-006	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5838498)									
EP2407055-012	0960_MW018_240522	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	0.35	<0.05	150	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: 5838498)									
EP2407055-012	0960_MW018_240522	EP231X: Sum of PFAS	----	0.01	µg/L	8.48	8.96	5.5	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.38	1.35	2.2	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	8.37	8.85	5.6	0% - 20%
EP231P: PFAS Sums (QC Lot: 5838659)									
EP2407045-006	Anonymous	EP231X: Sum of PFAS	----	0.01 (0.04)*	µg/L	98.2	90.3	8.4	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01 (0.04)*	µg/L	60.2	54.5	9.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01 (0.04)*	µg/L	88.2	81.0	8.4	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5825725)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	95.9	85.1	126
				<1	200 mg/L	101	90.5	111
ED037P: Alkalinity by PC Titrator (QCLot: 5825727)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	93.7	85.1	126
				<1	200 mg/L	98.2	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5827145)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	100.0	89.9	112
				<1	500 mg/L	101	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5827146)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	100	88.6	113
				<1	1000 mg/L	102	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5825054)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.1	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.2	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	96.3	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.0	84.6	108
ED093F: Dissolved Major Cations (QCLot: 5825055)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.7	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.3	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	97.3	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.0	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838498)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	91.5	72.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838498) - continued								
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	94.4	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	92.7	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	97.9	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	93.1	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	85.3	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838659)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	90.6	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	93.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	100	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	91.8	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	97.3	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838498)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	97.1	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	79.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	99.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	103	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	99.4	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	94.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	95.8	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	102	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	121	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	101	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838659)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	92.4	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	99.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	103	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	91.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	95.6	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	94.6	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	100	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	106	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	100	72.0	134



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838659) - continued								
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	103	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838498)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	88.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	110	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.2	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	94.9	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	95.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	94.4	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838659)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	92.2	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	91.0	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	106	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	100	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	109	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838498)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	97.3	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	108	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	112	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	86.1	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838659)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	95.0	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	100	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	107	64.2	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) LowHigh
EP231P: PFAS Sums (QCLot: 5838498)								
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: 5838659)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5827145)							
EP2407055-001	0960_MW122_240522	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5827146)							
EP2407055-001	0960_MW122_240522	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838498)							
EP2407056-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	88.4	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	94.6	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	91.2	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	94.5	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	87.1	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	90.9	53.0	129
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838659)							
EP2407047-010	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	97.0	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	98.5	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	95.7	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	105	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	90.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	84.6	53.0	129



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838498)							
EP2407056-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	97.6	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	79.6	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	110	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	97.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	84.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.2	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	93.6	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	90.2	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	122	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	100	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838659)							
EP2407047-010	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	90.7	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	94.7	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	102	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	95.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	91.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	92.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	95.7	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.8	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	107	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	89.8	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	129	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838498)							
EP2407056-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	85.8	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	99.9	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	104	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	96.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	107	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	84.8	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	90.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838659)							
EP2407047-010	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	92.4	59.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838659) - continued							
EP2407047-010	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	99.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	101	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	120	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	103	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	110	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	106	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838498)							
EP2407056-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	100	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	121	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	96.3	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838659)							
EP2407047-010	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	104	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	115	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	92.6	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	73.4	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407055	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Site	: Learmonth GW - CG	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED]	No. of samples received	: 17
Order number	: pfas-omp Learmonth	No. of samples analysed	: 17

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

- 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.

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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
Duplicate (DUP) RPDs							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407045--006	Anonymous	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	32.3 %	0% - 20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2407055--001	0960_MW122_240522	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	EP2407055--001	0960_MW122_240522	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	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
ED093F: Dissolved Major Cations						
Clear Plastic Bottle - Natural 0960_MW122_240522, 0960_MW021_240522, 0960_MW114_240522, 0960_MW162_240522, 0960_MW164_240522, 0960_MW211_240522, 0960_MW165_240522, 0960_MW167_240522, 0960_MW115_240522	0960_QC127_240522, 0960_QC130_240522, 0960_MW233_240522, 0960_MW113_240522, 0960_QC131_240522, 0960_MW018_240522, 0960_MW166_240522, 0960_MW112_240522,	---	---	---	31-May-2024	29-May-2024
						2

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	25	8.00	10.00	NEPM 2013 B3 & ALS QC Standard



Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		22-May-2024	---	---	---	30-May-2024	05-Jun-2024	✔
0960_MW122_240522, 0960_QC127_240522,								
0960_MW021_240522, 0960_QC130_240522,								
0960_MW114_240522, 0960_MW233_240522,								
0960_MW162_240522, 0960_MW113_240522,								
0960_MW164_240522, 0960_QC131_240522,								
0960_MW211_240522, 0960_MW018_240522,								
0960_MW165_240522, 0960_MW166_240522,								
0960_MW167_240522, 0960_MW112_240522,								
0960_MW115_240522								
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)		22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✔
0960_MW122_240522, 0960_QC127_240522,								
0960_MW021_240522, 0960_QC130_240522,								
0960_MW114_240522, 0960_MW233_240522,								
0960_MW162_240522, 0960_MW113_240522,								
0960_MW164_240522, 0960_QC131_240522,								
0960_MW211_240522, 0960_MW018_240522,								
0960_MW165_240522, 0960_MW166_240522,								
0960_MW167_240522, 0960_MW112_240522,								
0960_MW115_240522								
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)		22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✔
0960_MW122_240522, 0960_QC127_240522,								
0960_MW021_240522, 0960_QC130_240522,								
0960_MW114_240522, 0960_MW233_240522,								
0960_MW162_240522, 0960_MW113_240522,								
0960_MW164_240522, 0960_QC131_240522,								
0960_MW211_240522, 0960_MW018_240522,								
0960_MW165_240522, 0960_MW166_240522,								
0960_MW167_240522, 0960_MW112_240522,								
0960_MW115_240522								



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)	22-May-2024	---	---	---	31-May-2024	29-May-2024	✖	
0960_MW122_240522,								0960_QC127_240522,
0960_MW021_240522,								0960_QC130_240522,
0960_MW114_240522,								0960_MW233_240522,
0960_MW162_240522,								0960_MW113_240522,
0960_MW164_240522,								0960_QC131_240522,
0960_MW211_240522,								0960_MW018_240522,
0960_MW165_240522,								0960_MW166_240522,
0960_MW167_240522,								0960_MW112_240522,
0960_MW115_240522								
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔	
0960_MW122_240522,								0960_QC127_240522,
0960_MW021_240522,								0960_QC130_240522,
0960_MW114_240522,								0960_MW233_240522,
0960_MW162_240522,								0960_MW113_240522,
0960_MW164_240522,								0960_QC131_240522,
0960_MW211_240522,								0960_MW018_240522,
0960_MW165_240522,								0960_MW166_240522,
0960_MW167_240522,								0960_MW112_240522,
0960_MW115_240522								
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔	
0960_MW122_240522,								0960_QC127_240522,
0960_MW021_240522,								0960_QC130_240522,
0960_MW114_240522,								0960_MW233_240522,
0960_MW162_240522,								0960_MW113_240522,
0960_MW164_240522,								0960_QC131_240522,
0960_MW211_240522,								0960_MW018_240522,
0960_MW165_240522,								0960_MW166_240522,
0960_MW167_240522,								0960_MW112_240522,
0960_MW115_240522								

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_MW122_240522, 0960_MW021_240522, 0960_MW114_240522, 0960_MW162_240522, 0960_MW164_240522, 0960_MW211_240522, 0960_MW165_240522, 0960_MW167_240522, 0960_MW115_240522	0960_QC127_240522, 0960_QC130_240522, 0960_MW233_240522, 0960_MW113_240522, 0960_QC131_240522, 0960_MW018_240522, 0960_MW166_240522, 0960_MW112_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW122_240522, 0960_MW021_240522, 0960_MW114_240522, 0960_MW162_240522, 0960_MW164_240522, 0960_MW211_240522, 0960_MW165_240522, 0960_MW167_240522, 0960_MW115_240522	0960_QC127_240522, 0960_QC130_240522, 0960_MW233_240522, 0960_MW113_240522, 0960_QC131_240522, 0960_MW018_240522, 0960_MW166_240522, 0960_MW112_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0960_MW122_240522, 0960_MW021_240522, 0960_MW114_240522, 0960_MW162_240522, 0960_MW164_240522, 0960_MW211_240522, 0960_MW165_240522, 0960_MW167_240522, 0960_MW115_240522	0960_QC127_240522, 0960_QC130_240522, 0960_MW233_240522, 0960_MW113_240522, 0960_QC131_240522, 0960_MW018_240522, 0960_MW166_240522, 0960_MW112_240522,	22-May-2024	05-Jun-2024	18-Nov-2024	✔	06-Jun-2024	18-Nov-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	3	23	13.04	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	25	8.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	23	8.70	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	23	8.70	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	25	8.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, 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.



Custody Document for Submissions via ALS Compass App

Project: NA-0960-PE/50MD-24 Client: Stantec

Project Manager: _____

Phone: _____

ALS Compass COC Reference: 68061, 68061 # Samples: _____

Sampler: _____

Phone: _____

68063, 68075, 68062, 68101, 68071, 68090, 68080

Turnaround Requirements: Standard

Special Instructions:

Custody:

Relinquished by:



Received by:



Relinquished by:

Received by:

Date / Time:

22/5/24

Date / Time:

24/5 11am

Date / Time:

Date / Time:



CHAIN OF CUSTODY

COC#: 68080

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth SW/OTH - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_POT110		22/05/2024 11:12 AM	WATER	ALS: 5 Non ALS: 0	No	X		Extra Lab QAQC PFAS



CHAIN OF CUSTODY

COC#: 68080

ALS Laboratory: EP Perth
Environmental

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth SW/OTH - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_POT110	HDPE (no PTFE)	20 mL	00351221006136	Grey	No	
001	0960_POT110	HDPE (no PTFE)	20 mL	00351221005974	Grey	No	
001	0960_POT110	HDPE (no PTFE)	20 mL	00350821000419	Grey	No	
001	0960_POT110	HDPE (no PTFE)	20 mL	00350821000359	Grey	No	
001	0960_POT110	Clear Plastic Bottle - Natural	125 mL	00070821151128	Green	No	

Total Bottle Count: ALS: 5, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407056

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

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

E-mail :
stantec.com
Telephone : ----
Facsimile : ----

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68080
Site : Learmonth SW/OTH - CG
Sampler :

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

Dates

Date Samples Received : 24-May-2024 11:00
Client Requested Due : 06-Jun-2024
Date :

Issue Date : 29-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 3
Receipt Detail :

Security Seal : Not Available
Temperature : 17.1 - Ice present
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
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2407056	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68080	Issue Date	: 07-Jun-2024 15:07
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SW/OTH - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 1		
No. of samples analysed	: 1		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

0960_POT110_24052
2

Sampling date / time

22-May-2024 11:12

Compound	CAS Number	LOR	Unit	EP2407056-001	-----	-----	-----	-----
				Result	---	---	---	---

ED037P: Alkalinity by PC Titrator

Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	---	---	---	---
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	---	---	---	---
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	300	---	---	---	---
Total Alkalinity as CaCO ₃	---	1	mg/L	300	---	---	---	---

ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA

Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	12	---	---	---	---
--	------------	---	------	----	-----	-----	-----	-----

ED045G: Chloride by Discrete Analyser

Chloride	16887-00-6	1	mg/L	128	---	---	---	---
----------	------------	---	------	-----	-----	-----	-----	-----

ED093F: Dissolved Major Cations

Calcium	7440-70-2	1	mg/L	116	---	---	---	---
Magnesium	7439-95-4	1	mg/L	11	---	---	---	---
Sodium	7440-23-5	1	mg/L	70	---	---	---	---
Potassium	7440-09-7	1	mg/L	4	---	---	---	---

EN055: Ionic Balance

∅ Total Anions	---	0.01	meq/L	9.85	---	---	---	---
∅ Total Cations	---	0.01	meq/L	9.84	---	---	---	---
∅ Ionic Balance	---	0.01	%	0.07	---	---	---	---

EP231A: Perfluoroalkyl Sulfonic Acids

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



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

0960_POT110_24052
2

Sampling date / time

22-May-2024 11:12

Compound CAS Number LOR Unit

EP2407056-001

Result

EP231B: Perfluoroalkyl Carboxylic Acids

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

EP231C: Perfluoroalkyl Sulfonamides

Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	---	---	---	---
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	---	---	---	---
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	---	---	---	---
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	---	---	---	---
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	---	---	---	---
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	---	---	---	---
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	---	---	---	---

EP231D: (n:2) Fluorotelomer Sulfonic Acids



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

0960_POT110_24052
2

Sampling date / time

22-May-2024 11:12

Compound

CAS Number

LOR

Unit

EP2407056-001

Result

EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued

4:2 Fluorotelomer sulfonic acid
(4:2 FTS)

757124-72-4

0.05

µg/L

<0.05

6:2 Fluorotelomer sulfonic acid
(6:2 FTS)

27619-97-2

0.05

µg/L

<0.05

8:2 Fluorotelomer sulfonic acid
(8:2 FTS)

39108-34-4

0.05

µg/L

<0.05

10:2 Fluorotelomer sulfonic acid
(10:2 FTS)

120226-60-0

0.05

µg/L

<0.05

EP231P: PFAS Sums

Sum of PFAS

0.01

µg/L

<0.01

Sum of PFHxS and PFOS

355-46-4/1763-23-
1

0.01

µg/L

<0.01

Sum of PFAS (WA DER List)

0.01

µg/L

<0.01

EP231S: PFAS Surrogate

13C4-PFOS

0.02

%

97.5

13C8-PFOA

0.02

%

84.7



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407056	Page	: 1 of 8
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68080	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED]		
Site	: Learmonth SW/OTH - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 1		
No. of samples analysed	: 1		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5825727)									
EP2407055-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	452	453	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3		1	mg/L	452	453	0.0	0% - 20%
EP2407055-015	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	934	932	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	934	932	0.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5823559)									
EP2407043-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3230	3230	0.1	0% - 20%
EP2407043-011	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3280	3310	0.9	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5823560)									
EP2407043-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	24100	23300	3.6	0% - 20%
EP2407043-011	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	25300	24600	3.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5825055)									
EP2407055-016	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	91	92	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	121	122	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2120	2150	1.5	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	122	123	1.3	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5838498)									
EP2407055-012	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.82	0.82	0.0	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.56	0.53	6.3	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: 5838498) - continued									
EP2407055-012	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	0.05	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.08	0.08	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.03	0.03	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: 5838498)									
EP2407055-012	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.16	0.17	0.0	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	2.19	2.37	8.0	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	2.14	2.09	2.4	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	1.44	1.72	18.2	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	1.0	1.1	0.0	0% - 50%
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5838498)									
EP2407055-012	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5838498)									
EP2407055-012	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231P: PFAS Sums (QC Lot: 5838498)									
EP2407055-012	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	8.48	8.96	5.5	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.38	1.35	2.2	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	---	0.01	µg/L	8.37	8.85	5.6	0% - 20%



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
ED037P: Alkalinity by PC Titrator (QCLot: 5825727)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	93.7	85.1	126
				<1	200 mg/L	98.2	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5823559)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	89.9	112
				<1	500 mg/L	100	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5823560)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	94.8	88.6	113
				<1	1000 mg/L	102	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5825055)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.7	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.3	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	97.3	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	94.0	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838498)								
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	94.4	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	92.7	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	97.9	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	93.1	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	85.3	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838498)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	97.1	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	79.6	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	107	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	99.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	103	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	99.4	69.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838498) - continued								
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	94.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	95.8	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	102	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	121	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838498)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	88.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	110	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.2	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	94.9	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	102	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	95.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	94.4	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838498)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	97.3	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.2378 µg/L	108	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	112	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	86.1	64.2	133
EP231P: PFAS Sums (QCLot: 5838498)								
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**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5823559)							
EP2407043-001	Anonymous						

Sub-Matrix: WATER

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5823559) - continued							
EP2407043-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5823560)							
EP2407043-001	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5838498)							
EP2407056-001	0960_POT110_240522	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	88.4	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	94.6	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	91.2	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	94.5	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	87.1	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	90.9	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5838498)							
EP2407056-001	0960_POT110_240522	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	97.6	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	79.6	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	110	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	96.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	97.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	84.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.2	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	93.6	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	90.2	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	122	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	100	71.0	132
		EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5838498)					
EP2407056-001	0960_POT110_240522	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	85.8	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	99.9	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	104	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	96.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	107	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	84.8	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	90.0	61.0	135
		EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838498)					



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5838498) - continued							
EP2407056-001	0960_POT110_240522	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	100	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	121	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	96.3	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order : EP2407056

Page : 1 of 5

Client : STANTEC AUSTRALIA PTY LTD

Laboratory : Environmental Division Perth

Contact : [REDACTED]

Telephone : +61-8-9406 1301

Project : WA_0960_PFASOMP_24

Date Samples Received : 24-May-2024

Site : Learmonth SW/OTH - CG

Issue Date : 07-Jun-2024

Sampler : [REDACTED]

No. of samples received : 1

Order number : pfas-omp Learmonth

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

Outliers : Analysis Holding Time Compliance

- 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
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2407043--001	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	EP2407043--001	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
ED093F: Dissolved Major Cations						
Clear Plastic Bottle - Natural 0960_POT110_240522	---	---	---	31-May-2024	29-May-2024	2

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	6.25	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) 0960_POT110_240522	22-May-2024	---	---	---	30-May-2024	05-Jun-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) 0960_POT110_240522	22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✓

Page : 3 of 5
 Work Order : EP2407056
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_24



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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) 0960_POT110_240522	22-May-2024	---	---	---	06-Jun-2024	19-Jun-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) 0960_POT110_240522	22-May-2024	---	---	---	31-May-2024	29-May-2024	✗
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0960_POT110_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0960_POT110_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0960_POT110_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0960_POT110_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0960_POT110_240522	22-May-2024	05-Jun-2024	18-Nov-2024	✓	06-Jun-2024	18-Nov-2024	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	6.25	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2407057



Telephone : +61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PEASOMD-24 Client: Stantec

Project Manager:

Phone:

ALS Compass COC Reference: 68066; 68061 # Samples:

Sampler:

Phone:

Turnaround Requirements: Standard

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Date / Time:

Date / Time:

 CHAIN OF CUSTODY COC#: 68090 ALS Laboratory: EP Perth Environmental		RELINQUISHED BY: DATE TIME:	RECEIVED BY: DATE TIME:	RELINQUISHED BY: DATE TIME:	RECEIVED BY: DATE TIME:
CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD PROJECT: WA_0960_PFASOMP_24 SITE: Learmonth SD - CG ORDER NO: pfas-omp Learmonth		TURNAROUND REQUIREMENTS: 5 Days Biohazard info:		LABORATORY USE ONLY (Circle) Custody Seal intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comments:	
PROJECT MANAGER: [REDACTED] CONTACT PH: [REDACTED] SAMPLER MOBILE: [REDACTED]					
PRIMARY SAMPLER: [REDACTED] QUOTE NO: SY/139/19 B / ES2022MWHAUS0002					
EMAIL REPORTS TO: [REDACTED]					
EMAIL INVOICES TO: [REDACTED]					

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SS123		22/05/2024 12:05 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_SS121		22/05/2024 03:02 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
003	0960_SS124		22/05/2024 03:42 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
004	0960_SS125		22/05/2024 03:44 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
005	0960_SS277		22/05/2024 03:47 PM	SOIL	ALS: 1 Non ALS: 0	No	X		
006	0960_SS278		22/05/2024 03:50 PM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 68090 ALS Laboratory: EP Perth Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth SD - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard Info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SS123	HDPE Soil Jar	200 mL	00621222053701	Grey	No	
002	0960_SS121	HDPE Soil Jar	200 mL	00620322054976	Grey	No	
003	0960_SS124	HDPE Soil Jar	200 mL	00621122003308	Grey	No	
004	0960_SS125	HDPE Soil Jar	200 mL	00621122003349	Grey	No	
005	0960_SS277	HDPE Soil Jar	200 mL	00621222067109	Grey	No	
006	0960_SS278	HDPE Soil Jar	200 mL	00621222067125	Grey	No	

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



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EP2407057**

Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
E-mail	: [REDACTED]@stantec.com	E-mail	: [REDACTED]@alsglobal.com
Telephone	: ----	Telephone	: +61-8-9406 1301
Facsimile	: ----	Facsimile	: +61-8-9406 1399
Project	: WA_0960_PFASOMP_24	Page	: 1 of 2
Order number	: pfas-omp Learmonth	Quote number	: ES2022MWH AUS0002 (SY/139/19 B)
C-O-C number	: 68090	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Learmonth SD - CG		
Sampler	: [REDACTED] [REDACTED]		

Dates

Date Samples Received	: 24-May-2024 11:00	Issue Date	: 29-May-2024
Client Requested Due Date	: 06-Jun-2024	Scheduled Reporting Date	: 06-Jun-2024

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 17.1 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 6 / 6

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2407057	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024 11:00
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68090	Issue Date	: 06-Jun-2024 13:48
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 6		
No. of samples analysed	: 6		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X: LOR raised for analyte "PFDoDA" on sample "EP2407057_006" due to matrix interferences.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS123_240522	0960_SS121_240522	0960_SS124_240522	0960_SS125_240522	0960_SS277_240522
Sampling date / time				22-May-2024 12:05	22-May-2024 15:02	22-May-2024 15:42	22-May-2024 15:44	22-May-2024 15:47
Compound	CAS Number	LOR	Unit	EP2407057-001	EP2407057-002	EP2407057-003	EP2407057-004	EP2407057-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	—	0.1	%	1.8	1.7	1.8	0.9	0.9
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	0.0003
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0086	0.0457	0.0125	0.0143	0.0483
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0039	0.0056	<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	0.0005	0.0006	0.0011
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.0011	0.0002	<0.0002	0.0004
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.0006	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS123_240522	0960_SS121_240522	0960_SS124_240522	0960_SS125_240522	0960_SS277_240522
Sampling date / time				22-May-2024 12:05	22-May-2024 15:02	22-May-2024 15:42	22-May-2024 15:44	22-May-2024 15:47
Compound	CAS Number	LOR	Unit	EP2407057-001	EP2407057-002	EP2407057-003	EP2407057-004	EP2407057-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	---	0.0002	mg/kg	0.0125	0.0533	0.0132	0.0149	0.0501
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0086	0.0457	0.0125	0.0143	0.0483
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0086	0.0457	0.0125	0.0143	0.0483
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.0002	%	108	104	102	99.0	98.0
13C8-PFOA	---	0.0002	%	104	104	104	98.5	102



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

0960_SS278_240522

Sampling date / time

22-May-2024 15:50

Compound

CAS Number

LOR

Unit

EP2407057-006

Result

EA055: Moisture Content (Dried @ 105-110°C)

Moisture Content

0.1

%

2.2

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

0.0004

Perfluorooctane sulfonic acid
(PFOS)

1763-23-1

0.0002

mg/kg

0.0225

Perfluorodecane sulfonic acid
(PFDS)

335-77-3

0.0002

mg/kg

0.0004

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

0.0005

Perfluorodecanoic acid (PFDA)

335-76-2

0.0002

mg/kg

0.0007

Perfluoroundecanoic acid
(PFUnDA)

2058-94-8

0.0002

mg/kg

0.0004

Perfluorododecanoic acid
(PFDoDA)

307-55-1

0.0002

mg/kg

<0.0006

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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

0960_SS278_240522

Sampling date / time

22-May-2024 15:50

Compound

CAS Number

LOR

Unit

EP2407057-006

Result

EP231C: Perfluoroalkyl Sulfonamides - Continued

N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	----	----	----
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	0.0251	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0227	----	----	----	----
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0227	----	----	----	----

EP231S: PFAS Surrogate

13C4-PFOS	---	0.0002	%	110	----	----	----	----
13C8-PFOA	---	0.0002	%	105	----	----	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407057	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68090	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 6		
No. of samples analysed	: 6		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 5825083)									
EP2407046-001	Anonymous	EA055: Moisture Content	----	0.1	%	2.5	2.8	11.5	0% - 20%
EP2407046-011	Anonymous	EA055: Moisture Content	----	0.1	%	29.3	28.1	4.4	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5823461)									
EP2407046-003	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	0.0216	0.0241	11.1	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0009	0.0010	12.8	No Limit
EP2407057-002	0960_SS121_240522	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	0.0457	0.0434	5.3	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0056	0.0048	16.1	0% - 20%
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5823461)									
EP2407046-003	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



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: 5823461) - continued									
EP2407046-003	Anonymous	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
EP2407057-002	0960_SS121_240522	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	0.0011	0.0010	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0006	0.0006	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0003	<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: 5823461)							
EP2407046-003	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
EP2407057-002	0960_SS121_240522	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



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5823461) - continued									
EP2407057-002	0960_SS121_240522	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5823461)									
EP2407046-003	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
EP2407057-002	0960_SS121_240522	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5823461)									
EP2407046-003	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0225	0.0251	10.9	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0216	0.0241	10.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0216	0.0241	10.9	0% - 20%
EP2407057-002	0960_SS121_240522	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0533	0.0498	6.8	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0457	0.0434	5.2	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0457	0.0434	5.2	0% - 20%

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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
		LCS	Low	High
Result				
<0.0002	0.0011 mg/kg	101	72.0	128
<0.0002	0.00125 mg/kg	82.8	73.0	123
<0.0002	0.00118 mg/kg	98.3	67.0	130
<0.0002	0.00119 mg/kg	112	70.0	132
<0.0002	0.00116 mg/kg	93.1	68.0	136
<0.0002	0.0012 mg/kg	96.2	59.0	134
<0.001	0.00625 mg/kg	95.1	71.0	135
<0.0002	0.00125 mg/kg	104	69.0	132
<0.0002	0.00125 mg/kg	104	70.0	132
<0.0002	0.00125 mg/kg	99.6	71.0	131
<0.0002	0.00125 mg/kg	104	69.0	133
<0.0002	0.00125 mg/kg	105	72.0	129
<0.0002	0.00125 mg/kg	99.6	69.0	133
<0.0002	0.00125 mg/kg	108	64.0	136
<0.0002	0.00125 mg/kg	106	69.0	135
<0.0002	0.00125 mg/kg	113	66.0	139
<0.0005	0.00125 mg/kg	111	69.0	133
<0.0002	0.00125 mg/kg	97.2	67.0	137
<0.0005	0.00312 mg/kg	96.0	59.6	143
<0.0005	0.00312 mg/kg	98.6	62.8	140
<0.0005	0.00312 mg/kg	113	61.5	139
<0.0005	0.00312 mg/kg	112	61.9	139
<0.0002	0.00125 mg/kg	106	63.0	144
<0.0002	0.00125 mg/kg	104	61.0	139



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823461) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	113	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	110	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
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0012 mg/kg	88.8	54.8	124
EP231P: PFAS Sums (QCLot: 5823461)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	---	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	---	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	---	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823461)							
EP2407046-004	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	103	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	80.8	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	99.2	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	116	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	61.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823461)							
EP2407046-004	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	90.2	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	96.4	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	114	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	97.6	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	102	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	102	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	110	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	103	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	105	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.00125 mg/kg	107	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	108	69.0	133



Sub-Matrix: **SOIL**

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: 5823461)							
EP2407046-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	95.6	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	110	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	97.6	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	105	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	111	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	111	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	96.8	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823461)							
EP2407046-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	106	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	106	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	109	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	99.6	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407057	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 24-May-2024
Site	: Learmonth SD - CG	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED]	No. of samples received	: 6
Order number	: pfas-omp Learmonth	No. of samples analysed	: 6

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, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EP2407046--004	Anonymous	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055) 0960_SS123_240522, 0960_SS124_240522, 0960_SS277_240522,	0960_SS121_240522, 0960_SS125_240522, 0960_SS278_240522	22-May-2024	---	---	---	30-May-2024	05-Jun-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SS123_240522, 0960_SS124_240522, 0960_SS277_240522,	0960_SS121_240522, 0960_SS125_240522, 0960_SS278_240522	22-May-2024	04-Jun-2024	18 Nov 2024	✓	05-Jun-2024	14 Jul 2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) 0960 SS123 240522, 0960 SS124 240522, 0960 SS277 240522,	0960 SS121 240522, 0960 SS125 240522, 0960 SS278 240522	22-May-2024	04-Jun-2024	18-Nov-2024	✓	05-Jun-2024	14-Jul-2024	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) 0960_SS123_240522, 0960_SS124_240522, 0960_SS277_240522,	0960_SS121_240522, 0960_SS125_240522, 0960_SS278_240522	22-May-2024	04-Jun-2024	18-Nov-2024	✓	05-Jun-2024	14-Jul-2024	✓

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X)	22-May-2024	04-Jun-2024	18-Nov-2024	✓	05-Jun-2024	14-Jul-2024	✓	
0960_SS123_240522,								0960_SS121_240522,
0960_SS124_240522,								0960_SS125_240522,
0960_SS277_240522,								0960_SS278_240522
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X)	22-May-2024	04-Jun-2024	18-Nov-2024	✓	05-Jun-2024	14-Jul-2024	✓	
0960_SS123_240522,								0960_SS121_240522,
0960_SS124_240522,								0960_SS125_240522,
0960_SS277_240522,								0960_SS278_240522



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	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.
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.



Environmental Division
Perth
Work Order Reference
EP2407103



Telephone: 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASOMP-24 Client: STANTEC

Project Manager:
Phone:

ALS Compass COC Reference: 68117 68140 68136
Samples:

Sampler:
Phone:

68114, 68119, 68120, 68118,

Turnaround Requirements: Standard ☐ Urgent ☐

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date / Time:

Date / Time:

Date / Time:

Date / Time:



CHAIN OF CUSTODY

ALS COC#: 68117

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_MW140_1.5-2.0		23/05/2024 07:44 AM	WATER	ALS: 3 Non ALS: 0	No	X		
002	0960_MW181_1.5-2.0	Lab qc added	23/05/2024 08:13 AM	WATER	ALS: 5 Non ALS: 0	No	X		
003	0960_MW180_1.0-1.5		23/05/2024 08:42 AM	WATER	ALS: 3 Non ALS: 0	No	X		
004	0960_MW147_3.0-3.5		23/05/2024 09:07 AM	WATER	ALS: 3 Non ALS: 0	No	X		
005	0960_POT107		23/05/2024 12:19 PM	WATER	ALS: 3 Non ALS: 0	No	Partial 1/2		



CHAIN OF CUSTODY

COC#: 68117

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

-C

Other comments:

SAMPLE	SAMPLE NAME	PARTIAL ANALYSIS GROUP NAME	MATRIX	SELECTED ANALYSIS NAME
005	0960_POT107	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)



CHAIN OF CUSTODY

COC#: 68117

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_MW140_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020568	Gray	No	
001	0960_MW140_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020683	Gray	No	
001	0960_MW140_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00071121128651	Green	No	
002	0960_MW181_1.5-2.0	HDPE (no PTFE)	20 mL	00352312004121	Gray	No	
002	0960_MW181_1.5-2.0	HDPE (no PTFE)	20 mL	00352312003865	Gray	No	
002	0960_MW181_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020478	Gray	No	
002	0960_MW181_1.5-2.0	HDPE (no PTFE)	20 mL	00351221020418	Gray	No	
002	0960_MW181_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00071121128640	Green	No	
003	0960_MW180_1.0-1.5	Clear Plastic Bottle - Natural	125 mL	00071121181691	Green	No	
003	0960_MW180_1.0-1.5	HDPE (no PTFE)	20 mL	00352312011913	Gray	No	
003	0960_MW180_1.0-1.5	HDPE (no PTFE)	20 mL	00352312012018	Gray	No	
004	0960_MW147_3.0-3.5	Clear Plastic Bottle - Natural	125 mL	00070821217407	Green	No	
004	0960_MW147_3.0-3.5	HDPE (no PTFE)	20 mL	00352309066034	Gray	No	
004	0960_MW147_3.0-3.5	HDPE (no PTFE)	20 mL	00352309065803	Gray	No	
005	0960_POT107	HDPE (no PTFE)	125 mL	00350423000332	Gray	No	
005	0960_POT107	HDPE (no PTFE)	20 mL	00352312011951	Gray	No	
005	0960_POT107	HDPE (no PTFE)	20 mL	00352312011992	Gray	No	
Total Bottle Count: ALS: 17, Non ALS: 0							





Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EP2407103-001 : 23-May-2024 07:44 : 0960_MW140_1.5-2.0_240523
EP2407103-002 : 23-May-2024 08:13 : 0960_MW181_1.5-2.0_240523
EP2407103-003 : 23-May-2024 08:42 : 0960_MW180_1.0-1.5_240523
EP2407103-004 : 23-May-2024 09:07 : 0960_MW147_3.0-3.5_240523

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 (30 analytes)	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
EP2407103-001	23-May-2024 07:44	0960_MW140_1.5-2.0_2...	✓	✓
EP2407103-002	23-May-2024 08:13	0960_MW181_1.5-2.0_2...	✓	✓
EP2407103-003	23-May-2024 08:42	0960_MW180_1.0-1.5_2...	✓	✓
EP2407103-004	23-May-2024 09:07	0960_MW147_3.0-3.5_2...	✓	✓
EP2407103-005	23-May-2024 12:19	0960_POT107_240523	✓	

Proactive Holding Time Report

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

Requested Deliverables

- A4 - AU Tax Invoice (INV)

Email [REDACTED]@cardno.com.au

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]@esdat.com.au

- *AU Certificate of Analysis - NATA (COA)

Email [REDACTED]@stantec.com

- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)

Email [REDACTED]@stantec.com

- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)

Email [REDACTED]@stantec.com

- A4 - AU Sample Receipt Notification - Environmental HT (SRN)

Email [REDACTED]@stantec.com

- Chain of Custody (CoC) (COC)

Email [REDACTED]@stantec.com

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]@stantec.com

- EDI Format - XTab (XTAB)

Email [REDACTED]@stantec.com



CERTIFICATE OF ANALYSIS

Work Order	: EP2407103	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024 10:50
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 29-May-2024
C-O-C number	: 68117	Issue Date	: 05-Jun-2024 22:00
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 5		
No. of samples analysed	: 5		



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

This 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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW140_1.5-2.0_240523	0960_MW181_1.5-2.0_240523	0960_MW180_1.0-1.5_240523	0960_MW147_3.0-3.5_240523	0960_POT107_240523_3
Sampling date / time				23-May-2024 07:44	23-May-2024 08:13	23-May-2024 08:42	23-May-2024 09:07	23-May-2024 12:19
Compound	CAS Number	LOR	Unit	EP2407103-001	EP2407103-002	EP2407103-003	EP2407103-004	EP2407103-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	139	217	146	128	----
Total Alkalinity as CaCO ₃	----	1	mg/L	139	217	146	128	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	5330	6230	4450	5610	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	37700	40100	29200	34800	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	812	1000	740	1000	----
Magnesium	7439-95-4	1	mg/L	2920	3190	2300	2830	----
Sodium	7440-23-5	1	mg/L	22200	24000	17500	21400	----
Potassium	7440-09-7	1	mg/L	1140	1190	1120	1110	----
EN055: Ionic Balance								
• Total Anions	----	0.01	meq/L	1180	1260	919	1100	----
• Total Cations	----	0.01	meq/L	1280	1390	1020	1240	----
• Ionic Balance	----	0.01	%	4.01	4.58	5.00	6.02	----
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

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW140_1.5-2.0 _240523	0960_MW181_1.5-2.0 _240523	0960_MW180_1.0-1.5 _240523	0960_MW147_3.0-3.5 _240523	0960_POT107_24052 3
Sampling date / time				23-May-2024 07:44	23-May-2024 08:13	23-May-2024 08:42	23-May-2024 09:07	23-May-2024 12:19	
Compound	CAS Number	LOR	Unit	EP2407103-001	EP2407103-002	EP2407103-003	EP2407103-004	EP2407103-005	
				Result	Result	Result	Result	Result	
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	
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									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW140_1.5-2.0_240523	0960_MW181_1.5-2.0_240523	0960_MW180_1.0-1.5_240523	0960_MW147_3.0-3.5_240523	0960_POT107_240523
Sampling date / time				23-May-2024 07:44	23-May-2024 08:13	23-May-2024 08:42	23-May-2024 09:07	23-May-2024 12:19
Compound	CAS Number	LOR	Unit	EP2407103-001	EP2407103-002	EP2407103-003	EP2407103-004	EP2407103-005
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - continued								
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	%	111	109	106	101	98.5
13C8-PFOA	---	0.02	%	91.3	92.8	92.2	87.7	96.8



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407103	Page	: 1 of 10
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 29-May-2024
C-O-C number	: 68117	Issue Date	: 05-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 5		
No. of samples analysed	: 5		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5820673)									
EP2406986-010	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	181	180	0.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	181	180	0.7	0% - 20%
EP2406988-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	126	126	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	126	126	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5823548)									
EP2406932-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	15400	15600	0.9	0% - 20%
EP2407030-021	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2210	2380	7.7	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5823549)									
EP2406932-001	Anonymous	ED045G: Chloride	16887-00-6	1 (10)*	mg/L	128000	127000	0.9	0% - 20%
EP2407030-021	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	16200	16500	2.0	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5821858)									
EP2407103-001	0960_MW140_1.5-2.0_240 523	ED093F: Calcium	7440-70-2	1	mg/L	812	812	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2920	2900	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	22200	22100	0.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1140	1130	0.3	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 (%)
ED093F: Dissolved Major Cations (QC Lot: 5821858) - continued									
EP2407163-005	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	1330	1330	0.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2280	2260	0.8	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	19200	19100	0.5	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	722	714	1.1	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2407163-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTriDA)	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
		EP2407163-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01
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



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: 5824178) - continued									
EP2407163-005	Anonymous	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: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407163-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5824178)									
EP2407105-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5824178) - continued									
EP2407163-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5824178)									
EP2407105-005	Anonymous	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
EP2407163-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5820673)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	106	85.1	126
				<1	200 mg/L	104	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5823548)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	89.9	112
				<1	500 mg/L	102	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5823549)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	98.8	88.6	113
				<1	1000 mg/L	98.3	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5821858)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	100.0	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	100	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.2	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	95.1	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	91.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	102	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	97.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	113	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5826565)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	81.2	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	84.0	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	85.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	93.9	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	73.7	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	80.5	53.0	142



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	98.5	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	91.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	93.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	105	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	102	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	108	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	99.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	97.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5826565)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	88.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	82.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	96.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	87.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	84.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	73.8	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	88.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	75.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.8	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	98.2	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	101	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	107	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	104	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	92.8	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	110	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	96.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	98.0	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5826565)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	87.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	89.0	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	77.7	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	86.2	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	87.0	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	89.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	101	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	103	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	107	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	98.3	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	86.5	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5826565)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	87.1	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	83.9	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	102	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	86.1	64.2	133
EP231P: PFAS Sums (QCLot: 5824178)								
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: 5826565)								
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**

Matrix Spike (MS) Report

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5823548)							
EP2406932-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5823549)							
EP2406932-001	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	102	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	97.9	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	80.1	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	92.9	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	87.3	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	102	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	101	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	94.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	108	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	93.2	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	99.2	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	96.7	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.1	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	99.0	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	95.5	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	107	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	97.8	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	102	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	106	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	88.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	109	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	86.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178)							



Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178) - continued							
EP2407163-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	103	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	109	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	107	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407103	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Site	: Learmonth GW - SC	Issue Date	: 05-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 5
Order number	: pfas-omp Learmonth	No. of samples analysed	: 5

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2406932--001	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	EP2406932--001	Anonymous	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	27	3.70	5.00	NEPM 2013 B3 & ALS QC Standard

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

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523,	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523	23-May-2024	---	---	---	31-May-2024 06-Jun-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523,	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523	23-May-2024	---	---	---	05-Jun-2024 20-Jun-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523,	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523	23-May-2024	---	---	---	05-Jun-2024 20-Jun-2024	✓



Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) 0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523,	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523	23-May-2024	---	---	---	30-May-2024	30-May-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523, 0960_POT107_240523	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523, 0960_POT107_240523	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523, 0960_POT107_240523	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523, 0960_POT107_240523	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0960_MW140_1.5-2.0_240523, 0960_MW180_1.0-1.5_240523, 0960_POT107_240523	0960_MW181_1.5-2.0_240523, 0960_MW147_3.0-3.5_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	27	3.70	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2407105



Telephone : 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASOMP-24 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 68117 68140 68136

Samples:

Sampler:

Phone:

68114, 68119, 68120, 68118,

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date /

Date / Time:

Date / Time:

Date / Time:



CHAIN OF CUSTODY

COC#: 68136

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHHAUS0002

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAAS WATERS - ST WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_OTH129		23/05/2024 10:04 AM	WATER	ALS: 3 Non ALS: 0	No	X	Partial 1/2		
002	0960_OTH103		23/05/2024 10:33 AM	WATER	ALS: 3 Non ALS: 0	No	X	Partial 1/2		
003	0960_SW304		23/05/2024 10:51 AM	WATER	ALS: 3 Non ALS: 0	No		X		
004	0960_QC135		23/05/2024 10:52 AM	WATER	ALS: 3 Non ALS: 0	No		X		
005	0960_SW303	Lab QC added	23/05/2024 11:12 AM	WATER	ALS: 5 Non ALS: 0	No		X		
006	0960_SW001		23/05/2024 11:24 AM	WATER	ALS: 3 Non ALS: 0	No		X		
007	0960_SW300		23/05/2024 11:40 AM	WATER	ALS: 3 Non ALS: 0	No		X		



CHAIN OF CUSTODY

COC#: 68136

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS WATERS - ST WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_SW211	Lab QC bottle added	23/05/2024 11:50 AM	WATER	ALS: 4 Non ALS: 0	No	X	Partial 1/2		

**CHAIN OF CUSTODY**

COC#: 68136

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	PARTIAL ANALYSIS GROUP NAME	MATRIX	SELECTED ANALYSIS NAME
001	0960_OTH129	WA OMP Water Suite WATER	WATER	- NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
002	0960_OTH103	WA OMP Water Suite WATER	WATER	- NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity
008	0960_SW211	WA OMP Water Suite WATER	WATER	- NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity

**CHAIN OF CUSTODY**

COC#: 68136

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth SW/OTH - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_OTH129	Clear Plastic Bottle - Natural	125 mL	00070821217621	Green	No	
001	0960_OTH129	HDPE (no PTFE)	125 mL	00352205024971	Grey	No	
001	0960_OTH129	HDPE (no PTFE)	125 mL	00352205024981	Grey	No	
002	0960_OTH103	Clear Plastic Bottle - Natural	125 mL	00070821217583	Green	No	
002	0960_OTH103	HDPE (no PTFE)	125 mL	00350423000317	Grey	No	
002	0960_OTH103	HDPE (no PTFE)	125 mL	00350423000321	Grey	No	
003	0960_SW304	Clear Plastic Bottle - Natural	125 mL	00070522075326	Green	No	
003	0960_SW304	HDPE (no PTFE)	20 mL	00351221020546	Grey	No	
003	0960_SW304	HDPE (no PTFE)	20 mL	00351221020569	Grey	No	
004	0960_QC135	Clear Plastic Bottle - Natural	125 mL	00071121181770	Green	No	
004	0960_QC135	HDPE (no PTFE)	20 mL	00352312011764	Grey	No	
004	0960_QC135	HDPE (no PTFE)	20 mL	00352312011960	Grey	No	
005	0960_SW303	Clear Plastic Bottle - Natural	125 mL	00070522075454	Green	No	
005	0960_SW303	HDPE (no PTFE)	20 mL	00351221020423	Grey	No	
005	0960_SW303	HDPE (no PTFE)	20 mL	00351221020419	Grey	No	
005	0960_SW303	HDPE (no PTFE)	20 mL	00352312011838	Grey	No	
005	0960_SW303	HDPE (no PTFE)	20 mL	00351221006124	Grey	No	
006	0960_SW001	Clear Plastic Bottle - Natural	125 mL	00070822231608	Green	No	
006	0960_SW001	HDPE (no PTFE)	20 mL	00352309065942	Grey	No	
006	0960_SW001	HDPE (no PTFE)	20 mL	00352309065960	Grey	No	
007	0960_SW300	Clear Plastic Bottle - Natural	125 mL	00070822231413	Green	No	
007	0960_SW300	HDPE (no PTFE)	20 mL	00352312011755	Grey	No	
007	0960_SW300	HDPE (no PTFE)	20 mL	00352312011840	Grey	No	
008	0960_SW211	Clear Plastic Bottle - Natural	125 mL	00070822231366	Green	No	
008	0960_SW211	HDPE (no PTFE)	125 mL	00352302006197	Grey	No	
008	0960_SW211	HDPE (no PTFE)	125 mL	00352302006219	Grey	No	



ALS Laboratory: EP Perth
Environmental

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

EMAIL INVOICES TO:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

Other comments:

HDPE (no PTFE)

125 mL

00350423000316

Grey

No

Total Bottle Count: ALS: 27, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407105

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

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

E-mail :
stantec.com
Telephone :
Facsimile :

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68136
Site : Learmonth SW/OTH - SC
Sampler :

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

Dates

Date Samples Received : 27-May-2024 10:50
Client Requested Due : 05-Jun-2024
Date

Issue Date : 28-May-2024
Scheduled Reporting Date : **05-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 2
Receipt Detail :

Security Seal : Not Available
Temperature : 9.0 - Ice present
No. of samples received / analysed : 8 / 8

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2407105	Page	: 1 of 13
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024 10:50
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 29-May-2024
C-O-C number	: 68136	Issue Date	: 05-Jun-2024 21:31
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SW/OTH - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 8		
No. of samples analysed	: 8		



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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X-ST: LOR raised for particular analytes on various samples due to matrix interferences.
- 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 or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH129_24052 3	0960_OTH103_24052 3	0960_SW304_240523	0960_QC135_240523	0960_SW303_240523
Sampling date / time				23-May-2024 10:04	23-May-2024 10:33	23-May-2024 10:51	23-May-2024 10:52	23-May-2024 11:12
Compound	CAS Number	LOR	Unit	EP2407105-001	EP2407105-002	EP2407105-003	EP2407105-004	EP2407105-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	151	173	148	153	143
Total Alkalinity as CaCO ₃	---	1	mg/L	151	173	148	153	143
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	3000	3020	3220	3170	3340
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	22000	21800	22600	22600	24000
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	463	479	507	511	492
Magnesium	7439-95-4	1	mg/L	1490	1510	1590	1590	1550
Sodium	7440-23-5	1	mg/L	10900	11300	11800	11800	11500
Potassium	7440-09-7	1	mg/L	639	549	669	669	648
EN055: Ionic Balance								
∅ Total Anions	---	0.01	meq/L	686	681	708	706	749
∅ Total Cations	---	0.01	meq/L	636	654	686	687	669
∅ Ionic Balance	---	0.01	%	3.77	2.06	1.50	1.42	5.68
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	<0.0005	----	----	----
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	<0.0005	<0.0005	----	----	----
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	<0.0005	<0.0005	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	----	----	<0.01	<0.01	<0.01



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_OTH129_24052 3	0960_OTH103_24052 3	0960_SW304_240523	0960_QC135_240523	0960_SW303_240523
Sampling date / time					23-May-2024 10:04	23-May-2024 10:33	23-May-2024 10:51	23-May-2024 10:52	23-May-2024 11:12
Compound	CAS Number	LOR	Unit	EP2407105-001	EP2407105-002	EP2407105-003	EP2407105-004	EP2407105-005	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	----	----	----	
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	0.0009	0.0009	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	----	----	----	
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	0.002	<0.002	----	----	----	
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	<0.0005	0.0032	----	----	----	
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	0.0005	0.0005	----	----	----	
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	<0.0005	<0.0005	----	----	----	
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	<0.0005	0.0008	----	----	----	
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	<0.0005	0.0007	----	----	----	
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	<0.0005	<0.0005	----	----	----	
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	<0.0005	<0.0005	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	----	----	<0.02	<0.02	<0.02	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_OTH129_24052 3	0960_OTH103_24052 3	0960_SW304_240523	0960_QC135_240523	0960_SW303_240523
Sampling date / time					23-May-2024 10:04	23-May-2024 10:33	23-May-2024 10:51	23-May-2024 10:52	23-May-2024 11:12
Compound	CAS Number	LOR	Unit	EP2407105-001	EP2407105-002	EP2407105-003	EP2407105-004	EP2407105-005	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	----	----	----	
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	<0.0005	<0.0005	----	----	----	
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	<0.0005	<0.0005	----	----	----	
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	<0.0005	<0.0005	----	----	----	
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	<0.001	<0.001	----	----	----	
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	<0.001	<0.001	----	----	----	
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	<0.001	<0.001	----	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	----	----	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	----	----	----	
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	<0.0005	<0.0005	----	----	----	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_OTH129_24052 3	0960_OTH103_24052 3	0960_SW304_240523	0960_QC135_240523	0960_SW303_240523
Sampling date / time				23-May-2024 10:04	23-May-2024 10:33	23-May-2024 10:51	23-May-2024 10:52	23-May-2024 11:12
Compound	CAS Number	LOR	Unit	EP2407105-001	EP2407105-002	EP2407105-003	EP2407105-004	EP2407105-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	<0.0005	<0.0005	----	----	----
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	<0.001	<0.001	----	----	----
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	<0.001	<0.001	----	----	----
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	<0.001	<0.001	----	----	----
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	<0.001	<0.001	----	----	----
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	0.0169	0.0056	----	----	----
Sum of PFAS	----	0.01	µg/L	----	----	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	0.0009	0.0009	----	----	----
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	0.0029	0.0049	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_OTH129_24052 3	0960_OTH103_24052 3	0960_SW304_240523	0960_QC135_240523	0960_SW303_240523
Sampling date / time					23-May-2024 10:04	23-May-2024 10:33	23-May-2024 10:51	23-May-2024 10:52	23-May-2024 11:12
Compound	CAS Number	LOR	Unit		EP2407105-001	EP2407105-002	EP2407105-003	EP2407105-004	EP2407105-005
				Result	Result	Result	Result	Result	Result
EP231P: PFAS Sums - Continued									
Sum of PFAS (WA DER List)	---	0.01	µg/L		----	----	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0005	%		99.1	104	----	----	----
13C4-PFOS	---	0.02	%		----	----	95.2	91.6	99.2
13C8-PFOA	---	0.0005	%		84.7	101	----	----	----
13C8-PFOA	---	0.02	%		----	----	99.2	95.4	100



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW001_240523	0960_SW300_240523	0960_SW211_240523	---	---
Sampling date / time				23-May-2024 11:24	23-May-2024 11:40	23-May-2024 11:50	---	---
Compound	CAS Number	LOR	Unit	EP2407105-006	EP2407105-007	EP2407105-008	-----	-----
				Result	Result	Result	---	---
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	---	---
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	---	---
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	175	222	223	---	---
Total Alkalinity as CaCO3	---	1	mg/L	175	222	223	---	---
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3350	3960	4100	---	---
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	23800	28400	28900	---	---
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	538	636	660	---	---
Magnesium	7439-95-4	1	mg/L	1680	2000	2090	---	---
Sodium	7440-23-5	1	mg/L	12500	15000	15700	---	---
Potassium	7440-09-7	1	mg/L	710	858	902	---	---
EN055: Ionic Balance								
☐ Total Anions	---	0.01	meq/L	745	888	905	---	---
☐ Total Cations	---	0.01	meq/L	727	871	911	---	---
☐ Ionic Balance	---	0.01	%	1.20	0.98	0.32	---	---
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	---	---	<0.0005	---	---
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	---	---	<0.0005	---	---
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	---	---	0.0005	---	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	---	---	---



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW001_240523	0960_SW300_240523	0960_SW211_240523	----	----
Sampling date / time					23-May-2024 11:24	23-May-2024 11:40	23-May-2024 11:50	----	----
Compound	CAS Number	LOR	Unit	EP2407105-006	EP2407105-007	EP2407105-008	-----	-----	
				Result	Result	Result	---	---	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	----	----	<0.0005	----	----	
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	----	----	0.0034	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	----	----	0.0005	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.01	0.01	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.02	0.02	----	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	----	----	<0.004	----	----	
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	----	----	0.0006	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	----	----	<0.0005	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	----	----	<0.0005	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	----	----	<0.0005	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	----	----	<0.0005	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	----	----	<0.0005	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	----	----	<0.0005	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW001_240523	0960_SW300_240523	0960_SW211_240523	----	----
Sampling date / time					23-May-2024 11:24	23-May-2024 11:40	23-May-2024 11:50	----	----
Compound	CAS Number	LOR	Unit	EP2407105-006	EP2407105-007	EP2407105-008	-----	-----	
				Result	Result	Result	---	---	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	----	----	<0.0005	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	----	----	<0.0005	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	----	----	<0.0019	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	----	----	<0.0005	----	----	
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	----	----	<0.001	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	----	----	<0.001	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	----	----	<0.001	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	----	----	<0.001	----	----	
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	0.0005	µg/L	----	----	<0.0005	----	----	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				0960_SW001_240523	0960_SW300_240523	0960_SW211_240523	---	---
Sampling date / time				23-May-2024 11:24	23-May-2024 11:40	23-May-2024 11:50	---	---
Compound	CAS Number	LOR	Unit	EP2407105-006	EP2407105-007	EP2407105-008	-----	-----
				Result	Result	Result	---	---
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	---	---	<0.0005	---	---
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	---	---	<0.001	---	---
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	---	---	<0.001	---	---
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	---	---	<0.001	---	---
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	---	---	<0.001	---	---
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	---	---	0.0045	---	---
Sum of PFAS	---	0.01	µg/L	<0.01	<0.01	---	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	---	---	0.0039	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	---	---	---
Sum of PFAS (WA DER List)	---	0.0003	µg/L	---	---	0.0045	---	---



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	0960_SW001_240523	0960_SW300_240523	0960_SW211_240523	----	----
Sampling date / time					23-May-2024 11:24	23-May-2024 11:40	23-May-2024 11:50	----	----
Compound	CAS Number	LOR	Unit		EP2407105-006	EP2407105-007	EP2407105-008	-----	-----
				Result	Result	Result		---	---
EP231P: PFAS Sums - Continued									
Sum of PFAS (WA DER List)	---	0.01	µg/L		<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0005	%		----	----	106	----	----
13C4-PFOS	---	0.02	%		95.8	112	----	----	----
13C8-PFOA	----	0.0005	%		----	----	88.7	----	----
13C8-PFOA	---	0.02	%		94.8	97.5	----	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EP2407105	Page	: 1 of 13
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 29-May-2024
C-O-C number	: 68136	Issue Date	: 05-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SW/OTH - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 8		
No. of samples analysed	: 8		



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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5820673)									
EP2406986-010	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	181	180	0.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	181	180	0.7	0% - 20%
EP2406988-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	126	126	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	126	126	0.0	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5825585)									
EP2407246-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	191	186	2.7	0% - 20%
		ED037 P Total Alkalinity as CaCO3	----	1	mg/L	191	186	2.7	0% - 20%
EP2407298-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	103	103	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	103	103	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5821065)									
EP2406986-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2730	2770	1.4	0% - 20%
EP2406986-016	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2790	2820	1.0	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 5821066)									
EP2406986-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	20600	20500	0.5	0% - 20%
EP2406986-016	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	20800	20800	0.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5821858)									
EP2407103-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	812	812	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2920	2900	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	22200	22100	0.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1140	1130	0.3	0% - 20%
EP2407163-005	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	1330	1330	0.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2280	2260	0.8	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	19200	19100	0.5	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	722	714	1.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5821863)									
EP2406932-001	Anonymous	ED093F: Calcium	7440-70-2	1 (5)*	mg/L	787	793	0.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1 (5)*	mg/L	9850	9970	1.2	0% - 20%
		ED093F: Sodium	7440-23-5	1 (5)*	mg/L	85100	86000	1.1	0% - 20%
		ED093F: Potassium	7440-09-7	1 (5)*	mg/L	4720	4800	1.7	0% - 20%
EP2407165-014	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	894	895	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2660	2670	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	20000	20100	0.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1010	1010	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5824178)									
EP2407105-005	0960_SW303_240523	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
EP2407163-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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: 5824178)									
EP2407105-005	0960_SW303_240523	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5824178) - continued									
EP2407105-005	0960_SW303_240523	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
EP2407163-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5824178)									
EP2407105-005	0960_SW303_240523	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
EP2407163-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5824178) - continued									
EP2407163-005	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5824178)									
EP2407105-005	0960_SW303_240523	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
EP2407163-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5824178)									
EP2407105-005	0960_SW303_240523	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
EP2407163-005	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit



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

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

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5820673)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	<1	20 mg/L	106	85.1	126
				<1	200 mg/L	104	90.5	111
ED037P: Alkalinity by PC Titrator (QCLot: 5825585)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	<1	20 mg/L	105	85.1	126
				<1	200 mg/L	104	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5821065)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.2	89.9	112
				<1	500 mg/L	101	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5821066)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	96.7	88.6	113
				<1	1000 mg/L	96.0	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5821858)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	100.0	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	100	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.2	84.6	108
ED093F: Dissolved Major Cations (QCLot: 5821863)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	101	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.9	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823801)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	96.0	72.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823801) - continued								
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	106	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	98.8	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	111	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	90.1	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	92.7	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824087)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	94.6	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	106	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	96.2	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	111	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	78.0	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	80.6	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	95.1	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	91.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	102	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	97.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	113	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5825604)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	98.2	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	97.4	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	92.4	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	99.5	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	82.8	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	81.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823801)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	98.5	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	115	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	95.2	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	115	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	96.4	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	94.0	71.0	129



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823801) - continued								
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	102	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	98.4	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	101	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	109	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824087)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	107	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	118	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	105	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	106	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	115	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	82.4	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	76.0	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	90.0	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	77.6	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	91.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	98.5	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	91.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	93.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	105	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	102	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	108	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	99.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	97.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5825604)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	106	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	80.8	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	113	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	112	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	96.4	71.0	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5825604) - continued								
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	95.2	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	92.4	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	104	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	116	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	88.4	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5823801)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	96.0	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	96.8	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	84.5	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	111	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	101	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	90.8	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	100	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824087)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	83.2	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	93.6	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	107	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	98.7	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	100	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	115	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	101	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	107	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	104	60.5	138

Sub-Matrix: WATER					Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound		CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178) - continued									
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)		24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	92.8	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)		1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	110	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)		2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	96.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)		2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	98.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5825604)									
EP231X-ST: Perfluorooctane sulfonamide (FOSA)		754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	82.4	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)		31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	101	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)		4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	93.3	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)		24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	101	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)		1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	104	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)		2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	86.4	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)		2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	94.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823801)									
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)		757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	112	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	102	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	116	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: 5824087)									
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)		757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	115	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	102	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	94.2	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	85.4	53.1	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178)									
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)		757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	103	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	107	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	98.3	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)		120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	86.5	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5825604)									

Matrix Spike (MS) Report

Sub-Matrix: WATER

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5821065)							
EP2406986-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5821066)							



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 5821066) - continued							
EP2406986-001	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	# Not Determined	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	102	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	97.9	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	80.1	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	92.9	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	87.3	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	102	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	101	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	94.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	108	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	93.2	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	99.2	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	96.7	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.1	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	99.0	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	95.5	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTeDA)	72629-94-8	0.25 µg/L	107	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	97.8	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	102	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	106	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	88.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	109	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	86.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	103	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	109	67.0	138



Sub-Matrix: WATER				Matrix Spike (MS) Report			
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%)	
						Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178) - continued							
EP2407163-003	Anonymous	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	107	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407105	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Site	: Learmonth SW/OTH - SC	Issue Date	: 05-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 8
Order number	: pfas-omp Learmonth	No. of samples analysed	: 8

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, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP2406986--001	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	EP2406986--001	Anonymous	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

Matrix: WATER

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

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

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

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

Matrix: WATER

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		23-May-2024	---	---	---	31-May-2024	06-Jun-2024	✓
0960_OTH129_240523,	0960_OTH103_240523,							
0960_SW304_240523,	0960_QC135_240523,							
0960_SW303_240523,	0960_SW001_240523,							
0960_SW300_240523,	0960_SW211_240523							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)		23-May-2024	---	---	---	05-Jun-2024	20-Jun-2024	✓
0960_OTH129_240523,	0960_OTH103_240523,							
0960_SW304_240523,	0960_QC135_240523,							
0960_SW303_240523,	0960_SW001_240523,							
0960_SW300_240523,	0960_SW211_240523							



Matrix: WATER

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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) 0960_OTH129_240523, 0960_SW304_240523, 0960_SW303_240523, 0960_SW300_240523,	0960_OTH103_240523, 0960_QC135_240523, 0960_SW001_240523, 0960_SW211_240523	23-May-2024	---	---	---	05-Jun-2024	20-Jun-2024	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) 0960_OTH129_240523, 0960_SW304_240523, 0960_SW303_240523, 0960_SW300_240523,	0960_OTH103_240523, 0960_QC135_240523, 0960_SW001_240523, 0960_SW211_240523	23-May-2024	---	---	---	30-May-2024	30-May-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X-ST) 0960_SW304_240523, 0960_SW303_240523, 0960_SW300_240523,	0960_QC135_240523, 0960_SW001_240523, 0960_SW211_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_OTH129_240523		23-May-2024	30-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_OTH103_240523		23-May-2024	31-May-2024	19-Nov-2024	✓	04-Jun-2024	19-Nov-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X-ST) 0960_SW304_240523, 0960_SW303_240523, 0960_SW300_240523,	0960_QC135_240523, 0960_SW001_240523, 0960_SW211_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_OTH129_240523		23-May-2024	30-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_OTH103_240523		23-May-2024	31-May-2024	19-Nov-2024	✓	04-Jun-2024	19-Nov-2024	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X-ST) 0960_SW304_240523, 0960_SW303_240523, 0960_SW300_240523,	0960_QC135_240523, 0960_SW001_240523, 0960_SW211_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_OTH129_240523		23-May-2024	30-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_OTH103_240523		23-May-2024	31-May-2024	19-Nov-2024	✓	04-Jun-2024	19-Nov-2024	✓



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

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X-ST) 0960_SW304_240523, 0960_SW303_240523, 0960_SW300_240523,	0960_QC135_240523, 0960_SW001_240523, 0960_SW211_240523	23-May-2024	30-May-2024	19-Nov-2024	✔	30-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X-ST) 0960_OTH129_240523		23-May-2024	30-May-2024	19-Nov-2024	✔	31-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X-ST) 0960_OTH103_240523		23-May-2024	31-May-2024	19-Nov-2024	✔	04-Jun-2024	19-Nov-2024	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X-ST) 0960_SW304_240523, 0960_SW303_240523, 0960_SW300_240523,	0960_QC135_240523, 0960_SW001_240523, 0960_SW211_240523	23-May-2024	30-May-2024	19-Nov-2024	✔	30-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X-ST) 0960_OTH129_240523		23-May-2024	30-May-2024	19-Nov-2024	✔	31-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X-ST) 0960_OTH103_240523		23-May-2024	31-May-2024	19-Nov-2024	✔	04-Jun-2024	19-Nov-2024	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	36	11.11	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
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	18	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	3	18	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	3	36	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	3	18	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	5.00	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
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, 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 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
---------------------	--------	--------	---------------------



Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2407107



Telephone — 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASOMP-24 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 68117 68140 68136
Samples: 68114, 68119, 68120, 68118,

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date:

Date / Time:

Date / Time:

Date / Time:



CHAIN OF CUSTODY

COC#: 68140

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth SD - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE

/ ES2022MWH AUS0002

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SD304		23/05/2024 10:56 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_SD303		23/05/2024 11:12 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
003	0960_SD301		23/05/2024 11:25 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
004	0960_SD300		23/05/2024 11:39 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
005	0960_SD211		23/05/2024 01:41 PM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 68140

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PASOMP_24

SITE: Learmonth SD - SC

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SD304	HDPE Soil Jar	200 mL	00621222067084	Grey	No	
002	0960_SD303	HDPE Soil Jar	200 mL	00621122049021	Grey	No	
003	0960_SD301	HDPE Soil Jar	200 mL	00620322054849	Grey	No	
004	0960_SD300	HDPE Soil Jar	200 mL	00621122027919	Grey	No	
005	0960_SD211	HDPE Soil Jar	200 mL	00621222053614	Grey	No	

Total Bottle Count: ALS: 5, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407107

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

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

E-mail :
stantec.com
Telephone : ----
Facsimile : ----

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68140
Site : Learmonth SD - SC
Sampler :

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

Dates

Date Samples Received : 27-May-2024 10:50
Client Requested Due : 06-Jun-2024
Date

Issue Date : 28-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 2
Receipt Detail :

Security Seal : Not Available
Temperature : 9.0 - Ice present
No. of samples received / analysed : 5 / 5

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

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

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

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

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

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP231X (solids) PFAS - Full Suite (30 analytes)
EP2407107-001	23-May-2024 10:56	0960_SD304_240523	✓	✓
EP2407107-002	23-May-2024 11:12	0960_SD303_240523	✓	✓
EP2407107-003	23-May-2024 11:25	0960_SD301_240523	✓	✓
EP2407107-004	23-May-2024 11:39	0960_SD300_240523	✓	✓
EP2407107-005	23-May-2024 13:41	0960_SD211_240523	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

- A4 - AU Tax Invoice (INV)

Email [REDACTED]@cardno.com.au

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]@esdat.com.au

- *AU Certificate of Analysis - NATA (COA)

Email [REDACTED]@stantec.com

- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)

Email [REDACTED]@stantec.com

- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)

Email [REDACTED]@stantec.com

- A4 - AU Sample Receipt Notification - Environmental HT (SRN)

Email [REDACTED]@stantec.com

- Chain of Custody (CoC) (COC)

Email [REDACTED]@stantec.com

- EDI Format - ESDAT (ESDAT)

Email [REDACTED]@stantec.com

- EDI Format - XTab (XTAB)

Email [REDACTED]@stantec.com



CERTIFICATE OF ANALYSIS

Work Order	: EP2407107	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024 10:50
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68140	Issue Date	: 06-Jun-2024 16:43
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 5		
No. of samples analysed	: 5		



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

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

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

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

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

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SD304_240523	0960_SD303_240523	0960_SD301_240523	0960_SD300_240523	0960_SD211_240523
Sampling date / time				23-May-2024 10:56	23-May-2024 11:12	23-May-2024 11:25	23-May-2024 11:39	23-May-2024 13:41
Compound	CAS Number	LOR	Unit	EP2407107-001	EP2407107-002	EP2407107-003	EP2407107-004	EP2407107-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	20.5	25.5	26.0	29.7	36.1
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	0.0004	0.0034
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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SD304_240523	0960_SD303_240523	0960_SD301_240523	0960_SD300_240523	0960_SD211_240523
Sampling date / time					23-May-2024 10:56	23-May-2024 11:12	23-May-2024 11:25	23-May-2024 11:39	23-May-2024 13:41
Compound	CAS Number	LOR	Unit	EP2407107-001	EP2407107-002	EP2407107-003	EP2407107-004	EP2407107-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	—	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0004	0.0034	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0004	0.0034	
Sum of PFAS (WA DER List)	—	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0004	0.0034	
EP231S: PFAS Surrogate									
13C4-PFOS	—	0.0002	%	96.5	96.5	100	96.0	100	
13C8-PFOA	—	0.0002	%	99.0	94.5	97.5	108	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



QUALITY CONTROL REPORT

Work Order	: EP2407107	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68140	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - SC		
Quote number	: SY/139/19 B		
No. of samples received	: 5		
No. of samples analysed	: 5		



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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 5822207)									
EP2407107-001	0960_SD304_240523	EA055: Moisture Content	----	0.1	%	20.5	22.6	10.0	0% - 20%
EP2407161-006	Anonymous	EA055: Moisture Content	----	0.1	%	4.9	5.0	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5819807)									
EP2407107-001	0960_SD304_240523	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
EP2407161-006	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	0.0031	0.0030	0.0	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0012	0.0013	8.3	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5819807)									
EP2407107-001	0960_SD304_240523	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



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: 5819807) - continued											
EP2407107-001	0960_SD304_240523	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		
EP2407161-006	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: 5819807)									
		EP2407107 001	0960 SD304 240523	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		
EP2407161-006	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		



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5819807) - continued									
EP2407161-006	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5819807)									
EP2407107-001	0960_SD304_240523	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
EP2407161-006	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
EP231P: PFAS Sums (QC Lot: 5819807)									
EP2407107-001	0960_SD304_240523	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2407161-006	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0043	0.0043	0.0	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0031	0.0030	3.3	0% - 50%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0031	0.0030	3.3	0% - 50%

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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
		LCS	Low	High
Result				
<0.0002	0.0011 mg/kg	99.1	72.0	128
<0.0002	0.00125 mg/kg	78.8	73.0	123
<0.0002	0.00118 mg/kg	84.7	67.0	130
<0.0002	0.00119 mg/kg	95.8	70.0	132
<0.0002	0.00116 mg/kg	87.9	68.0	136
<0.0002	0.0012 mg/kg	98.8	59.0	134
<0.001	0.00625 mg/kg	117	71.0	135
<0.0002	0.00125 mg/kg	92.4	69.0	132
<0.0002	0.00125 mg/kg	105	70.0	132
<0.0002	0.00125 mg/kg	88.8	71.0	131
<0.0002	0.00125 mg/kg	101	69.0	133
<0.0002	0.00125 mg/kg	86.4	72.0	129
<0.0002	0.00125 mg/kg	93.2	69.0	133
<0.0002	0.00125 mg/kg	99.6	64.0	136
<0.0002	0.00125 mg/kg	81.2	69.0	135
<0.0002	0.00125 mg/kg	103	66.0	139
<0.0005	0.00125 mg/kg	112	69.0	133
<0.0002	0.00125 mg/kg	92.4	67.0	137
<0.0005	0.00312 mg/kg	112	59.6	143
<0.0005	0.00312 mg/kg	99.5	62.8	140
<0.0005	0.00312 mg/kg	98.2	61.5	139
<0.0005	0.00312 mg/kg	101	61.9	139
<0.0002	0.00125 mg/kg	106	63.0	144
<0.0002	0.00125 mg/kg	100	61.0	139

Matrix Spike (MS) Report

Sub-Matrix: SOIL

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5819807)							
EP2407107-002	0960_SD303_240523	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	87.7	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	77.8	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	82.6	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	100	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	78.4	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	92.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5819807)							
EP2407107-002	0960_SD303_240523	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	107	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	89.2	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	108	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	98.0	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	89.6	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	88.4	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	91.6	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	97.2	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	94.4	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	123	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	100	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5819807)							



Sub-Matrix: **SOIL**

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: 5819807) - continued							
EP2407107-002	0960_SD303_240523	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	85.6	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	94.1	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	99.5	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	86.9	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	86.8	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	91.2	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	91.2	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5819807)							
EP2407107-002	0960_SD303_240523	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	98.7	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	103	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	104	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	99.9	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407107	Page	: 1 of 4
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Site	: Learmonth SD - SC	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED]	No. of samples received	: 5
Order number	: pfas-omp Learmonth	No. of samples analysed	: 5

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Analysis Holding Time Compliance

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

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

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

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055) 0960_SD304_240523, 0960_SD301_240523, 0960_SD211_240523	0960_SD303_240523, 0960_SD300_240523,	23-May-2024	---	---	---	04-Jun-2024	06-Jun-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SD304_240523, 0960_SD301_240523, 0960_SD211_240523	0960_SD303_240523, 0960_SD300_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) 0960_SD304_240523, 0960_SD301_240523, 0960_SD211_240523	0960_SD303_240523, 0960_SD300_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) 0960_SD304_240523, 0960_SD301_240523, 0960_SD211_240523	0960_SD303_240523, 0960_SD300_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SD304_240523, 0960_SD301_240523, 0960_SD211_240523	0960_SD303_240523, 0960_SD300_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) 0960_SD304_240523, 0960_SD301_240523, 0960_SD211_240523	0960_SD303_240523, 0960_SD300_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **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 5.4, 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.



Environmental Division
Perth
Work Order Reference
EP2407161



Telephone : 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA_0960-PFASOMP-24 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 68117 68140 68136
68114, 68119, 68120, 68118,

Samples:

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date

Date / Time:

Date / Time:

Date / Time:



ALS Laboratory: EP Perth
Environmental

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

EMAIL INVOICES TO:

/ ES2022MWH AUS0002

Biohazard info:

LABORATORY USE ONLY (Circle)

Yes No N/A

Yes No N/A

C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SD199		23/05/2024 08:01 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_SS176		23/05/2024 09:14 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
003	0960_SS279		23/05/2024 09:15 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
004	0960_SS174		23/05/2024 09:16 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
005	0960_SS243		23/05/2024 09:17 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
006	0960_SS170		23/05/2024 09:18 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
007	0960_SS108		23/05/2024 09:18 AM	SOIL	ALS: 1 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

COC#: 68118

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth SD - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

CONTACT PH: [REDACTED]

QUOTE NO: SY139/19 B

SAMPLER MOBILE: [REDACTED]

/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SD199	HDPE Soil Jar	200 mL	00621222053657	Grey	No	
002	0960_SS176	HDPE Soil Jar	200 mL	00621122048979	Grey	No	
003	0960_SS279	HDPE Soil Jar	200 mL	00621122048944	Grey	No	
004	0960_SS174	HDPE Soil Jar	200 mL	00621122049014	Grey	No	
005	0960_SS243	HDPE Soil Jar	200 mL	00621122048999	Grey	No	
006	0960_SS170	HDPE Soil Jar	200 mL	00620322054916	Grey	No	
007	0960_SS108	HDPE Soil Jar	200 mL	00621122048998	Grey	No	
008	0960_SS168	HDPE Soil Jar	200 mL	00621122049005	Grey	No	
009	0960_SS168	HDPE Soil Jar	200 mL	00621122048915	Grey	No	
010	0960_SS265	HDPE Soil Jar	200 mL	00621122049010	Grey	No	
011	0960_SS157	HDPE Soil Jar	200 mL	00621122049029	Grey	No	
012	0960_SS235	HDPE Soil Jar	200 mL	00621019025089	Grey	No	
013	0960_SD219	HDPE Soil Jar	200 mL	00621222066991	Grey	No	

Total Bottle Count: ALS: 13, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407161

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact :
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
stantec.com
Telephone :
Facsimile :

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68118
Site : Learmonth SD - JS
Sampler :

Page : 1 of 2
Quote number : ES2022MWH AUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 27-May-2024 10:50
Client Requested Due : 06-Jun-2024
Date

Issue Date : 28-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 2
Receipt Detail :

Security Seal : Not Available
Temperature : 9.0 - Ice present
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
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2407161	Page	: 1 of 9
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024 10:50
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68118	Issue Date	: 06-Jun-2024 16:07
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 13		
No. of samples analysed	: 13		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This 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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SD199_240523	0960_SS176_240523	0960_SS279_240523	0960_SS174_240523	0960_SS243_240523
Sampling date / time				23-May-2024 08:01	23-May-2024 09:14	23-May-2024 09:15	23-May-2024 09:16	23-May-2024 09:17
Compound	CAS Number	LOR	Unit	EP2407161-001	EP2407161-002	EP2407161-003	EP2407161-004	EP2407161-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	3.1	5.9	6.0	1.9	1.9
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	0.0006	0.0015	0.0097	0.0068
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



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SD199_240523	0960_SS176_240523	0960_SS279_240523	0960_SS174_240523	0960_SS243_240523
Sampling date / time					23-May-2024 08:01	23-May-2024 09:14	23-May-2024 09:15	23-May-2024 09:16	23-May-2024 09:17
Compound	CAS Number	LOR	Unit	EP2407161-001	EP2407161-002	EP2407161-003	EP2407161-004	EP2407161-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0003	0.0006	0.0015	0.0097	0.0068	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0003	0.0006	0.0015	0.0097	0.0068	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0003	0.0006	0.0015	0.0097	0.0068	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	94.5	97.5	104	94.5	91.5	
13C8-PFOA	---	0.0002	%	95.5	103	92.5	98.5	96.0	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0960_SS170_240523	0960_SS108_240523	0960_SS168_240523	0960_SS166_240523	0960_SS265_240523
Sampling date / time				23-May-2024 09:18	23-May-2024 09:18	23-May-2024 09:19	23-May-2024 09:20	23-May-2024 09:21
Compound	CAS Number	LOR	Unit	EP2407161-006	EP2407161-007	EP2407161-008	EP2407161-009	EP2407161-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	4.9	4.9	1.9	0.5	18.8
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	0.0031	0.0060	0.0007	0.0004	0.0271
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0012	<0.0002	<0.0002	<0.0002	0.0008
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	0.0004
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS170_240523	0960_SS108_240523	0960_SS168_240523	0960_SS166_240523	0960_SS265_240523
Sampling date / time					23-May-2024 09:18	23-May-2024 09:18	23-May-2024 09:19	23-May-2024 09:20	23-May-2024 09:21
Compound	CAS Number	LOR	Unit	EP2407161-006	EP2407161-007	EP2407161-008	EP2407161-009	EP2407161-010	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	0.0043	0.0060	0.0007	0.0004	0.0283	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0031	0.0060	0.0007	0.0004	0.0271	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0031	0.0060	0.0007	0.0004	0.0271	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	97.0	100	92.0	93.5	91.0	
13C8-PFOA	---	0.0002	%	99.0	97.0	92.0	89.5	95.5	



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SS157_240523	0960_SS235_240523	0960_SD219_240523	---	---
Sampling date / time				23-May-2024 09:24	23-May-2024 09:25	23-May-2024 09:26	---	---
Compound	CAS Number	LOR	Unit	EP2407161-011	EP2407161-012	EP2407161-013	-----	-----
				Result	Result	Result	---	---
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	23.7	1.3	1.2	---	---
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	0.0011	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	0.0070	0.0112	0.0009	---	---
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0003	<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	0.0004	<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	---	---



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SS157_240523	0960_SS235_240523	0960_SD219_240523	----	----
Sampling date / time					23-May-2024 09:24	23-May-2024 09:25	23-May-2024 09:26	----	----
Compound	CAS Number	LOR	Unit	EP2407161-011	EP2407161-012	EP2407161-013	-----	-----	
				Result	Result	Result	---	---	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	---	---	
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	0.0088	0.0114	0.0009	---	---	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0081	0.0114	0.0009	---	---	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	0.0085	0.0114	0.0009	---	---	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	89.0	92.5	100	---	---	
13C8-PFOA	---	0.0002	%	99.5	98.0	109	---	---	



Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	---	76	136
13C8-PFOA	---	78	131



QUALITY CONTROL REPORT

Work Order	: EP2407161	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68118	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 13		
No. of samples analysed	: 13		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

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: 5822207)									
EP2407107-001	Anonymous	EA055: Moisture Content	----	0.1	%	20.5	22.6	10.0	0% - 20%
EP2407161-006	0960_SS170_240523	EA055: Moisture Content	----	0.1	%	4.9	5.0	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5819807)									
EP2407107-001	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
EP2407161-006	0960_SS170_240523	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	0.0031	0.0030	0.0	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0012	0.0013	8.3	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5819807)									
EP2407107-001	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



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: 5819807) - continued									
EP2407107-001	Anonymous	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
EP2407161-006	0960_SS170_240523	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: 5819807)							
EP2407107 001	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
EP2407161-006	0960_SS170_240523	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



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5819807) - continued									
EP2407161-006	0960_SS170_240523	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5819807)									
EP2407107-001	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
EP2407161-006	0960_SS170_240523	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5819807)									
EP2407107-001	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2407161-006	0960_SS170_240523	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0043	0.0043	0.0	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0031	0.0030	3.3	0% - 50%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0031	0.0030	3.3	0% - 50%

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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
		LCS	Low	High
Result				
<0.0002	0.0011 mg/kg	99.1	72.0	128
<0.0002	0.00125 mg/kg	78.8	73.0	123
<0.0002	0.00118 mg/kg	84.7	67.0	130
<0.0002	0.00119 mg/kg	95.8	70.0	132
<0.0002	0.00116 mg/kg	87.9	68.0	136
<0.0002	0.0012 mg/kg	98.8	59.0	134
<0.001	0.00625 mg/kg	117	71.0	135
<0.0002	0.00125 mg/kg	92.4	69.0	132
<0.0002	0.00125 mg/kg	105	70.0	132
<0.0002	0.00125 mg/kg	88.8	71.0	131
<0.0002	0.00125 mg/kg	101	69.0	133
<0.0002	0.00125 mg/kg	86.4	72.0	129
<0.0002	0.00125 mg/kg	93.2	69.0	133
<0.0002	0.00125 mg/kg	99.6	64.0	136
<0.0002	0.00125 mg/kg	81.2	69.0	135
<0.0002	0.00125 mg/kg	103	66.0	139
<0.0005	0.00125 mg/kg	112	69.0	133
<0.0002	0.00125 mg/kg	92.4	67.0	137
<0.0005	0.00312 mg/kg	112	59.6	143
<0.0005	0.00312 mg/kg	99.5	62.8	140
<0.0005	0.00312 mg/kg	98.2	61.5	139
<0.0005	0.00312 mg/kg	101	61.9	139
<0.0002	0.00125 mg/kg	106	63.0	144
<0.0002	0.00125 mg/kg	100	61.0	139

Matrix Spike (MS) Report

Sub-Matrix: SOIL

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5819807)							
EP2407107-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	87.7	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	77.8	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	82.6	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	100	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	78.4	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	92.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5819807)							
EP2407107-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	107	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	89.2	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	108	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	98.0	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	89.6	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	88.4	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	91.6	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	97.2	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	94.4	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	123	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	100	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5819807)							



Sub-Matrix: **SOIL**

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: 5819807) - continued							
EP2407107-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	85.6	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	94.1	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	99.5	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	86.9	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	86.8	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	91.2	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	91.2	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5819807)							
EP2407107-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	98.7	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	103	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	104	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	99.9	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407161	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Site	: Learmonth SD - JS	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 13
Order number	: pfas-omp Learmonth	No. of samples analysed	: 13

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055)	23-May-2024	---	---	---	04-Jun-2024	06-Jun-2024	✔	
0960_SD199_240523,								0960_SS176_240523,
0960_SS279_240523,								0960_SS174_240523,
0960_SS243_240523,								0960_SS170_240523,
0960_SS108_240523,								0960_SS168_240523,
0960_SS166_240523,								0960_SS265_240523,
0960_SS157_240523,								0960_SS235_240523,
0960_SD219_240523								
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)	23-May-2024	30-May-2024	19-Nov-2024	✔	05-Jun-2024	09-Jul-2024	✔	
0960_SD199_240523,								0960_SS176_240523,
0960_SS279_240523,								0960_SS174_240523,
0960_SS243_240523,								0960_SS170_240523,
0960_SS108_240523,								0960_SS168_240523,
0960_SS166_240523,								0960_SS265_240523,
0960_SS157_240523,								0960_SS235_240523,
0960_SD219_240523								
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X)	23-May-2024	30-May-2024	19-Nov-2024	✔	05-Jun-2024	09-Jul-2024	✔	
0960_SD199_240523,								0960_SS176_240523,
0960_SS279_240523,								0960_SS174_240523,
0960_SS243_240523,								0960_SS170_240523,
0960_SS108_240523,								0960_SS168_240523,
0960_SS166_240523,								0960_SS265_240523,
0960_SS157_240523,								0960_SS235_240523,
0960_SD219_240523								



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 5.4, 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.



ALS Compass

SAMPLING *Intelligence*



Environmental Division
Perth
Work Order Reference
EP2407163



Telephone: 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASCOMP-24 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 68117 68140 68136

Samples:

Sampler:

Phone:

68114, 68119, 68120, 68118,

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date

Date / Time:

Date / Time:

Date / Time:

24-5-24

27/5
1050

**CHAIN OF CUSTODY**

ALS COC#: 68119

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PASOMP_24

SITE: Learmonth GW - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

Other comments:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_POT109		23/05/2024 09:06 AM	WATER	ALS: 3 Non ALS: 0	No	X		
002	0960_MW172		23/05/2024 09:28 AM	WATER	ALS: 3 Non ALS: 0	No	X		
003	0960_MW170		23/05/2024 09:30 AM	WATER	ALS: 5 Non ALS: 0	No	X		
004	0960_MW126		23/05/2024 09:32 AM	WATER	ALS: 5 Non ALS: 0	No	X		
005	0960_MW102		23/05/2024 09:34 AM	WATER	ALS: 5 Non ALS: 0	No	X		
006	0960_MW124		23/05/2024 09:36 AM	WATER	ALS: 3 Non ALS: 0	No	X		
007	0960_MW159		23/05/2024 09:37 AM	WATER	ALS: 3 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 68119

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth GW - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	WA OMP Water Sample WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_MW103		23/05/2024 09:39 AM	WATER	ALS: 3 Non ALS: 0	No	X		
009	0960_POT106		23/05/2024 10:23 AM	WATER	ALS: 3 Non ALS: 0	No	X		
010	0960_POT105		23/05/2024 10:31 AM	WATER	ALS: 3 Non ALS: 0	No	X		

**CHAIN OF CUSTODY**

COC#: 68119

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_POT109	Clear Plastic Bottle - Natural	125 mL	00071121181890	Green	No	
001	0960_POT109	HDPE (no PTFE)	20 mL	00352312004045	Grey	No	
001	0960_POT109	HDPE (no PTFE)	20 mL	00352312004324	Grey	No	
002	0960_MW172	Clear Plastic Bottle - Natural	125 mL	00070522075252	Green	No	
002	0960_MW172	HDPE (no PTFE)	20 mL	00351221020926	Grey	No	
002	0960_MW172	HDPE (no PTFE)	20 mL	00351221020633	Grey	No	
003	0960_MW170	HDPE (no PTFE)	20 mL	00352309015117	Grey	No	
003	0960_MW170	HDPE (no PTFE)	20 mL	00352309014978	Grey	No	
003	0960_MW170	Clear Plastic Bottle - Natural	125 mL	00071121181568	Green	No	
003	0960_MW170	HDPE (no PTFE)	20 mL	00352312011780	Grey	No	
003	0960_MW170	HDPE (no PTFE)	20 mL	00352312011831	Grey	No	
004	0960_MW126	HDPE (no PTFE)	20 mL	00352312004231	Grey	No	
004	0960_MW126	HDPE (no PTFE)	20 mL	00352312003878	Grey	No	
004	0960_MW126	HDPE (no PTFE)	20 mL	00350822082707	Grey	No	
004	0960_MW126	HDPE (no PTFE)	20 mL	00350822082653	Grey	No	
004	0960_MW126	Clear Plastic Bottle - Natural	125 mL	00070522054825	Green	No	
005	0960_MW102	HDPE (no PTFE)	20 mL	00352309014950	Grey	No	
005	0960_MW102	HDPE (no PTFE)	20 mL	00352309014824	Grey	No	
005	0960_MW102	HDPE (no PTFE)	20 mL	00352309014872	Grey	No	
005	0960_MW102	Clear Plastic Bottle - Natural	125 mL	00071121181848	Green	No	
005	0960_MW102	HDPE (no PTFE)	20 mL	00352309014810	Grey	No	
006	0960_MW124	Clear Plastic Bottle - Natural	125 mL	00071121181955	Green	No	
006	0960_MW124	HDPE (no PTFE)	20 mL	00352312011807	Grey	No	
006	0960_MW124	HDPE (no PTFE)	20 mL	00352312011854	Grey	No	
007	0960_MW159	HDPE (no PTFE)	20 mL	00350822000533	Grey	No	
007	0960_MW159	HDPE (no PTFE)	20 mL	00350822000360	Grey	No	

**CHAIN OF CUSTODY**

COC#: 68119

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - JS

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

007	0960_MW159	Clear Plastic Bottle - Natural	125 mL	00071121130200	Green	No	
008	0960_MW103	HDPE (no PTFE)	20 mL	00352312003833	Grey	No	
008	0960_MW103	HDPE (no PTFE)	20 mL	00352312004534	Grey	No	
008	0960_MW103	Clear Plastic Bottle - Natural	125 mL	00071121181960	Green	No	
009	0960_POT106	HDPE (no PTFE)	20 mL	00352312011870	Grey	No	
009	0960_POT106	HDPE (no PTFE)	20 mL	00352312011998	Grey	No	
009	0960_POT106	Clear Plastic Bottle - Natural	125 mL	00071121181966	Green	No	
010	0960_POT105	Clear Plastic Bottle - Natural	125 mL	00070522162823	Green	No	
010	0960_POT105	HDPE (no PTFE)	20 mL	00350821001895	Grey	No	
010	0960_POT105	HDPE (no PTFE)	20 mL	00350821001688	Grey	No	

Total Bottle Count: ALS: 36, Non ALS: 0



Page : 1 of 2
Quote number : ES2022MWH AUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard



CERTIFICATE OF ANALYSIS

Work Order	: EP2407163	Page	: 1 of 12
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024 10:30
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 29-May-2024
C-O-C number	: 68119	Issue Date	: 07-Jun-2024 16:55
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 10		
No. of samples analysed	: 10		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
[REDACTED]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X: Matrix spike not reported (NR) due to insufficient sample volume received.
- 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, PFTTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW172_240523	0960_MW170_240523	0960_MW126_240523	0960_MW102_240523	0960_MW124_240523
Sampling date / time				23-May-2024 09:28	23-May-2024 09:30	23-May-2024 09:32	23-May-2024 09:34	23-May-2024 09:36	
Compound	CAS Number	LOR	Unit	EP2407163-002	EP2407163-003	EP2407163-004	EP2407163-005	EP2407163-006	
				Result	Result	Result	Result	Result	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	538	702	225	141	223	
Total Alkalinity as CaCO3	----	1	mg/L	538	702	225	141	223	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1920	964	2270	3570	4120	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	9480	11900	21800	33000	32300	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	403	603	921	1330	889	
Magnesium	7439-95-4	1	mg/L	548	753	1640	2280	2310	
Sodium	7440-23-5	1	mg/L	6800	7060	12700	19200	17800	
Potassium	7440-09-7	1	mg/L	204	185	660	722	1150	
EN055: Ionic Balance									
☐ Total Anions	----	0.01	meq/L	318	370	667	1010	1000	
☐ Total Cations	----	0.01	meq/L	366	404	750	1110	1040	
☐ Ionic Balance	----	0.01	%	7.02	4.41	5.89	4.71	1.80	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.50	0.05	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.77	0.05	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	5.34	0.41	<0.01	<0.01	<0.01	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.22	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.38	<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	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW172_240523	0960_MW170_240523	0960_MW126_240523	0960_MW102_240523	0960_MW124_240523
Sampling date / time					23-May-2024 09:28	23-May-2024 09:30	23-May-2024 09:32	23-May-2024 09:34	23-May-2024 09:36
Compound	CAS Number	LOR	Unit	EP2407163-002	EP2407163-003	EP2407163-004	EP2407163-005	EP2407163-006	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	---	0.01	µg/L	11.1	0.55	<0.01	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	6.72	0.41	<0.01	<0.01	<0.01	
Sum of PFAS (WA DER List)	---	0.01	µg/L	10.1	0.50	<0.01	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.02	%	102	101	111	106	93.8	
13C8-PFOA	---	0.02	%	93.9	101	75.8	103	100	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW159_240523	0960_MW103_240523	0960_POT106_240523	---	---
Sampling date / time				23-May-2024 09:37	23-May-2024 09:39	23-May-2024 10:23	---	---
Compound	CAS Number	LOR	Unit	EP2407163-007	EP2407163-008	EP2407163-009	-----	-----
				Result	Result	Result	---	---
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	---	---
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	---	---
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	971	210	351	---	---
Total Alkalinity as CaCO ₃	---	1	mg/L	971	210	351	---	---
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	790	2290	13	---	---
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	10100	29000	141	---	---
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	467	1380	142	---	---
Magnesium	7439-95-4	1	mg/L	692	2140	13	---	---
Sodium	7440-23-5	1	mg/L	6360	14700	63	---	---
Potassium	7440-09-7	1	mg/L	286	759	4	---	---
EN055: Ionic Balance								
∅ Total Anions	---	0.01	meq/L	321	870	11.3	---	---
∅ Total Cations	---	0.01	meq/L	364	904	11.0	---	---
∅ Ionic Balance	---	0.01	%	6.34	1.91	1.18	---	---
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.17	<0.02	---	---
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.08	<0.02	---	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.28	<0.01	---	---
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	---	---
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	---	---
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	---	---



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW159_240523	0960_MW103_240523	0960_POT106_240523	---	---
Sampling date / time				23-May-2024 09:37	23-May-2024 09:39	23-May-2024 10:23	---	---
Compound	CAS Number	LOR	Unit	EP2407163-007	EP2407163-008	EP2407163-009	-----	-----
				Result	Result	Result	---	---
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	---	---
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	---	---
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	---	---
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	---	---
EP231P: PFAS Sums								
Sum of PFAS	---	0.01	µg/L	<0.01	0.64	<0.01	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.28	<0.01	---	---
Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.01	0.49	<0.01	---	---
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	105	102	87.9	---	---
13C8-PFOA	---	0.02	%	89.7	103	98.0	---	---



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

				0960_POT109_24052 3	0960_POT105_24052 3	----	----	----
Sampling date / time				23-May-2024 09:06	23-May-2024 10:31	----	----	----
Compound	CAS Number	LOR	Unit	EP2407163-001	EP2407163-010	-----	-----	-----
				Result	Result	—	—	—
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	101	361	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	101	361	----	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	3	12	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	50	117	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	38	148	----	----	----
Magnesium	7439-95-4	1	mg/L	3	10	----	----	----
Sodium	7440-23-5	1	mg/L	32	63	----	----	----
Potassium	7440-09-7	1	mg/L	2	4	----	----	----
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	3.49	10.8	----	----	----
∅ Total Cations	----	0.01	meq/L	3.59	11.0	----	----	----
∅ Ionic Balance	----	0.01	%	1.35	1.32	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----



Analytical Results

Sub-Matrix: POTABLE WATER
 (Matrix: WATER)

Sample ID

				0960_POT109_24052 3	0960_POT105_24052 3	----	----	----
Sampling date / time				23-May-2024 09:06	23-May-2024 10:31	----	----	----
Compound	CAS Number	LOR	Unit	EP2407163-001	EP2407163-010	-----	-----	-----
				Result	Result	—	—	—
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	106	98.4	----	----	----
13C8-PFOA	----	0.02	%	97.8	97.1	----	----	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

Sub-Matrix: POTABLE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133



QUALITY CONTROL REPORT

Work Order	: EP2407163	Page	: 1 of 13
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 29-May-2024
C-O-C number	: 68119	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - JS		
Quote number	: SY/139/19 B		
No. of samples received	: 10		
No. of samples analysed	: 10		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This 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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5825727)									
EP2407055-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	452	453	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	452	453	0.0	0% - 20%
EP2407055-015	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	934	932	0.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	934	932	0.3	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 5826379)									
EP2407163-008	0960_MW103_240523	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	210	209	0.0	0% - 20%
		ED037 P Total Alkalinity as CaCO3	----	1	mg/L	210	209	0.0	0% - 20%
EP2407165-006	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	162	157	3.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	162	157	3.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5821067)									
EP2407163-001	0960_POT109_240523	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3	3	0.0	No Limit
EP2407165-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2480	2590	4.6	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 (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 5821068)									
EP2407163-001	0960_POT109_240523	ED045G: Chloride	16887-00-6	1	mg/L	50	47	7.3	0% - 20%
EP2407165-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	22900	23100	1.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5821858)									
EP2407103-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	812	812	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2920	2900	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	22200	22100	0.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1140	1130	0.3	0% - 20%
EP2407163-005	0960_MW102_240523	ED093F: Calcium	7440-70-2	1	mg/L	1330	1330	0.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2280	2260	0.8	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	19200	19100	0.5	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	722	714	1.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5821863)									
EP2406932-001	Anonymous	ED093F: Calcium	7440-70-2	1 (5)*	mg/L	787	793	0.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1 (5)*	mg/L	9850	9970	1.2	0% - 20%
		ED093F: Sodium	7440-23-5	1 (5)*	mg/L	85100	86000	1.1	0% - 20%
		ED093F: Potassium	7440-09-7	1 (5)*	mg/L	4720	4800	1.7	0% - 20%
EP2407165-014	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	894	895	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2660	2670	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	20000	20100	0.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1010	1010	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2407163-005	0960_MW102_240523	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5824180)									
EP2407163-004	0960_MW126_240523	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



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: 5824180) - continued									
EP2407163-004	0960_MW126_240523	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: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2407163-005	0960_MW102_240523	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5824180)									
EP2407163-004	0960_MW126_240523	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5824180) - continued									
EP2407163-004	0960_MW126_240523	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407163-005	0960_MW102_240523	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5824180)									
EP2407163-004	0960_MW126_240523	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



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5824180) - continued									
EP2407163-004	0960_MW126_240523	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: 5824178)									
EP2407105-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407163-005	0960_MW102_240523	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5824180)									
EP2407163-004	0960_MW126_240523	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: 5824178)									
EP2407105-005	Anonymous	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
EP2407163-005	0960_MW102_240523	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
EP231P: PFAS Sums (QC Lot: 5824180)									
EP2407163-004	0960_MW126_240523	EP231X: Sum of PFAS	----	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 (%)
EP231P: PFAS Sums (QC Lot: 5824180) - continued									
EP2407163-004	0960_MW126_240523	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5825727)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	93.7	85.1	126
				<1	200 mg/L	98.2	90.5	111
ED037P: Alkalinity by PC Titrator (QCLot: 5826379)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	94.8	85.1	126
				<1	200 mg/L	99.9	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5821067)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	89.9	112
				<1	500 mg/L	101	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5821068)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	101	88.6	113
				<1	1000 mg/L	105	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5821858)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	100.0	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	100	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.2	84.6	108
ED093F: Dissolved Major Cations (QCLot: 5821863)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	101	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.9	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	95.1	72.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178) - continued								
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	91.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	102	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	97.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	113	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824180)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	86.8	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	91.6	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	84.7	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	85.7	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	85.1	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	83.2	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5826565)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	81.2	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	84.0	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	85.1	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	93.9	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	73.7	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	80.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	98.5	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	91.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	93.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	105	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	102	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	108	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	99.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	97.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824180)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	72.4	72.0	129



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824180) - continued								
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	94.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	98.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	94.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	81.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	80.8	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	83.0	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	88.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5826565)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	88.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	82.8	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	96.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	87.2	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	84.2	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	73.8	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	88.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	75.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	92.8	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	98.2	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	101	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	107	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	104	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	92.8	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	110	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	96.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	98.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824180)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	81.2	67.0	137



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824180) - continued								
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	108	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	63.2	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	102	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	101	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	92.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	94.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5826565)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	87.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	89.0	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	77.7	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	86.2	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	87.0	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	89.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	101	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	103	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	107	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	98.3	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	86.5	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824180)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	98.0	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	115	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	97.5	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	92.7	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5826565)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	87.1	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	83.9	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	102	67.0	138

Matrix Spike (MS) Report

Sub-Matrix: WATER

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5821067)							
EP2407163-001	0960_POT109_240523	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	99.1	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5821068)							
EP2407163-001	0960_POT109_240523	ED045G: Chloride	16887-00-6	200 mg/L	119	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178)							
EP2407163-003	0960_MW170_240523	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	102	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	97.9	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	80.1	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	92.9	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	87.3	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	102	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178)							



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178) - continued							
EP2407163-003	0960_MW170_240523	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	101	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	94.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	108	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	93.2	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	99.2	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	96.7	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.1	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	99.0	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	95.5	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	107	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178)							
EP2407163-003	0960_MW170_240523	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	97.8	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	102	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	106	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	88.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	109	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	86.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178)							
EP2407163-003	0960_MW170_240523	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	103	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	109	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	107	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407163	Page	: 1 of 6
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Site	: Learmonth GW - JS	Issue Date	: 07-Jun-2024
Sampler	: [REDACTED] [REDACTED]	No. of samples received	: 10
Order number	: pfas-omp Learmonth	No. of samples analysed	: 10

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, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Matrix: WATER

Analysis Holding Time Compliance

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Evaluation: ✖ = Holding time breach : ✔ = Within holding time

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
0960_POT109_240523,	0960_MW172_240523,	23-May-2024	---	---	30-May-2024	06-Jun-2024	✓
0960_MW170_240523,	0960_MW126_240523,						
0960_MW102_240523,	0960_MW124_240523,						
0960_MW159_240523,	0960_MW103_240523,						
0960_POT106_240523,	0960_POT105_240523						
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
0960_POT109_240523,	0960_MW172_240523,	23-May-2024	---	---	06-Jun-2024	20-Jun-2024	✓
0960_MW170_240523,	0960_MW126_240523,						
0960_MW102_240523,	0960_MW124_240523,						
0960_MW159_240523,	0960_MW103_240523,						
0960_POT106_240523,	0960_POT105_240523						
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
0960_POT109_240523,	0960_MW172_240523,	23-May-2024	---	---	06-Jun-2024	20-Jun-2024	✓
0960_MW170_240523,	0960_MW126_240523,						
0960_MW102_240523,	0960_MW124_240523,						
0960_MW159_240523,	0960_MW103_240523,						
0960_POT106_240523,	0960_POT105_240523						



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) 0960_POT109_240523, 0960_MW170_240523, 0960_MW102_240523, 0960_MW159_240523, 0960_POT106_240523,	0960_MW172_240523, 0960_MW126_240523, 0960_MW124_240523, 0960_MW103_240523, 0960_POT105_240523	23-May-2024	---	---	---	30-May-2024	30-May-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW126_240523		23-May-2024	29-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_POT109_240523, 0960_MW170_240523, 0960_MW124_240523, 0960_MW103_240523, 0960_POT105_240523	0960_MW172_240523, 0960_MW102_240523, 0960_MW159_240523, 0960_POT106_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0960_MW126_240523		23-May-2024	29-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_POT109_240523, 0960_MW170_240523, 0960_MW124_240523, 0960_MW103_240523, 0960_POT105_240523	0960_MW172_240523, 0960_MW102_240523, 0960_MW159_240523, 0960_POT106_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0960_MW126_240523		23-May-2024	29-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_POT109_240523, 0960_MW170_240523, 0960_MW124_240523, 0960_MW103_240523, 0960_POT105_240523	0960_MW172_240523, 0960_MW102_240523, 0960_MW159_240523, 0960_POT106_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0960_MW126_240523		23-May-2024	29-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_POT109_240523, 0960_MW170_240523, 0960_MW124_240523, 0960_MW103_240523, 0960_POT105_240523	0960_MW172_240523, 0960_MW102_240523, 0960_MW159_240523, 0960_POT106_240523,	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0960_MW126_240523		23-May-2024	29-May-2024	19-Nov-2024	✔	31-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X) 0960_POT109_240523, 0960_MW170_240523, 0960_MW124_240523, 0960_MW103_240523, 0960_POT105_240523		23-May-2024	30-May-2024	19-Nov-2024	✔	30-May-2024	19-Nov-2024	✔
0960_MW172_240523, 0960_MW102_240523, 0960_MW159_240523,								



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 Auto Titrator	ED037-P	4	34	11.76	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
Major Cations - Dissolved	ED093F	4	36	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	35	8.57	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
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	4	34	11.76	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
Major Cations - Dissolved	ED093F	2	36	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	35	8.57	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
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	2	34	5.88	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
Major Cations - Dissolved	ED093F	3	36	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	35	8.57	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
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	35	2.86	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
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



Environmental Division
Perth
Work Order Reference
EP2407164



Telephone -- 61-8-9406 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASOMP-24 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 68117 68140 68136
Samples: 68114, 68119, 68120, 68118,

Sampler:

Phone:

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date:

Date / Time:

Date / Time:

Date / Time:



CHAIN OF CUSTODY

COC#: 68120

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth SD - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWHAUS0002

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

-C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	PFAS Sediments SEDIMENT	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_SD200		23/05/2024 08:04 AM	SOIL	ALS: 1 Non ALS: 0	No	X		
002	0960_SS288		23/05/2024 09:27 AM	SOIL	ALS: 1 Non ALS: 0	No	X		



CHAIN OF CUSTODY

COC#: 68120

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFASOMP_24

SITE: Learmonth SD - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_SD200	HDPE Soil Jar	200 mL	00621122003361	Grey	No	
002	0960_SS288	HDPE Soil Jar	200 mL	00621122027968	Grey	No	

Total Bottle Count: ALS: 2, Non ALS: 0



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407164

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact :
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
stantec.com
Telephone : ----
Facsimile : ----

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68120
Site : Learmonth SD - CG
Sampler :

Page : 1 of 2
Quote number : ES2022MWH AUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 27-May-2024 10:50
Client Requested Due : 06-Jun-2024
Date

Issue Date : 28-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 2
Receipt Detail :

Security Seal : Not Available
Temperature : 9.0 - Ice present
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
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



CERTIFICATE OF ANALYSIS

Work Order	: EP2407164	Page	: 1 of 5
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024 10:50
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68120	Issue Date	: 06-Jun-2024 16:07
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 2		
No. of samples analysed	: 2		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

				0960_SD200_240523	0960_SS288_240523	----	----	----
Sampling date / time				23-May-2024 08:04	23-May-2024 09:27	----	----	----
Compound	CAS Number	LOR	Unit	EP2407164-001	EP2407164-002	-----	-----	-----
				Result	Result	---	---	---
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	---	0.1	%	10.9	9.3	----	----	----
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	0.0060	----	----	----
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	<0.0002	<0.0002	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----



Analytical Results

Sub-Matrix: SEDIMENT
 (Matrix: SOIL)

Sample ID

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	0960_SD200_240523	0960_SS288_240523	----	----	----
Sampling date / time					23-May-2024 08:04	23-May-2024 09:27	----	----	----
Compound	CAS Number	LOR	Unit	EP2407164-001	EP2407164-002	-----	-----	-----	
				Result	Result	---	---	---	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg	<0.0002	0.0060	----	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	0.0060	----	----	----	
Sum of PFAS (WA DER List)	---	0.0002	mg/kg	<0.0002	0.0060	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%	96.0	97.5	----	----	----	
13C8-PFOA	---	0.0002	%	102	105	----	----	----	



Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	---	76	136
13C8-PFOA	---	78	131



QUALITY CONTROL REPORT

Work Order	: EP2407164	Page	: 1 of 7
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 30-May-2024
C-O-C number	: 68120	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth SD - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 2		
No. of samples analysed	: 2		



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]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

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: 5822207)									
EP2407107-001	Anonymous	EA055: Moisture Content	----	0.1	%	20.5	22.6	10.0	0% - 20%
EP2407161-006	Anonymous	EA055: Moisture Content	----	0.1	%	4.9	5.0	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5819807)									
EP2407107-001	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
EP2407161-006	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	0.0031	0.0030	0.0	0% - 50%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0012	0.0013	8.3	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5819807)									
EP2407107-001	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



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: 5819807) - continued									
EP2407107-001	Anonymous	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
EP2407161-006	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: 5819807)							
EP2407107 001	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
EP2407161-006	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



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5819807) - continued									
EP2407161-006	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5819807)									
EP2407107-001	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
EP2407161-006	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
EP231P: PFAS Sums (QC Lot: 5819807)									
EP2407107-001	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP2407161-006	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0043	0.0043	0.0	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0031	0.0030	3.3	0% - 50%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0031	0.0030	3.3	0% - 50%

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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Result				
<0.0002	0.0011 mg/kg	99.1	72.0	128
<0.0002	0.00125 mg/kg	78.8	73.0	123
<0.0002	0.00118 mg/kg	84.7	67.0	130
<0.0002	0.00119 mg/kg	95.8	70.0	132
<0.0002	0.00116 mg/kg	87.9	68.0	136
<0.0002	0.0012 mg/kg	98.8	59.0	134
<0.001	0.00625 mg/kg	117	71.0	135
<0.0002	0.00125 mg/kg	92.4	69.0	132
<0.0002	0.00125 mg/kg	105	70.0	132
<0.0002	0.00125 mg/kg	88.8	71.0	131
<0.0002	0.00125 mg/kg	101	69.0	133
<0.0002	0.00125 mg/kg	86.4	72.0	129
<0.0002	0.00125 mg/kg	93.2	69.0	133
<0.0002	0.00125 mg/kg	99.6	64.0	136
<0.0002	0.00125 mg/kg	81.2	69.0	135
<0.0002	0.00125 mg/kg	103	66.0	139
<0.0005	0.00125 mg/kg	112	69.0	133
<0.0002	0.00125 mg/kg	92.4	67.0	137
<0.0005	0.00312 mg/kg	112	59.6	143
<0.0005	0.00312 mg/kg	99.5	62.8	140
<0.0005	0.00312 mg/kg	98.2	61.5	139
<0.0005	0.00312 mg/kg	101	61.9	139
<0.0002	0.00125 mg/kg	106	63.0	144
<0.0002	0.00125 mg/kg	100	61.0	139

EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5819807)

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
			Spike Concentration		Spike Recovery (%) LCS	Acceptable Limits (%) Low High		
Method: Compound	CAS Number	LOR	Unit		Result			
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5819807) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	109	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	108	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	121	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	121	54.8	124
EP231P: PFAS Sums (QCLot: 5819807)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	---	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	---	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	---	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5819807)							
EP2407107-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0011 mg/kg	87.7	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00117 mg/kg	77.8	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00118 mg/kg	82.6	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	100	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	78.4	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0012 mg/kg	92.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5819807)							
EP2407107-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	107	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	89.2	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	108	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	98.0	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	89.6	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	88.4	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	91.6	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	97.2	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	94.4	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	123	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00125 mg/kg	100	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5819807)							



Sub-Matrix: **SOIL**

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: 5819807) - continued							
EP2407107-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	85.6	48.0	128
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	94.1	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	99.5	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	86.9	60.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	86.8	60.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	91.2	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	91.2	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5819807)							
EP2407107-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	98.7	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00118 mg/kg	103	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	104	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0012 mg/kg	99.9	60.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407164	Page	: 1 of 4
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Site	: Learmonth SD - CG	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED]	No. of samples received	: 2
Order number	: pfas-omp Learmonth	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, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055) 0960_SD200_240523, 0960_SS288_240523	23-May-2024	---	---	---	04-Jun-2024	06-Jun-2024	✓	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SD200_240523, 0960_SS288_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) 0960_SD200_240523, 0960_SS288_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) 0960_SD200_240523, 0960_SS288_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) 0960_SD200_240523, 0960_SS288_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓	
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) 0960_SD200_240523, 0960_SS288_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	05-Jun-2024	09-Jul-2024	✓	



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **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 5.4, 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.



Environmental Division
Perth

Work Order Reference
EP2407165



Telephone - 61-8-9106 1301

Custody Document for Submissions via ALS Compass App

Project: WA-0960-PFASOMP-24 Client: STANTEC

Project Manager:

Phone:

ALS Compass COC Reference: 68117 68140 68136

Samples:

Sampler:

Phone:

68114, 68119, 68120, 68118,

Turnaround Requirements: Standard Urgent

Special Instructions:

Custody:

Relinquished by:

Received by:

Relinquished by:

Received by:

Date:

Date / Time:

Date / Time:

Date / Time:



CHAIN OF CUSTODY

COC#: 68114

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

CONTACT PH:

SAMPLER MOBILE:

PRIMARY SAMPLER:

QUOTE NO: SY/139/19 B

/ ES2022MWHHAUS0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0960_MW127		23/05/2024 07:38 AM	WATER	ALS: 1 Non ALS: 1	No		X		
002	0960_MW146_3.0-3.5		23/05/2024 08:12 AM	WATER	ALS: 1 Non ALS: 1	No		X		
003	0960_MW139		23/05/2024 08:40 AM	WATER	ALS: 1 Non ALS: 1	No		X		
004	0960_MW143_3.0-3.5		23/05/2024 08:54 AM	WATER	ALS: 1 Non ALS: 1	No		X		
005	0960_MW135_4.5-5.0		23/05/2024 09:24 AM	WATER	ALS: 1 Non ALS: 1	No		X		
006	0960_MW176_4.0-4.5		23/05/2024 10:10 AM	WATER	ALS: 3 Non ALS: 0	No		X		
007	0960_QC134		23/05/2024 10:11 AM	WATER	ALS: 3 Non ALS: 0	No		X		

**CHAIN OF CUSTODY**

COC#: 68114

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PASOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH: [REDACTED]

SAMPLER MOBILE: [REDACTED]

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS**ANALYSIS REQUIRED**

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsale WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
008	0960_MW178_7.0-7.5		23/05/2024 10:13 AM	WATER	ALS: 2 Non ALS: 0	No		X		
009	0960_MW178_9.0-9.5		23/05/2024 10:14 AM	WATER	ALS: 2 Non ALS: 0	No		Partial 1/2		
010	0960_MW176_1.5-2.0		23/05/2024 10:50 AM	WATER	ALS: 3 Non ALS: 0	No		X		
011	0960_MW176_3.5-4.0		23/05/2024 10:52 AM	WATER	ALS: 2 Non ALS: 0	No		Partial 1/2		
012	0960_MW176_6.0-6.5		23/05/2024 10:53 AM	WATER	ALS: 2 Non ALS: 0	No		Partial 1/2		
013	0960_MW176_8.5-9.0		23/05/2024 10:54 AM	WATER	ALS: 2 Non ALS: 0	No		Partial 1/2		
014	0960_MW177_1.5-2.0		23/05/2024 11:25 AM	WATER	ALS: 3 Non ALS: 0	No		Partial 1/2		



CHAIN OF CUSTODY

COC#: 68114

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: SY/139/19 B

/ ES2022MWHAUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinse WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
015	0960_MW177_3.5-4.0		23/05/2024 11:26 AM	WATER	ALS: 2 Non ALS: 0	No		Partial 1/2		
016	0960_MW177_6.0-6.5		23/05/2024 11:27 AM	WATER	ALS: 2 Non ALS: 0	No		Partial 1/2		
017	0960_MW177_8.5-9.0		23/05/2024 11:28 AM	WATER	ALS: 2 Non ALS: 0	No		Partial 1/2		
018	0960_QC301		23/05/2024 01:27 PM	WATER	ALS: 2 Non ALS: 0	No	X			
019	0960_QC302		23/05/2024 01:28 PM	WATER	ALS: 2 Non ALS: 0	No	X			
020	0960_QC303		23/05/2024 01:28 PM	WATER	ALS: 2 Non ALS: 0	No	X			
021	0960_QC401		23/05/2024 01:29 PM	WATER	ALS: 2 Non ALS: 0	No	X			



CHAIN OF CUSTODY

COC#: 68114

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWH AUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omip Learmonth

PROJECT MANAGER:

CONTACT PH:

SAMPLER MOBILE:

PRIMARY SAMPLER:

QUOTE NO: SY/139/19 B

/ ES2022MWH AUS0002

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE DETAILS

ANALYSIS REQUIRED

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Rinsale WATER	WA OMP Water Suite WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
022	0960_QC402		23/05/2024 01:30 PM	WATER	ALS: 2 Non ALS: 0	No	x			
023	0960_QC403		23/05/2024 01:31 PM	WATER	ALS: 2 Non ALS: 0	No	X			

**CHAIN OF CUSTODY**

COC#: 68114

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

DATE TIME:

DATE TIME:

DATE TIME:

DATE TIME:

CLIENT: MWHHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER: [REDACTED]

PRIMARY SAMPLER: [REDACTED]

EMAIL REPORTS TO: [REDACTED]

EMAIL INVOICES TO: [REDACTED]

CONTACT PH: [REDACTED]

QUOTE NO: SY/139/19 B

SAMPLER MOBILE: [REDACTED]

/ ES2022MWHHAUS0002

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

°C

Other comments:

SAMPLE	SAMPLE NAME	PARTIAL ANALYSIS GROUP NAME	MATRIX	SELECTED ANALYSIS NAME
009	0960_MW178_9.0-9.5	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)
011	0960_MW176_3.5-4.0	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)
012	0960_MW176_6.0-6.5	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)
013	0960_MW176_8.5-9.0	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)
014	0960_MW177_1.5-2.0	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)
015	0960_MW177_3.5-4.0	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)
016	0960_MW177_6.0-6.5	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)
017	0960_MW177_8.5-9.0	WA OMP Water Suite WATER	WATER	- EP231X PFAS - Full Suite (30 analytes)



CHAIN OF CUSTODY

COC#: 68114

ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

CLIENT: MWAHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA_0960_PFSOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWAHAUS0002

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0960_MW127	Clear Plastic Bottle - Natural	125 mL	00071121181423	Green	No	
002	0960_MW146_3.0-3.5	Clear Plastic Bottle - Natural	125 mL	00071121181661	Green	No	
003	0960_MW139	Clear Plastic Bottle - Natural	125 mL	00071121181295	Green	No	
004	0960_MW143_3.0-3.5	Clear Plastic Bottle - Natural	125 mL	00071121181836	Green	No	
005	0960_MW135_4.5-5.0	Clear Plastic Bottle - Natural	125 mL	00071121181978	Green	No	
006	0960_MW178_4.0-4.5	HDPE (no PTFE)	125 mL	00352205025095	Grey	No	
006	0960_MW178_4.0-4.5	HDPE (no PTFE)	125 mL	00352205025089	Grey	No	
006	0960_MW178_4.0-4.5	Clear Plastic Bottle - Natural	125 mL	00071121181673	Green	No	
007	0960_QC134	Clear Plastic Bottle - Natural	125 mL	00071121181830	Green	No	
007	0960_QC134	HDPE (no PTFE)	125 mL	00352208008054	Grey	No	
007	0960_QC134	HDPE (no PTFE)	125 mL	00352208008055	Grey	No	
008	0960_MW178_7.0-7.5	HDPE (no PTFE)	125 mL	00352302011406	Grey	No	
008	0960_MW178_7.0-7.5	HDPE (no PTFE)	125 mL	00352302011458	Grey	No	
009	0960_MW178_9.0-9.5	HDPE (no PTFE)	125 mL	00352208077225	Grey	No	
009	0960_MW178_9.0-9.5	HDPE (no PTFE)	125 mL	00352208077207	Grey	No	
010	0960_MW178_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00071121181686	Green	No	
010	0960_MW178_1.5-2.0	HDPE (no PTFE)	125 mL	00352302011349	Grey	No	
010	0960_MW178_1.5-2.0	HDPE (no PTFE)	125 mL	00352302011302	Grey	No	
011	0960_MW178_3.5-4.0	HDPE (no PTFE)	125 mL	00352205025108	Grey	No	
011	0960_MW178_3.5-4.0	HDPE (no PTFE)	125 mL	00352205025134	Grey	No	
012	0960_MW178_6.0-6.5	HDPE (no PTFE)	125 mL	00352208076912	Grey	No	
012	0960_MW178_6.0-6.5	HDPE (no PTFE)	125 mL	00352208077020	Grey	No	
013	0960_MW178_8.5-9.0	HDPE (no PTFE)	125 mL	00352205024857	Grey	No	
013	0960_MW178_8.5-9.0	HDPE (no PTFE)	125 mL	00352205024870	Grey	No	
014	0960_MW177_1.5-2.0	HDPE (no PTFE)	125 mL	00352106001943	Grey	No	
014	0960_MW177_1.5-2.0	HDPE (no PTFE)	125 mL	00352106002035	Grey	No	



ALS Laboratory: EP Perth
Environmental

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

RELINQUISHED BY:

DATE TIME:

RECEIVED BY:

DATE TIME:

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: WA 0960 PFASOMP_24

SITE: Learmonth GW - CG

ORDER NO: pfas-omp Learmonth

PROJECT MANAGER:

PRIMARY SAMPLER:

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

CONTACT PH:

QUOTE NO: SY/139/19 B

SAMPLER MOBILE:

/ ES2022MWH AUS0002

LABORATORY USE ONLY (Circle)

Custody Seal intact?

Yes No N/A

Free ice / frozen ice bricks present upon receipt?

Yes No N/A

Random Sample Temperature on Receipt:

C

Other comments:

EMAIL INVOICES TO:							
014	0960_MW177_1.5-2.0	Clear Plastic Bottle - Natural	125 mL	00071121181903	Green	No	
015	0960_MW177_3.5-4.0	HDPE (no PTFE)	125 mL	00352208077260	Grey	No	
015	0960_MW177_3.5-4.0	HDPE (no PTFE)	125 mL	00352208077209	Grey	No	
016	0960_MW177_6.0-6.5	HDPE (no PTFE)	125 mL	00352208077194	Grey	No	
016	0960_MW177_6.0-6.5	HDPE (no PTFE)	125 mL	00352208077254	Grey	No	
017	0960_MW177_8.5-9.0	HDPE (no PTFE)	125 mL	00352208077074	Grey	No	
017	0960_MW177_8.5-9.0	HDPE (no PTFE)	125 mL	00352208077029	Grey	No	
018	0960_QC301	HDPE (no PTFE)	20 mL	00350822058710	Grey	No	
018	0960_QC301	HDPE (no PTFE)	20 mL	00350822058711	Grey	No	
019	0960_QC302	HDPE (no PTFE)	20 mL	00352312004058	Grey	No	
019	0960_QC302	HDPE (no PTFE)	20 mL	00352312003917	Grey	No	
020	0960_QC303	HDPE (no PTFE)	20 mL	00351221020686	Grey	No	
020	0960_QC303	HDPE (no PTFE)	20 mL	00351221020713	Grey	No	
021	0960_QC401	HDPE (no PTFE)	20 mL	00350822058737	Grey	No	
021	0960_QC401	HDPE (no PTFE)	20 mL	00350822059004	Grey	No	
022	0960_QC402	HDPE (no PTFE)	20 mL	00351221005941	Grey	No	
022	0960_QC402	HDPE (no PTFE)	20 mL	00351221006184	Grey	No	
023	0960_QC403	HDPE (no PTFE)	20 mL	00352312004113	Grey	No	
023	0960_QC403	HDPE (no PTFE)	20 mL	00352312003735	Grey	No	

Total Bottle Count: ALS: 45, Non ALS: 5



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP2407165

Client : STANTEC AUSTRALIA PTY LTD
Contact :
Address : GROUND FLOOR 226 ADELAIDE
TERRACE
PERTH 6000

Laboratory : Environmental Division Perth
Contact :
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail :
stantec.com
Telephone : ----
Facsimile : ----

E-mail :
alsglobal.com
Telephone : +61-8-9406 1301
Facsimile : +61-8-9406 1399

Project : WA_0960_PFASOMP_24
Order number : pfas-omp Learmonth
C-O-C number : 68114
Site : Learmonth GW - CG
Sampler :

Page : 1 of 3
Quote number : ES2022MWH AUS0002 (SY/139/19 B)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 27-May-2024 10:50
Client Requested Due : 06-Jun-2024
Date

Issue Date : 28-May-2024
Scheduled Reporting Date : **06-Jun-2024**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 2
Receipt Detail :

Security Seal : Not Available
Temperature : 9.0 - Ice present
No. of samples received / analysed : 23 / 23

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (Samples.Perth@alsglobal.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Any sample identifications that cannot be displayed entirely in the analysis summary table will be listed below.

EP2407165-002	23-May-2024 08:12	0960_MW146_3.0-3.5_240523
EP2407165-004	23-May-2024 08:54	0960_MW143_3.0-3.5_240523
EP2407165-005	23-May-2024 09:24	0960_MW135_4.5-5.0_240523
EP2407165-006	23-May-2024 10:10	0960_MW178_4.0-4.5_240523
EP2407165-008	23-May-2024 10:13	0960_MW178_7.0-7.5_240523
EP2407165-009	23-May-2024 10:14	0960_MW178_9.0-9.5_240523
EP2407165-010	23-May-2024 10:50	0960_MW176_1.5-2.0_240523
EP2407165-011	23-May-2024 10:52	0960_MW176_3.5-4.0_240523
EP2407165-012	23-May-2024 10:53	0960_MW176_6.0-6.5_240523
EP2407165-013	23-May-2024 10:54	0960_MW176_8.5-9.0_240523
EP2407165-014	23-May-2024 11:25	0960_MW177_1.5-2.0_240523
EP2407165-015	23-May-2024 11:26	0960_MW177_3.5-4.0_240523
EP2407165-016	23-May-2024 11:27	0960_MW177_6.0-6.5_240523
EP2407165-017	23-May-2024 11:28	0960_MW177_8.5-9.0_240523

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 (30 analytes)	WATER - EP231X-ST PFAS - Full Suite (30 analytes) Super Trace	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO ₄ , Alkalinity
EP2407165-001	23-May-2024 07:38	0960_MW127_240523	✓		✓
EP2407165-002	23-May-2024 08:12	0960_MW146_3.0-3.5_2...	✓		✓
EP2407165-003	23-May-2024 08:40	0960_MW139_240523	✓		✓
EP2407165-004	23-May-2024 08:54	0960_MW143_3.0-3.5_2...	✓		✓
EP2407165-005	23-May-2024 09:24	0960_MW135_4.5-5.0_2...	✓		✓
EP2407165-006	23-May-2024 10:10	0960_MW178_4.0-4.5_2...		✓	✓
EP2407165-007	23-May-2024 10:11	0960_QC134_240523		✓	✓
EP2407165-008	23-May-2024 10:13	0960_MW178_7.0-7.5_2...		✓	
EP2407165-009	23-May-2024 10:14	0960_MW178_9.0-9.5_2...		✓	
EP2407165-010	23-May-2024 10:50	0960_MW176_1.5-2.0_2...		✓	✓
EP2407165-011	23-May-2024 10:52	0960_MW176_3.5-4.0_2...		✓	
EP2407165-012	23-May-2024 10:53	0960_MW176_6.0-6.5_2...		✓	
EP2407165-013	23-May-2024 10:54	0960_MW176_8.5-9.0_2...		✓	
EP2407165-014	23-May-2024 11:25	0960_MW177_1.5-2.0_2...		✓	✓
EP2407165-015	23-May-2024 11:26	0960_MW177_3.5-4.0_2...		✓	
EP2407165-016	23-May-2024 11:27	0960_MW177_6.0-6.5_2...		✓	
EP2407165-017	23-May-2024 11:28	0960_MW177_8.5-9.0_2...		✓	
EP2407165-018	23-May-2024 13:27	0960_QC301_240523	✓		
EP2407165-019	23-May-2024 13:28	0960_QC302_240523	✓		
EP2407165-020	23-May-2024 13:28	0960_QC303_240523	✓		
EP2407165-021	23-May-2024 13:29	0960_QC401_240523	✓		
EP2407165-022	23-May-2024 13:30	0960_QC402_240523	✓		



			WATER - EP231X PFAS - Full Suite (30 analytes)		
			WATER - EP231X-ST PFAS - Full Suite (30 analytes) Super Trace		
			WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO4, Alkalinity		
EP2407165-023	23-May-2024 13:31	0960_QC403_240523	✓		

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

[REDACTED]	- A4 - AU Tax Invoice (INV)	Email	[REDACTED]cardno.com.au
DERP LAB REPORTS			
[REDACTED]	- EDI Format - ESDAT (ESDAT)	Email	[REDACTED]esdat.com.au
[REDACTED]			
	- *AU Certificate of Analysis - NATA (COA)	Email	[REDACTED]stantec.com
	- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	[REDACTED]stantec.com
	- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	[REDACTED]stantec.com
	- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	[REDACTED]stantec.com
	- Chain of Custody (CoC) (COC)	Email	[REDACTED]stantec.com
	- EDI Format - ESDAT (ESDAT)	Email	[REDACTED]stantec.com
	- EDI Format - XTab (XTAB)	Email	[REDACTED]stantec.com



CERTIFICATE OF ANALYSIS

Work Order	: EP2407165	Page	: 1 of 18
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024 10:50
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 29-May-2024
C-O-C number	: 68114	Issue Date	: 06-Jun-2024 18:55
Sampler	: [REDACTED] [REDACTED]		
Site	: Learmonth GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 23		
No. of samples analysed	: 23		



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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X-ST: The LOR of particular analytes has been raised for some samples due to sample matrix interferences.
- 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 or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW127_240523	0960_MW146_3.0-3.5_240523	0960_MW139_240523	0960_MW143_3.0-3.5_240523	0960_MW135_4.5-5.0_240523
Sampling date / time				23-May-2024 07:38	23-May-2024 08:12	23-May-2024 08:40	23-May-2024 08:54	23-May-2024 09:24
Compound	CAS Number	LOR	Unit	EP2407165-001	EP2407165-002	EP2407165-003	EP2407165-004	EP2407165-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	151	1160	237	467	505
Total Alkalinity as CaCO ₃	---	1	mg/L	151	1160	237	467	505
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	2480	5260	4020	4500	1090
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	22900	32300	22600	32000	10900
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1040	997	804	992	358
Magnesium	7439-95-4	1	mg/L	1660	2530	1920	2360	809
Sodium	7440-23-5	1	mg/L	13500	19900	13000	18000	6580
Potassium	7440-09-7	1	mg/L	553	1030	788	1180	347
EN055: Ionic Balance								
• Total Anions	---	0.01	meq/L	701	1040	726	1000	340
• Total Cations	---	0.01	meq/L	790	1150	784	1060	380
• Ionic Balance	---	0.01	%	5.99	4.84	3.83	2.48	5.46
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

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW127_240523	0960_MW146_3.0-3.5_240523	0960_MW139_240523	0960_MW143_3.0-3.5_240523	0960_MW135_4.5-5.0_240523
Sampling date / time				23-May-2024 07:38	23-May-2024 08:12	23-May-2024 08:40	23-May-2024 08:54	23-May-2024 09:24	
Compound	CAS Number	LOR	Unit	EP2407165-001	EP2407165-002	EP2407165-003	EP2407165-004	EP2407165-005	
				Result	Result	Result	Result	Result	
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	
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									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW127_240523	0960_MW146_3.0-3.5_240523	0960_MW139_240523	0960_MW143_3.0-3.5_240523	0960_MW135_4.5-5.0_240523
Sampling date / time				23-May-2024 07:38	23-May-2024 08:12	23-May-2024 08:40	23-May-2024 08:54	23-May-2024 09:24	
Compound	CAS Number	LOR	Unit	EP2407165-001	EP2407165-002	EP2407165-003	EP2407165-004	EP2407165-005	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
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	%	92.8	92.6	96.8	94.0	91.2	
13C8-PFOA	---	0.02	%	106	108	97.4	112	92.5	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW178_4.0-4.5 _240523	0960_QC134_240523	0960_MW178_7.0-7.5 _240523	0960_MW178_9.0-9.5 _240523	0960_MW176_1.5-2.0 _240523
Sampling date / time				23-May-2024 10:10	23-May-2024 10:11	23-May-2024 10:13	23-May-2024 10:14	23-May-2024 10:50
Compound	CAS Number	LOR	Unit	EP2407165-006	EP2407165-007	EP2407165-008	EP2407165-009	EP2407165-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	----	----	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	----	----	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	162	150	----	----	1300
Total Alkalinity as CaCO ₃	----	1	mg/L	162	150	----	----	1300
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	5290	5400	----	----	3080
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	34500	34300	----	----	19000
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1100	1110	----	----	668
Magnesium	7439-95-4	1	mg/L	2600	2640	----	----	1520
Sodium	7440-23-5	1	mg/L	19800	20000	----	----	10200
Potassium	7440-09-7	1	mg/L	1040	1050	----	----	640
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	1090	1080	----	----	626
☐ Total Cations	----	0.01	meq/L	1160	1170	----	----	618
☐ Ionic Balance	----	0.01	%	3.13	3.84	----	----	0.61
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	<0.0005	0.0032	0.0023	<0.0005
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	0.0007	0.0012	0.0043	0.0029	0.0003
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW178_4.0-4.5_240523	0960_QC134_240523	0960_MW178_7.0-7.5_240523	0960_MW178_9.0-9.5_240523	0960_MW176_1.5-2.0_240523
Sampling date / time				23-May-2024 10:10	23-May-2024 10:11	23-May-2024 10:13	23-May-2024 10:14	23-May-2024 10:50	
Compound	CAS Number	LOR	Unit	EP2407165-006	EP2407165-007	EP2407165-008	EP2407165-009	EP2407165-010	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.003	<0.002	0.010	<0.004	<0.002	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	<0.0005	0.0273	0.0053	<0.0005	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	<0.0005	0.0179	0.0201	<0.0005	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	<0.0005	0.0234	0.170	<0.0005	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	<0.0005	0.0005	0.0006	<0.0005	
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	0960_MW178_4.0-4.5_240523	0960_QC134_240523	0960_MW178_7.0-7.5_240523	0960_MW178_9.0-9.5_240523	0960_MW176_1.5-2.0_240523
Sampling date / time				23-May-2024 10:10	23-May-2024 10:11	23-May-2024 10:13	23-May-2024 10:14	23-May-2024 10:50	
Compound	CAS Number	LOR	Unit	EP2407165-006	EP2407165-007	EP2407165-008	EP2407165-009	EP2407165-010	
				Result	Result	Result	Result	Result	
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	<0.001	0.003	<0.001	<0.001	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
EP231P: PFAS Sums									
Sum of PFAS	---	0.0003	µg/L	0.0007	0.0012	0.0896	0.201	0.0003	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	0.0007	0.0012	0.0075	0.0052	0.0003	
Sum of PFAS (WA DER List)	---	0.0003	µg/L	0.0007	0.0012	0.0896	0.201	0.0003	
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0005	%	102	103	112	110	103	
13C8-PFOA	---	0.0005	%	89.8	95.4	96.3	87.4	88.1	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW176_3.5-4.0 _240523	0960_MW176_6.0-6.5 _240523	0960_MW176_8.5-9.0 _240523	0960_MW177_1.5-2.0 _240523	0960_MW177_3.5-4.0 _240523
Sampling date / time				23-May-2024 10:52	23-May-2024 10:53	23-May-2024 10:54	23-May-2024 11:25	23-May-2024 11:26
Compound	CAS Number	LOR	Unit	EP2407165-011	EP2407165-012	EP2407165-013	EP2407165-014	EP2407165-015
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	----	----	----	<1	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	----	----	----	<1	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	----	----	----	1020	----
Total Alkalinity as CaCO ₃	----	1	mg/L	----	----	----	1020	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	----	----	----	4590	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	----	33100	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	----	----	894	----
Magnesium	7439-95-4	1	mg/L	----	----	----	2660	----
Sodium	7440-23-5	1	mg/L	----	----	----	20000	----
Potassium	7440-09-7	1	mg/L	----	----	----	1010	----
EN055: Ionic Balance								
☐ Total Anions	----	0.01	meq/L	----	----	----	1050	----
☐ Total Cations	----	0.01	meq/L	----	----	----	1160	----
☐ Ionic Balance	----	0.01	%	----	----	----	4.96	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.0006	<0.0005	<0.0005	<0.0005
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	0.0031	0.0030	<0.0005	0.0008	0.0015
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	0.0030	0.0035	0.0005	0.0005	0.0015
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW176_3.5-4.0 _240523	0960_MW176_6.0-6.5 _240523	0960_MW176_8.5-9.0 _240523	0960_MW177_1.5-2.0 _240523	0960_MW177_3.5-4.0 _240523
Sampling date / time				23-May-2024 10:52	23-May-2024 10:53	23-May-2024 10:54	23-May-2024 11:25	23-May-2024 11:26
Compound	CAS Number	LOR	Unit	EP2407165-011	EP2407165-012	EP2407165-013	EP2407165-014	EP2407165-015
				Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.002	<0.001	<0.001	<0.001
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
EP231P: PFAS Sums								
Sum of PFAS	---	0.0003	µg/L	0.157	0.294	0.0073	0.0073	0.0062
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	0.0061	0.0065	0.0005	0.0013	0.0030
Sum of PFAS (WA DER List)	---	0.0003	µg/L	0.157	0.294	0.0073	0.0073	0.0062
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.0005	%	104	116	114	100	115
13C8-PFOA	---	0.0005	%	93.2	86.6	86.9	94.5	101



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW177_6.0-6.5 _240523	0960_MW177_8.5-9.0 _240523	----	----	----
Sampling date / time				23-May-2024 11:27	23-May-2024 11:28	----	----	----
Compound	CAS Number	LOR	Unit	EP2407165-016	EP2407165-017	-----	-----	-----
				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	<0.0005	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	0.0015	0.0026	----	----	----
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	0.0014	0.0023	----	----	----
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	<0.004	0.006	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	0.0035	0.0070	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	0.0063	0.0269	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	0.0710	0.221	----	----	----
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	<0.0008	<0.0005	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0008	<0.0005	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0019	<0.0019	----	----	----
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	<0.002	<0.001	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Sample ID

				0960_MW177_6.0-6.5 _240523	0960_MW177_8.5-9.0 _240523	----	----	----
Sampling date / time				23-May-2024 11:27	23-May-2024 11:28	----	----	----
Compound	CAS Number	LOR	Unit	EP2407165-016	EP2407165-017	-----	-----	-----
				Result	Result	—	—	—
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.002	<0.001	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.002	<0.001	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.002	<0.001	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0008	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0008	<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	0.0837	0.267	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0003	µg/L	0.0029	0.0049	----	----	----
Sum of PFAS (WA DER List)	----	0.0003	µg/L	0.0837	0.267	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	110	120	----	----	----
13C8-PFOA	----	0.0005	%	87.5	88.8	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)			Sample ID	0960_QC301_240523	0960_QC302_240523	0960_QC303_240523	0960_QC401_240523	0960_QC402_240523
Sampling date / time				23-May-2024 13:27	23-May-2024 13:28	23-May-2024 13:28	23-May-2024 13:29	23-May-2024 13:30
Compound	CAS Number	LOR	Unit	EP2407165-018	EP2407165-019	EP2407165-020	EP2407165-021	EP2407165-022
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	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



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

Sub-Matrix: RINSATE (Matrix: WATER)			Sample ID	0960_QC301_240523	0960_QC302_240523	0960_QC303_240523	0960_QC401_240523	0960_QC402_240523
Sampling date / time				23-May-2024 13:27	23-May-2024 13:28	23-May-2024 13:28	23-May-2024 13:29	23-May-2024 13:30
Compound	CAS Number	LOR	Unit	EP2407165-018	EP2407165-019	EP2407165-020	EP2407165-021	EP2407165-022
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<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	<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	%	108	105	110	115	113
13C8-PFOA	---	0.02	%	77.6	80.0	84.8	80.9	83.4



Analytical Results

Sub-Matrix: RINSATE (Matrix: WATER)			Sample ID		0960_QC403_240523	---	----	----	----
Sampling date / time					23-May-2024 13:31	---	----	----	----
Compound	CAS Number	LOR	Unit	EP2407165-023	-----	-----	-----	-----	
				Result	---	---	---	---	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	---	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.02	---	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.01	---	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	---	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	---	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	---	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	---	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	---	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	---	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	---	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	---	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	---	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	---	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	---	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	---	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	---	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	---	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	---	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	---	----	----	----	----



Analytical Results

Sub-Matrix: RINSATE
 (Matrix: WATER)

Sample ID

0960_QC403_240523

Sampling date / time				23-May-2024 13:31	---	---	---	---
Compound	CAS Number	LOR	Unit	EP2407165-023	-----	-----	-----	-----
Result				---	---	---	---	---
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	---	---	---	---
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	---	---	---	---
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	---	---	---	---
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	---	---	---	---
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	---	---	---	---
EP231P: PFAS Sums								
Sum of PFAS	---	0.01	µg/L	<0.01	---	---	---	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	---	---	---	---
Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.01	---	---	---	---
EP231S: PFAS Surrogate								
13C4-PFOS	---	0.02	%	117	---	---	---	---
13C8-PFOA	---	0.02	%	81.8	---	---	---	---



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

Sub-Matrix: RINSATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133



QUALITY CONTROL REPORT

Work Order	: EP2407165	Page	: 1 of 15
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Contact	: [REDACTED]
Address	: GROUND FLOOR 226 ADELAIDE TERRACE PERTH 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Order number	: pfas-omp Learmonth	Date Analysis Commenced	: 29-May-2024
C-O-C number	: 68114	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED]		
Site	: Learmonth GW - CG		
Quote number	: SY/139/19 B		
No. of samples received	: 23		
No. of samples analysed	: 23		



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]	Inorganics Supervisor	Perth Inorganics, Wangara, WA
[REDACTED]	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
[REDACTED]	Metals Chemist	Perth Inorganics, Wangara, WA
[REDACTED]	Senior Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 5826379)									
EP2407163-008	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	210	209	0.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	210	209	0.0	0% - 20%
EP2407165-006	0960_MW178_4.0-4.5_240 523	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71 52 3	1	mg/L	162	157	3.3	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	162	157	3.3	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 5821067)									
EP2407163-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3	3	0.0	No Limit
EP2407165-001	0960_MW127_240523	ED041G Sulfate as SO4 Turbidimetric	14808-79-8	1	mg/L	2480	2590	4.6	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 5821068)									
EP2407163-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	50	47	7.3	0% - 20%
EP2407165 001	0960 MW127 240523	ED045G: Chloride	16887 00 6	1	mg/L	22900	23100	1.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5821858)									
EP2407103-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	812	812	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2920	2900	0.5	0% - 20%
		ED093F Sodium	7440-23-5	1	mg/L	22200	22100	0.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1140	1130	0.3	0% - 20%

Page : 3 of 15
 Work Order : EP2407165
 Client : STANTEC AUSTRALIA PTY LTD
 Project : WA_0960_PFASOMP_24



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED093F: Dissolved Major Cations (QC Lot: 5821858) - continued									
EP2407163-005	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	1330	1330	0.2	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2280	2260	0.8	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	19200	19100	0.5	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	722	714	1.1	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5821859)									
EP2407165-006	0960_MW178_4.0-4.5_240 523	ED093F: Calcium	7440-70-2	1	mg/L	1100	1120	2.3	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2600	2660	2.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	19800	20300	2.7	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1040	1060	1.9	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 5821863)									
EP2406932-001	Anonymous	ED093F: Calcium	7440-70-2	1 (5)*	mg/L	787	793	0.7	0% - 20%
		ED093F: Magnesium	7439-95-4	1 (5)*	mg/L	9850	9970	1.2	0% - 20%
		ED093F: Sodium	7440-23-5	1 (5)*	mg/L	85100	86000	1.1	0% - 20%
		ED093F: Potassium	7440-09-7	1 (5)*	mg/L	4720	4800	1.7	0% - 20%
EP2407165-014	0960_MW177_1.5-2.0_240 523	ED093F: Calcium	7440-70-2	1	mg/L	894	895	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	2660	2670	0.5	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	20000	20100	0.3	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	1010	1010	0.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP2407163-005	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5824180)									
EP2407163-004	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit



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: 5824180) - continued									
EP2407163-004	Anonymous	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: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP2407163-005	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5824180)									
EP2407163-004	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit



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: 5824180) - continued									
EP2407163-004	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5824178)									
EP2407105-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407163-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5824180)									
EP2407163-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5824180) - continued									
EP2407163-004	Anonymous	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: 5824178)									
EP2407105-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP2407163-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5824180)									
EP2407163-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 5824178)									
EP2407105-005	Anonymous	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
EP2407163-005	Anonymous	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
EP231P: PFAS Sums (QC Lot: 5824180)									
EP2407163-004	Anonymous	EP231X: Sum of PFAS	---	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 (%)
EP231P: PFAS Sums (QC Lot: 5824180) - continued									
EP2407163-004	Anonymous	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit



Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
ED037P: Alkalinity by PC Titrator (QCLot: 5826379)								
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	---	---	---	---
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	---	---	---	---
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	---	---	---	---
ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	<1	20 mg/L	94.8	85.1	126
				<1	200 mg/L	99.9	90.5	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5821067)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	89.9	112
				<1	500 mg/L	101	89.9	112
ED045G: Chloride by Discrete Analyser (QCLot: 5821068)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	101	88.6	113
				<1	1000 mg/L	105	88.6	113
ED093F: Dissolved Major Cations (QCLot: 5821858)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	100.0	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	100	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.2	84.6	108
ED093F: Dissolved Major Cations (QCLot: 5821859)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.3	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	100	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	101	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.0	84.6	108
ED093F: Dissolved Major Cations (QCLot: 5821863)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	104	86.5	117
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	88.4	110
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	101	91.4	113
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.9	84.6	108
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823801)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	96.0	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	106	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	98.8	68.0	131



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5823801) - continued								
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	111	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	90.1	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	92.7	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824087)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	94.6	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	106	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	96.2	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	111	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	78.0	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	80.6	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	95.1	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	91.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	102	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	97.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	113	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824180)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.2218 µg/L	86.8	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.2352 µg/L	91.6	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.2373 µg/L	84.7	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	85.7	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	85.1	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	83.2	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5825604)								
EP231X-ST: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	98.2	72.0	130
EP231X-ST: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	97.4	71.0	127
EP231X-ST: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	92.4	68.0	131
EP231X-ST: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	99.5	69.0	134
EP231X-ST: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0003	µg/L	<0.0003	0.00371 µg/L	82.8	65.0	140
EP231X-ST: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	81.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823801)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	98.5	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

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method/Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5823801) - continued								
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	115	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	95.2	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	115	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	96.4	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	94.0	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	102	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	98.4	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	101	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	109	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824087)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	107	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	118	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	105	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	106	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	115	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	82.4	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	76.0	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	90.0	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	77.6	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	91.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	98.5	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	91.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	108	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	93.6	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	105	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	102	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	108	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	99.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	97.8	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824								



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824180) - continued								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	103	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	72.4	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	94.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	98.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	94.2	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	81.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	80.8	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	83.0	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	104	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.25 µg/L	88.2	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5825604)								
EP231X-ST: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.002	0.02 µg/L	106	73.0	129
EP231X-ST: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	80.8	72.0	129
EP231X-ST: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	113	72.0	129
EP231X-ST: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	112	72.0	130
EP231X-ST: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	96.4	71.0	133
EP231X-ST: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	95.2	69.0	130
EP231X-ST: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	92.4	71.0	129
EP231X-ST: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	87.2	69.0	133
EP231X-ST: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	104	72.0	134
EP231X-ST: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	116	65.0	144
EP231X-ST: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.004 µg/L	88.4	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5823801)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	96.0	67.0	137
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	96.8	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	84.5	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	111	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	101	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	90.8	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	100	61.0	135



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824087)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	83.2	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	93.6	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	107	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	98.7	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	100	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	115	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	101	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	107	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	104	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	92.8	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	110	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	96.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	98.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824180)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	81.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	108	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	63.2	60.5	138
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	102	68.3	134
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	101	62.2	138
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	92.4	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	94.0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5825604)								
EP231X-ST: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	82.4	67.0	137



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5825604) - continued								
EP231X-ST: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	101	68.0	141
EP231X-ST: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	93.3	57.9	141
EP231X-ST: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	101	63.3	134
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	104	60.0	136
EP231X-ST: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	86.4	65.0	136
EP231X-ST: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	94.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5823801)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	112	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	102	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	116	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: 5824087)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	115	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	102	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	94.2	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	85.4	53.1	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	103	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	107	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	98.3	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.241 µg/L	86.5	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824180)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.2343 µg/L	98.0	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	115	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	97.5	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	92.7	64.2	133
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5825604)								
EP231X-ST: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	100	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	104	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	84.2	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	90.4	53.1	133



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231P: PFAS Sums (QCLot: 5823801)								
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: 5824087)								
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: 5824178)								
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: 5824180)								
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: 5825604)								
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**

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number			Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 5821067)							
EP2407163-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	99.1	70.4	130
ED045G: Chloride by Discrete Analyser (QCLot: 5821068)							
EP2407163-001	Anonymous	ED045G: Chloride	16887-00-6	200 mg/L	119	70.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.2218 µg/L	102	72.0	129
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.232 µg/L	97.9	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.2352 µg/L	80.1	68.0	129
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	92.9	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	87.3	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	102	53.0	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	101	73.0	142
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	94.8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	108	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	93.2	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	99.2	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	96.7	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	98.1	71.0	134
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	99.0	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	95.5	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.25 µg/L	107	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.25 µg/L	101	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	97.8	59.0	135
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	102	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	106	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	88.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	109	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	86.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5824178)							
EP2407163-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	103	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.2378 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	109	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.2415 µg/L	107	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP2407165	Page	: 1 of 8
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division Perth
Contact	: [REDACTED]	Telephone	: +61-8-9406 1301
Project	: WA_0960_PFASOMP_24	Date Samples Received	: 27-May-2024
Site	: Learmonth GW - CG	Issue Date	: 06-Jun-2024
Sampler	: [REDACTED]	No. of samples received	: 23
Order number	: pfas-omp Learmonth	No. of samples analysed	: 23

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, where applicable to the methodology, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Matrix: WATER

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	28	3.57	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

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER

Evaluation: ✖ = Holding time breach : ✔ = Within holding time

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
0960 MW127 240523,	0960 MW146 3 0 3 5 240523,	23-May-2024	---	---	---	30-May-2024	06-Jun-2024
0960 MW139 240523,	0960 MW143 3 0 3 5 240523,						✓
0960 MW135 4 5 5 0 240523,	0960 MW178 4 0 4 5 240523,						
0960 QC134 240523,	0960 MW176 1 5 2 0 240523,						
0960 MW177 1 5 2 0 240523							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
0960_MW127_240523,	0960_MW146_3.0-3.5_240523,	23-May-2024	---	---	---	06-Jun-2024	20-Jun-2024
0960_MW139_240523,	0960_MW143_3.0-3.5_240523,						✓
0960_MW135_4.5-5.0_240523,	0960_MW178_4.0-4.5_240523,						
0960_QC134_240523,	0960_MW176_1.5-2.0_240523,						
0960_MW177_1.5-2.0_240523							
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
0960_MW127_240523,	0960_MW146_3.0-3.5_240523,	23-May-2024	---	---	---	06-Jun-2024	20-Jun-2024
0960_MW139_240523,	0960_MW143_3.0-3.5_240523,						✓
0960_MW135_4.5-5.0_240523,	0960_MW178_4.0-4.5_240523,						
0960_QC134_240523,	0960_MW176_1.5-2.0_240523,						
0960_MW177_1.5-2.0_240523							



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) 0960_MW127_240523, 0960_MW139_240523, 0960_MW135_4.5-5.0_240523, 0960_QC134_240523, 0960_MW177_1.5-2.0_240523	0960_MW146_3.0-3.5_240523, 0960_MW143_3.0-3.5_240523, 0960_MW178_4.0-4.5_240523, 0960_MW176_1.5-2.0_240523,	23-May-2024	---	---	---	30-May-2024	30-May-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
Clear Plastic Bottle - Natural (EP231X) 0960_MW146_3.0-3.5_240523, 0960_MW143_3.0-3.5_240523,	0960_MW139_240523, 0960_MW135_4.5-5.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_QC301_240523, 0960_QC303_240523, 0960_QC402_240523,	0960_QC302_240523, 0960_QC401_240523, 0960_QC403_240523	23-May-2024	29-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW127_240523, 0960_MW176_3.5-4.0_240523, 0960_MW176_8.5-9.0_240523, 0960_MW177_6.0-6.5_240523,	0960_MW178_9.0-9.5_240523, 0960_MW176_6.0-6.5_240523, 0960_MW177_3.5-4.0_240523, 0960_MW177_8.5-9.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW178_7.0-7.5_240523		23-May-2024	30-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW178_4.0-4.5_240523, 0960_MW176_1.5-2.0_240523,	0960_QC134_240523, 0960_MW177_1.5-2.0_240523	23-May-2024	31-May-2024	19-Nov-2024	✓	04-Jun-2024	19-Nov-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
Clear Plastic Bottle - Natural (EP231X) 0960_MW146_3.0-3.5_240523, 0960_MW143_3.0-3.5_240523,	0960_MW139_240523, 0960_MW135_4.5-5.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_QC301_240523, 0960_QC303_240523, 0960_QC402_240523,	0960_QC302_240523, 0960_QC401_240523, 0960_QC403_240523	23-May-2024	29-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW127_240523, 0960_MW176_3.5-4.0_240523, 0960_MW176_8.5-9.0_240523, 0960_MW177_6.0-6.5_240523,	0960_MW178_9.0-9.5_240523, 0960_MW176_6.0-6.5_240523, 0960_MW177_3.5-4.0_240523, 0960_MW177_8.5-9.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW178_7.0-7.5_240523		23-May-2024	30-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW178_4.0-4.5_240523, 0960_MW176_1.5-2.0_240523,	0960_QC134_240523, 0960_MW177_1.5-2.0_240523	23-May-2024	31-May-2024	19-Nov-2024	✓	04-Jun-2024	19-Nov-2024	✓



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
Clear Plastic Bottle - Natural (EP231X) 0960_MW146_3.0-3.5_240523, 0960_MW143_3.0-3.5_240523,	0960_MW139_240523, 0960_MW135_4.5-5.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_QC301_240523, 0960_QC303_240523, 0960_QC402_240523,	0960_QC302_240523, 0960_QC401_240523, 0960_QC403_240523	23-May-2024	29-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW127_240523, 0960_MW176_3.5-4.0_240523, 0960_MW176_8.5-9.0_240523, 0960_MW177_6.0-6.5_240523,	0960_MW178_9.0-9.5_240523, 0960_MW176_6.0-6.5_240523, 0960_MW177_3.5-4.0_240523, 0960_MW177_8.5-9.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW178_7.0-7.5_240523		23-May-2024	30-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW178_4.0-4.5_240523, 0960_MW176_1.5-2.0_240523,	0960_QC134_240523, 0960_MW177_1.5-2.0_240523	23-May-2024	31-May-2024	19-Nov-2024	✓	04-Jun-2024	19-Nov-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
Clear Plastic Bottle - Natural (EP231X) 0960_MW146_3.0-3.5_240523, 0960_MW143_3.0-3.5_240523,	0960_MW139_240523, 0960_MW135_4.5-5.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X) 0960_QC301_240523, 0960_QC303_240523, 0960_QC402_240523,	0960_QC302_240523, 0960_QC401_240523, 0960_QC403_240523	23-May-2024	29-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW127_240523, 0960_MW176_3.5-4.0_240523, 0960_MW176_8.5-9.0_240523, 0960_MW177_6.0-6.5_240523,	0960_MW178_9.0-9.5_240523, 0960_MW176_6.0-6.5_240523, 0960_MW177_3.5-4.0_240523, 0960_MW177_8.5-9.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✓	30-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW178_7.0-7.5_240523		23-May-2024	30-May-2024	19-Nov-2024	✓	31-May-2024	19-Nov-2024	✓
HDPE (no PTFE) (EP231X-ST) 0960_MW178_4.0-4.5_240523, 0960_MW176_1.5-2.0_240523,	0960_QC134_240523, 0960_MW177_1.5-2.0_240523	23-May-2024	31-May-2024	19-Nov-2024	✓	04-Jun-2024	19-Nov-2024	✓



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
Clear Plastic Bottle - Natural (EP231X) 0960_MW146_3.0-3.5_240523, 0960_MW143_3.0-3.5_240523,	0960_MW139_240523, 0960_MW135_4.5-5.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✔	30-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X) 0960_QC301_240523, 0960_QC303_240523, 0960_QC402_240523,	0960_QC302_240523, 0960_QC401_240523, 0960_QC403_240523	23-May-2024	29-May-2024	19-Nov-2024	✔	31-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X-ST) 0960_MW127_240523, 0960_MW176_3.5-4.0_240523, 0960_MW176_8.5-9.0_240523, 0960_MW177_6.0-6.5_240523,	0960_MW178_9.0-9.5_240523, 0960_MW176_6.0-6.5_240523, 0960_MW177_3.5-4.0_240523, 0960_MW177_8.5-9.0_240523	23-May-2024	30-May-2024	19-Nov-2024	✔	30-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X-ST) 0960_MW178_7.0-7.5_240523		23-May-2024	30-May-2024	19-Nov-2024	✔	31-May-2024	19-Nov-2024	✔
HDPE (no PTFE) (EP231X-ST) 0960_MW178_4.0-4.5_240523, 0960_MW176_1.5-2.0_240523,	0960_QC134_240523, 0960_MW177_1.5-2.0_240523	23-May-2024	31-May-2024	19-Nov-2024	✔	04-Jun-2024	19-Nov-2024	✔



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	14	14.29	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
Major Cations - Dissolved	ED093F	5	38	13.16	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	28	10.71	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
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	14	14.29	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
Major Cations - Dissolved	ED093F	3	38	7.89	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	3	18	16.67	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
Method Blanks (MB)							
Alkalinity by Auto Titrator	ED037-P	1	14	7.14	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
Major Cations - Dissolved	ED093F	4	38	10.53	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-ST	3	18	16.67	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
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	28	3.57	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
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
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
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 5.4, 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 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
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Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	* ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.



mgt

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Email: enquiries.melb@mgtlabmark.com.au

CHAIN OF CUSTODY RECORD**CLIENT DETAILS**

Page 1 of 1

Company Name : Stantec Australia	Contact Name : [REDACTED]	Purchase Order : PFAS-OMP 304700525	COC Number : AS-OMP 304700525 -02
Office Address : 226 Adelaide Tce, Perth, WA, 6000		PROJECT Number : WA_0960_PFASOMP_24	Eurofins mgt quote ID : NA
	Email for COC/SRN/Results : [REDACTED]	PROJECT Name : WA_0960_PFASOMP_24	Data output format: PDF; ESDAT

Special Directions & Comments:

Please send ESDAT files to [REDACTED] with the project No in the header file.

Please send email invoice to
SAPinvoices@stantec.com

Eurofins | mgt Ol water batch number:

	Sample ID	Date	Matrix	PFAS	PFAS															Containers:								Sample comments:
																				1LP	250P	125P	1LA	40mL vial	125mL A	Jar		
1	0960_QC219_240522	22/05/2024	Water	X																								
2	0960_QC220_240522	22/05/2024	Soil	X																								
3	0960_QC221_240522	22/05/2024	Soil	X																								
4	0960_QC222_240522	22/05/2024	Soil	X																								
5	0960_QC223_240522	22/05/2024	Soil	X																								
6	0960_QC224_240522	22/05/2024	Water		X																							
7	0960_QC225_240522	22/05/2024	Water		X																							
8	0960_QC226_240522	22/05/2024	Water	X																								
9	0960_QC227_240522	22/05/2024	Water	X																								
10	0960_QC228_240522	22/05/2024	Soil	X																								
11	0960_QC229_240522	22/05/2024	Water	X																								
12	0960_QC230_240522	22/05/2024	Water	X																								
13	0960_QC231_240522	22/05/2024	Water	X																								
14	0960_QC232_240522	22/05/2024	Water		X																							
15	0960_QC233_240522	22/05/2024	Water	X																								
16	0960_QC234_240523	23/05/2024	Water		X																							
17	0960_QC235_240523	23/05/2024	Water	X																								
18																												
19																												

Relinquished By: Stantec	Received By: [REDACTED]	Turn around time	Method Of Shipment	Temperature on arrival: 12.8
Date & Time : 24/05/2024	Date & Time : 27/5/24 9:56	1 DAY ☐ 2 DAY ☐ 3 DAY ☐ STANDARD ☒ Other:	☒ Courier ☐ Hand Delivered ☐ Postal Courier Consignment # :	Report number:
Signature: [REDACTED]	Signature: [REDACTED]			

Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370	Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3218 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarie QLD 4172 T: +61 7 3902 4800 NATA# 1261 Site# 20794	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289	Perth ProMicro 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2561 Site# 2554	Auckland 35 O'Rourke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
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Sample Receipt Advice

Company name: Stantec Australia Pty Ltd (WA)
Contact name: ALL INVOICES
Project name: WA_0960_PFASOMP_24
Project ID: WA_0960_PFASOMP_24
Turnaround time: 5 Day
Date/Time received: May 27, 2024 9:50 AM
Eurofins reference: 1101229

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- N/A Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

[Redacted Contact Information]

Results will be delivered electronically via email to ALL INVOICES - sapinvoices@stantec.com.

Note: A copy of these results will also be delivered to the general Stantec Australia Pty Ltd (WA) email address.



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email: EnviroSales@eurofins.com

Eurofins ARL Pty Ltd

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Site# 2370

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Newcastle
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NATA# 1261
Site# 25079 & 25289

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Site# 2554

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IANZ# 1290

Tauranga
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Tauranga 3112
+64 9 525 0568
IANZ# 1402

Company Name: Stantec Australia Pty Ltd (WA)
Address: 6F 226,Adelaide Terrace
Perth
WA 6000

Project Name: WA_0960_PFASOMP_24
Project ID: WA_0960_PFASOMP_24

Order No.: PFAS-OMP 304700525
Report #: 1101229
Phone: 0458 839 200
Fax:

Received: May 27, 2024 9:50 AM
Due: Jun 4, 2024
Priority: 5 Day
Contact Name: ALL INVOICES

Eurofins Analytical Services Manager : XXXXXXXXXX

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	0960_QC219_240522	May 22, 2024		Water	L24-My0073374		X	
2	0960_QC220_240522	May 22, 2024		Soil	L24-My0073375	X	X	
3	0960_QC221_240522	May 22, 2024		Soil	L24-My0073376	X	X	
4	0960_QC222_240522	May 22, 2024		Soil	L24-My0073377	X	X	
5	0960_QC223_240522	May 22, 2024		Soil	L24-My0073378	X	X	
6	0960_QC224_240522	May 22, 2024		Water	L24-My0073379			X
7	0960_QC225_240522	May 22, 2024		Water	L24-My0073380			X
8	0960_QC226_240522	May 22, 2024		Water	L24-My0073381		X	



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Eurofins ARL Pty Ltd

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NATA# 2377
Site# 2370

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289
---	--	--	--	--	--

Eurofins ProMicro Pty Ltd

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NATA# 2561
Site# 2554

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Auckland 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
---	--	--	--

Company Name:

Address:

Project Name:

Project ID:

Stantec Australia Pty Ltd (WA)

6F 226,Adelaide Terrace

Perth

WA 6000

WA_0960_PFASOMP_24

WA_0960_PFASOMP_24

Order No.:

Report #:

Phone:

Fax:

PFAS-OMP 304700525

1101229

0458 839 200

Received:

Due:

Priority:

Contact Name:

May 27, 2024 9:50 AM

Jun 4, 2024

5 Day

ALL INVOICES

Eurofins Analytical Services Manager :

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X
External Laboratory								
9	0960_QC227_240522	May 22, 2024		Water	L24-My0073382		X	
10	0960_QC228_240522	May 22, 2024		Soil	L24-My0073383	X	X	
11	0960_QC229_240522	May 22, 2024		Water	L24-My0073384		X	
12	0960_QC230_240522	May 22, 2024		Water	L24-My0073385		X	
13	0960_QC231_240522	May 22, 2024		Water	L24-My0073386		X	
14	0960_QC232_240522	May 22, 2024		Water	L24-My0073387			X
15	0960_QC234_240523	May 23, 2024		Water	L24-My0073388			X
16	0960_QC235_240523	May 23, 2024		Water	L24-My0073389		X	
17	0960_QC233_240522	May 22, 2024		Water	L24-My0073390			X



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NATA# 2377
Site# 2370

Eurofins Environment Testing Australia Pty Ltd

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Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289
---	--	--	--	--	--

Eurofins ProMicro Pty Ltd

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---	--	--	--

Company Name:	Stantec Australia Pty Ltd (WA)	Order No.:	PFAS-OMP 304700525	Received:	May 27, 2024 9:50 AM
Address:	6F 226,Adelaide Terrace Perth WA 6000	Report #:	1101229	Due:	Jun 4, 2024
		Phone:	0458 839 200	Priority:	5 Day
		Fax:		Contact Name:	ALL INVOICES
Project Name:	WA_0960_PFASOMP_24				
Project ID:	WA_0960_PFASOMP_24				

Eurofins Analytical Services Manager :

Sample Detail	Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370	X	X	X
External Laboratory			
Test Counts	5	12	5

Stantec Australia Pty Limited
6F 226, Adelaide Terrace
Perth
WA 6000



NATA Accredited
Accreditation Number 2377
Site Number 2370

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: ALL INVOICES

Report 1101229-S
Project name WA_0960_PFASOMP_24
Project ID WA_0960_PFASOMP_24
Received Date May 27, 2024

Client Sample ID			0960_QC220_2 40522	0960_QC221_2 40522	0960_QC222_2 40522	0960_QC223_2 40522
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24- My0073375	L24- My0073376	L24- My0073377	L24- My0073378
Date Sampled			May 22, 2024	May 22, 2024	May 22, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	4.8	26	8.9	21
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoropentanoic acid (PFPeA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorohexanoic acid (PFHxA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoroheptanoic acid (PFHpA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanoic acid (PFOA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorononanoic acid (PFNA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorodecanoic acid (PFDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoroundecanoic acid (PFUnDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorododecanoic acid (PFDoDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorotridecanoic acid (PFTeDA) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
13C4-PFBA (surr.)	1	%	61	58	60	50
13C5-PFPeA (surr.)	1	%	72	66	73	66
13C5-PFHxA (surr.)	1	%	73	70	74	69
13C4-PFHpA (surr.)	1	%	75	70	73	75
13C8-PFOA (surr.)	1	%	74	66	71	72
13C5-PFNA (surr.)	1	%	79	69	73	72
13C6-PFDA (surr.)	1	%	80	74	75	76
13C2-PFUnDA (surr.)	1	%	92	79	83	81
13C2-PFDoDA (surr.)	1	%	94	78	83	79
13C2-PFTeDA (surr.)	1	%	151	124	132	140
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10

Client Sample ID			0960_QC220_2 40522	0960_QC221_2 40522	0960_QC222_2 40522	0960_QC223_2 40522
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			L24-My0073375	L24-My0073376	L24-My0073377	L24-My0073378
Date Sampled			May 22, 2024	May 22, 2024	May 22, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
13C8-FOSA (surr.)	1	%	75	71	73	76
D3-N-MeFOSA (surr.)	1	%	78	83	85	84
D5-N-EtFOSA (surr.)	1	%	93	92	97	101
D7-N-MeFOSE (surr.)	1	%	68	73	74	74
D9-N-EtFOSE (surr.)	1	%	75	77	79	80
D5-N-EtFOSAA (surr.)	1	%	82	69	77	75
D3-N-MeFOSAA (surr.)	1	%	79	72	81	70
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
13C2-4:2 FTSA (surr.)	1	%	70	80	83	49
13C2-6:2 FTSA (surr.)	1	%	77	65	80	63
13C2-8:2 FTSA (surr.)	1	%	91	71	81	73
13C2-10:2 FTSA (surr.)	1	%	118	93	92	80
Perfluoroalkyl sulfonic acids (PFASs)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorononanesulfonic acid (PFNS) ^{*N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoropropanesulfonic acid (PFPrS) ^{*N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS) ^{N11}	5	ug/kg	^{N09} 11	^{N09} 16	^{N09} 43	< 5
Perfluorodecanesulfonic acid (PFDS) ^{N15}	5	ug/kg	< 5	11	< 5	< 5
13C3-PFBS (surr.)	1	%	77	71	70	77
18O2-PFHxS (surr.)	1	%	66	61	60	62
13C8-PFOS (surr.)	1	%	80	74	68	70
PFASs Summations						
Sum (PFHxS + PFOS)*	5	ug/kg	11	16	43	< 5
Sum of PFASs (n=30)*	50	ug/kg	< 50	< 50	< 50	< 50
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	11	16	43	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	11	16	43	< 5
Sum of WA DWER PFAS (n=10)*	10	ug/kg	11	16	43	< 10

Client Sample ID			0960_QC228_2
Sample Matrix			Soil
Eurofins Sample No.			L24-My0073383
Date Sampled			May 22, 2024
Test/Reference	LOR	Unit	
Sample Properties			
% Moisture	1	%	32
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	5	ug/kg	< 5
Perfluoropentanoic acid (PFPeA) ^{N11}	5	ug/kg	< 5
Perfluorohexanoic acid (PFHxA) ^{N11}	5	ug/kg	< 5
Perfluoroheptanoic acid (PFHpA) ^{N11}	5	ug/kg	< 5
Perfluorooctanoic acid (PFOA) ^{N11}	5	ug/kg	< 5
Perfluorononanoic acid (PFNA) ^{N11}	5	ug/kg	< 5
Perfluorodecanoic acid (PFDA) ^{N11}	5	ug/kg	< 5
Perfluoroundecanoic acid (PFUnDA) ^{N11}	5	ug/kg	< 5
Perfluorododecanoic acid (PFDoDA) ^{N11}	5	ug/kg	< 5
Perfluorotridecanoic acid (PFTeDA) ^{N15}	5	ug/kg	< 5
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	5	ug/kg	< 5
13C4-PFBA (surr.)	1	%	60
13C5-PFPeA (surr.)	1	%	68
13C5-PFHxA (surr.)	1	%	66
13C4-PFHpA (surr.)	1	%	67
13C8-PFOA (surr.)	1	%	71
13C5-PFNA (surr.)	1	%	72
13C6-PFDA (surr.)	1	%	73
13C2-PFUnDA (surr.)	1	%	79
13C2-PFDoDA (surr.)	1	%	79
13C2-PFTeDA (surr.)	1	%	134
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	5	ug/kg	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	5	ug/kg	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	5	ug/kg	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	5	ug/kg	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	5	ug/kg	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	10	ug/kg	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	10	ug/kg	< 10
13C8-FOSA (surr.)	1	%	71
D3-N-MeFOSA (surr.)	1	%	86
D5-N-EtFOSA (surr.)	1	%	101
D7-N-MeFOSE (surr.)	1	%	73
D9-N-EtFOSE (surr.)	1	%	81
D5-N-EtFOSAA (surr.)	1	%	75
D3-N-MeFOSAA (surr.)	1	%	74

Client Sample ID			0960_QC228_2
Sample Matrix			Soil
Eurofins Sample No.			L24-My0073383
Date Sampled			May 22, 2024
Test/Reference	LOR	Unit	
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	5	ug/kg	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	10	ug/kg	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	5	ug/kg	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	5	ug/kg	< 5
13C2-4:2 FTSA (surr.)	1	%	56
13C2-6:2 FTSA (surr.)	1	%	56
13C2-8:2 FTSA (surr.)	1	%	66
13C2-10:2 FTSA (surr.)	1	%	79
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	5	ug/kg	< 5
Perfluorononanesulfonic acid (PFNS) ^{*N15}	5	ug/kg	< 5
Perfluoropropanesulfonic acid (PFPrS) ^{*N15}	5	ug/kg	< 5
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	5	ug/kg	< 5
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	5	ug/kg	< 5
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	5	ug/kg	< 5
Perfluorooctanesulfonic acid (PFOS) ^{N11}	5	ug/kg	< 5
Perfluorodecanesulfonic acid (PFDS) ^{N15}	5	ug/kg	< 5
13C3-PFBS (surr.)	1	%	70
18O2-PFHxS (surr.)	1	%	60
13C8-PFOS (surr.)	1	%	68
PFASs Summations			
Sum (PFHxS + PFOS)*	5	ug/kg	< 5
Sum of PFASs (n=30)*	50	ug/kg	< 50
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
% Moisture - Method: ARL135 Moisture in Solids	Welshpool	May 27, 2024	14 Days
Perfluoroalkyl carboxylic acids (PFCAs) - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
Perfluoroalkyl sulfonamido substances - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
Perfluoroalkyl sulfonic acids (PFSA)s - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
PFASs Summations - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	



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Address: 6F 226,Adelaide Terrace
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WA 6000

Project Name: WA_0960_PFASOMP_24
Project ID: WA_0960_PFASOMP_24

Order No.: PFAS-OMP 304700525
Report #: 1101229
Phone: 0458 839 200
Fax:

Received: May 27, 2024 9:50 AM
Due: Jun 4, 2024
Priority: 5 Day
Contact Name: ALL INVOICES

Eurofins Analytical Services Manager : XXXXXXXXXX

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	0960_QC219_240522	May 22, 2024		Water	L24-My0073374		X	
2	0960_QC220_240522	May 22, 2024		Soil	L24-My0073375	X	X	
3	0960_QC221_240522	May 22, 2024		Soil	L24-My0073376	X	X	
4	0960_QC222_240522	May 22, 2024		Soil	L24-My0073377	X	X	
5	0960_QC223_240522	May 22, 2024		Soil	L24-My0073378	X	X	
6	0960_QC224_240522	May 22, 2024		Water	L24-My0073379			X
7	0960_QC225_240522	May 22, 2024		Water	L24-My0073380			X
8	0960_QC226_240522	May 22, 2024		Water	L24-My0073381		X	



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Project Name: WA_0960_PFASOMP_24
Project ID: WA_0960_PFASOMP_24

Order No.: PFAS-OMP 304700525
Report #: 1101229
Phone: 0458 839 200
Fax:

Received: May 27, 2024 9:50 AM
Due: Jun 4, 2024
Priority: 5 Day
Contact Name: ALL INVOICES

Eurofins Analytical Services Manager : XXXXXXXXXX

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X
External Laboratory								
9	0960_QC227_240522	May 22, 2024		Water	L24-My0073382		X	
10	0960_QC228_240522	May 22, 2024		Soil	L24-My0073383	X	X	
11	0960_QC229_240522	May 22, 2024		Water	L24-My0073384		X	
12	0960_QC230_240522	May 22, 2024		Water	L24-My0073385		X	
13	0960_QC231_240522	May 22, 2024		Water	L24-My0073386		X	
14	0960_QC232_240522	May 22, 2024		Water	L24-My0073387			X
15	0960_QC234_240523	May 23, 2024		Water	L24-My0073388			X
16	0960_QC235_240523	May 23, 2024		Water	L24-My0073389		X	
17	0960_QC233_240522	May 22, 2024		Water	L24-My0073390			X



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Project Name: WA_0960_PFASOMP_24
Project ID: WA_0960_PFASOMP_24

Order No.: PFAS-OMP 304700525
Report #: 1101229
Phone: 0458 839 200
Fax:

Received: May 27, 2024 9:50 AM
Due: Jun 4, 2024
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Contact Name: ALL INVOICES

Eurofins Analytical Services Manager : [REDACTED]

Sample Detail	Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370	X	X	X
External Laboratory			
Test Counts	5	12	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/kg	< 5			5	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 5			5	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 5			5	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 5			5	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 5			5	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 5			5	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 5			5	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/kg	< 5			5	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/kg	< 5			5	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/kg	< 5			5	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/kg	< 5			5	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/kg	< 5			5	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/kg	< 5			5	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/kg	< 5			5	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/kg	< 5			5	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/kg	< 5			5	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/kg	< 10			10	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/kg	< 10			10	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/kg	< 5			5	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/kg	< 10			10	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/kg	< 5			5	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/kg	< 5			5	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA)							
Perfluorobutanesulfonic acid (PFBS)	ug/kg	< 5			5	Pass	
Perfluorononanesulfonic acid (PFNS)*	ug/kg	< 5			5	Pass	
Perfluoropropanesulfonic acid (PFPrS)*	ug/kg	< 5			5	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/kg	< 5			5	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 5			5	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/kg	< 5			5	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 5			5	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/kg	< 5			5	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	141			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	128			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	145			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	142			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	134			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	145			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	141			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	131			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	137			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	109			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	136			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	133			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	137			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	131			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	123			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	119			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	126			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	137			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	145			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	134			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	140			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	144			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA)									
Perfluorobutanesulfonic acid (PFBS)			%	124			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)*			%	129			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)*			%	125			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	140			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	134			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	137			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	140			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	146			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)									
				Result 1					
Perfluorobutanoic acid (PFBA)	L24-My0069780	NCP	%	137			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	L24-My0069780	NCP	%	129			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	L24-My0069780	NCP	%	141			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	L24-My0069780	NCP	%	143			50-150	Pass	
Perfluorooctanoic acid (PFOA)	L24-My0069780	NCP	%	134			50-150	Pass	
Perfluorononanoic acid (PFNA)	L24-My0069780	NCP	%	142			50-150	Pass	
Perfluorodecanoic acid (PFDA)	L24-My0069780	NCP	%	140			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	L24-My0069780	NCP	%	135			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	L24-My0069780	NCP	%	133			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	L24-My0069780	NCP	%	103			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L24-My0069780	NCP	%	132			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	L24-My0069780	NCP	%	134			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L24-My0069780	NCP	%	132			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L24-My0069780	NCP	%	133			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L24-My0069780	NCP	%	126			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L24-My0069780	NCP	%	118			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L24-My0069780	NCP	%	122			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L24-My0069780	NCP	%	138			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L24-My0069780	NCP	%	136			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	L24-My0069780	NCP	%	140			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L24-My0069780	NCP	%	141			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L24-My0069780	NCP	%	131			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	L24-My0069780	NCP	%	122			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)*	L24-My0069780	NCP	%	143			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)*	L24-My0069780	NCP	%	133			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	L24-My0069780	NCP	%	142			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	L24-My0069780	NCP	%	126			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	L24-My0069780	NCP	%	131			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	L24-My0069780	NCP	%	137			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	L24-My0069780	NCP	%	147			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCA)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTTrDA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L24-My0073454	NCP	ug/kg	< 10	< 10	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L24-My0073454	NCP	ug/kg	< 10	< 10	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L24-My0073454	NCP	ug/kg	< 10	< 10	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSA)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)*	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)*	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	L24-My0073454	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Duplicate								
Sample Properties				Result 1	Result 2	RPD		
% Moisture	L24-My0073376	CP	%	26	25	3.7	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

	Analytical Services Manager
	Senior Analyst-Sample Properties
	Senior Analyst-PFAS

General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

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Stantec Australia Pty Limited
6F 226, Adelaide Terrace
Perth
WA 6000



NATA Accredited
Accreditation Number 2377
Site Number 2370

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: ALL INVOICES

Report 1101229-W
Project name WA_0960_PFASOMP_24
Project ID WA_0960_PFASOMP_24
Received Date May 27, 2024

Client Sample ID			0960_QC219_2 40522	0960_QC224_2 40522	0960_QC225_2 40522	0960_QC226_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24- My0073374	L24- My0073379	L24- My0073380	L24- My0073381
Date Sampled			May 22, 2024	May 22, 2024	May 22, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	-	-	1.1
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	0.06	-	-	1.5
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.37	-	-	8.8
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.05	ug/L	< 0.05	-	-	N09 1.1
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	N09 0.04	-	-	N09 2.1
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	-	-	0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	-	-	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	-	-	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	-	-	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	-	-	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	-	-	< 0.01
13C4-PFBA (surr.)	1	%	102	-	-	66
13C5-PFPeA (surr.)	1	%	94	-	-	89
13C5-PFHxA (surr.)	1	%	89	-	-	106
13C4-PFHpA (surr.)	1	%	98	-	-	85
13C8-PFOA (surr.)	1	%	133	-	-	100
13C5-PFNA (surr.)	1	%	96	-	-	79
13C6-PFDA (surr.)	1	%	127	-	-	73
13C2-PFUnDA (surr.)	1	%	70	-	-	88
13C2-PFDoDA (surr.)	1	%	79	-	-	98
13C2-PFTeDA (surr.)	1	%	52	-	-	68
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	-	-	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	-	-	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	-	-	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	-	-	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	-	-	< 0.05
N-ethylperfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	-	-	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	-	-	< 0.05
13C8-FOSA (surr.)	1	%	87	-	-	113
D3-N-MeFOSA (surr.)	1	%	64	-	-	79

Client Sample ID			0960_QC219_2 40522	0960_QC224_2 40522	0960_QC225_2 40522	0960_QC226_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24-My0073374	L24-My0073379	L24-My0073380	L24-My0073381
Date Sampled			May 22, 2024	May 22, 2024	May 22, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
D5-N-EtFOSA (surr.)	1	%	62	-	-	79
D7-N-MeFOSE (surr.)	1	%	65	-	-	80
D9-N-EtFOSE (surr.)	1	%	66	-	-	80
D5-N-EtFOSAA (surr.)	1	%	85	-	-	106
D3-N-MeFOSAA (surr.)	1	%	68	-	-	84
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	-	-	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	-	-	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	-	-	0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	-	-	< 0.01
13C2-4:2 FTSA (surr.)	1	%	91	-	-	74
13C2-6:2 FTSA (surr.)	1	%	101	-	-	75
13C2-8:2 FTSA (surr.)	1	%	79	-	-	76
13C2-10:2 FTSA (surr.)	1	%	69	-	-	84
Perfluoroalkyl sulfonic acids (PFSA)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	0.11	-	-	6.3
Perfluorononanesulfonic acid (PFNS) ^{*N15}	0.01	ug/L	< 0.01	-	-	0.02
Perfluoropropanesulfonic acid (PFPrS) ^{*N15}	0.01	ug/L	0.05	-	-	3.2
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 0.19	-	-	^{N09} 6.8
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 1.6	-	-	^{N09} 31
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.03	-	-	^{N09} 2.8
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.26	-	-	^{N09} 37
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	-	-	< 0.01
13C3-PFBS (surr.)	1	%	92	-	-	98
18O2-PFHxS (surr.)	1	%	80	-	-	87
13C8-PFOS (surr.)	1	%	78	-	-	71
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	1.86	-	-	68
Sum of PFASs (n=30)*	0.1	ug/L	2.71	-	-	101.74
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.3	-	-	39.1
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	1.9	-	-	70.1
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	2.44	-	-	88.91
Perfluoroalkyl sulfonamido substances- Trace						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
13C8-FOSA (surr.)	1	%	-	60	47	-
D3-N-MeFOSA (surr.)	1	%	-	35	29	-

Client Sample ID			0960_QC219_2 40522	0960_QC224_2 40522	0960_QC225_2 40522	0960_QC226_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24-My0073374	L24-My0073379	L24-My0073380	L24-My0073381
Date Sampled			May 22, 2024	May 22, 2024	May 22, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances- Trace						
D5-N-EtFOSA (surr.)	1	%	-	32	30	-
D7-N-MeFOSE (surr.)	1	%	-	36	26	-
D9-N-EtFOSE (surr.)	1	%	-	37	24	-
D5-N-EtFOSAA (surr.)	1	%	-	40	30	-
D3-N-MeFOSAA (surr.)	1	%	-	44	32	-
Perfluoroalkyl carboxylic acids (PFCAs) - Trace						
Perfluorobutanoic acid (PFBA) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
Perfluoropentanoic acid (PFPeA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorohexanoic acid (PFHxA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
Perfluorooctanoic acid (PFOA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorononanoic acid (PFNA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorodecanoic acid (PFDA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorotridecanoic acid (PFTeDA) ^{N15}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
13C4-PFBA (surr.)	1	%	-	50	44	-
13C5-PFPeA (surr.)	1	%	-	66	79	-
13C5-PFHxA (surr.)	1	%	-	86	83	-
13C4-PFHpA (surr.)	1	%	-	92	99	-
13C8-PFOA (surr.)	1	%	-	79	79	-
13C5-PFNA (surr.)	1	%	-	75	67	-
13C6-PFDA (surr.)	1	%	-	63	45	-
13C2-PFUnDA (surr.)	1	%	-	53	43	-
13C2-PFDoDA (surr.)	1	%	-	46	36	-
13C2-PFTeDA (surr.)	1	%	-	25	22	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Trace						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.005	ug/L	-	< 0.005	< 0.005	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
13C2-4:2 FTSA (surr.)	1	%	-	112	85	-
13C2-6:2 FTSA (surr.)	1	%	-	112	84	-
13C2-8:2 FTSA (surr.)	1	%	-	73	51	-
13C2-10:2 FTSA (surr.)	1	%	-	56	42	-
Perfluoroalkyl sulfonic acids (PFSA)- Trace						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorononanesulfonic acid (PFNS) ^{*N15}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluoropropanesulfonic acid (PFPrS) ^{*N15}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.001	ug/L	-	< 0.001	0.002	-
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.001	ug/L	-	< 0.001	< 0.001	-
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.001	ug/L	-	< 0.001	0.002	-
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.001	ug/L	-	< 0.001	< 0.001	-

Client Sample ID			0960_QC219_2 40522	0960_QC224_2 40522	0960_QC225_2 40522	0960_QC226_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24-My0073374	L24-My0073379	L24-My0073380	L24-My0073381
Date Sampled			May 22, 2024	May 22, 2024	May 22, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonic acids (PFASs)- Trace						
13C3-PFBS (surr.)	1	%	-	84	91	-
18O2-PFHxS (surr.)	1	%	-	74	71	-
13C8-PFOS (surr.)	1	%	-	64	57	-
PFASs Summations						
Sum (PFHxS + PFOS)*	0.001	ug/L	-	< 0.001	0.004	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.001	ug/L	-	< 0.001	0.004	-
Sum of PFASs (n=30)*	0.005	ug/L	-	< 0.005	< 0.005	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.001	ug/L	-	< 0.001	0.002	-
Sum of WA DWER PFAS (n=10)*	0.005	ug/L	-	< 0.005	< 0.005	-

Client Sample ID			0960_QC227_2 40522	0960_QC229_2 40522	0960_QC230_2 40522	0960_QC231_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24-My0073382	L24-My0073384	L24-My0073385	L24-My0073386
Date Sampled			May 22, 2024	May 22, 2024	May 22, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05	0.74	0.09	0.46
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01	1.2	0.13	1.00
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	< 0.01	6.3	0.53	5.3
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.05	ug/L	< 0.05	^{N09} 0.54	^{N09} 0.06	^{N09} 0.51
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01	^{N09} 1.2	^{N09} 0.06	^{N09} 0.67
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01	0.01	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	92	75	108	93
13C5-PFPeA (surr.)	1	%	96	101	111	82
13C5-PFHxA (surr.)	1	%	94	97	128	82
13C4-PFHpA (surr.)	1	%	95	100	135	88
13C8-PFOA (surr.)	1	%	124	91	151	81
13C5-PFNA (surr.)	1	%	86	94	134	80
13C6-PFDA (surr.)	1	%	105	88	161	94
13C2-PFUnDA (surr.)	1	%	61	68	100	62
13C2-PFDoDA (surr.)	1	%	68	75	97	67
13C2-PFTeDA (surr.)	1	%	45	49	65	42
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05

Client Sample ID			0960_QC227_2 40522	0960_QC229_2 40522	0960_QC230_2 40522	0960_QC231_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24-My0073382	L24-My0073384	L24-My0073385	L24-My0073386
Date Sampled			May 22, 2024	May 22, 2024	May 22, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl sulfonamido substances						
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	80	92	124	82
D3-N-MeFOSA (surr.)	1	%	55	64	84	57
D5-N-EtFOSA (surr.)	1	%	55	61	81	56
D7-N-MeFOSE (surr.)	1	%	58	62	87	61
D9-N-EtFOSE (surr.)	1	%	59	63	86	60
D5-N-EtFOSAA (surr.)	1	%	69	81	105	70
D3-N-MeFOSAA (surr.)	1	%	61	69	90	62
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05	< 0.05	< 0.05	0.20
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	0.03	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	81	93	143	79
13C2-6:2 FTSA (surr.)	1	%	89	100	173	90
13C2-8:2 FTSA (surr.)	1	%	68	83	137	76
13C2-10:2 FTSA (surr.)	1	%	55	65	96	59
Perfluoroalkyl sulfonic acids (PFSA)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01	2.4	0.25	1.8
Perfluorononanesulfonic acid (PFNS)* ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS)* ^{N15}	0.01	ug/L	< 0.01	0.91	0.10	0.94
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 2.8	^{N09} 0.36	^{N09} 2.8
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 17	^{N09} 2.1	^{N09} 15
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01	^{N09} 1.6	^{N09} 0.04	^{N09} 0.62
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	< 0.01	^{N09} 14	^{N09} 1.4	^{N09} 4.9
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	97	83	140	80
18O2-PFHxS (surr.)	1	%	92	82	124	75
13C8-PFOS (surr.)	1	%	72	72	108	60
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	31	3.5	19.9
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	48.73	5.12	34.2
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	15.2	1.46	5.57
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	32.2	3.56	20.57
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	43.41	4.62	29.84

Client Sample ID			0960_QC232_2 40522	0960_QC234_2 40523	0960_QC235_2 40523	0960_QC233_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24-My0073387	L24-My0073388	L24-My0073389	L24-My0073390
Date Sampled			May 22, 2024	May 23, 2024	May 23, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	-	-	< 0.05	-
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.05	ug/L	-	-	< 0.05	-
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	-	-	< 0.01	-
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
13C4-PFBA (surr.)	1	%	-	-	117	-
13C5-PFPeA (surr.)	1	%	-	-	119	-
13C5-PFHxA (surr.)	1	%	-	-	113	-
13C4-PFHpA (surr.)	1	%	-	-	117	-
13C8-PFOA (surr.)	1	%	-	-	139	-
13C5-PFNA (surr.)	1	%	-	-	103	-
13C6-PFDA (surr.)	1	%	-	-	122	-
13C2-PFUnDA (surr.)	1	%	-	-	64	-
13C2-PFDoDA (surr.)	1	%	-	-	56	-
13C2-PFTeDA (surr.)	1	%	-	-	20	-
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	-	-	< 0.05	-
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	-	-	< 0.05	-
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	-	-	< 0.05	-
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	-	-	< 0.05	-
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	-	-	< 0.05	-
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	-	-	< 0.05	-
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	-	-	< 0.05	-
13C8-FOSA (surr.)	1	%	-	-	95	-
D3-N-MeFOSA (surr.)	1	%	-	-	38	-
D5-N-EtFOSA (surr.)	1	%	-	-	33	-
D7-N-MeFOSE (surr.)	1	%	-	-	58	-
D9-N-EtFOSE (surr.)	1	%	-	-	54	-
D5-N-EtFOSAA (surr.)	1	%	-	-	64	-
D3-N-MeFOSAA (surr.)	1	%	-	-	67	-
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	-	-	< 0.05	-
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	-	-	< 0.01	-
13C2-4:2 FTSA (surr.)	1	%	-	-	107	-

Client Sample ID			0960_QC232_2 40522	0960_QC234_2 40523	0960_QC235_2 40523	0960_QC233_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24-My0073387	L24-My0073388	L24-My0073389	L24-My0073390
Date Sampled			May 22, 2024	May 23, 2024	May 23, 2024	May 22, 2024
Test/Reference	LOR	Unit				
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)						
13C2-6:2 FTSA (surr.)	1	%	-	-	113	-
13C2-8:2 FTSA (surr.)	1	%	-	-	89	-
13C2-10:2 FTSA (surr.)	1	%	-	-	57	-
Perfluoroalkyl sulfonic acids (PFSA)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluorononanesulfonic acid (PFNS) ^{*N15}	0.01	ug/L	-	-	< 0.01	-
Perfluoropropanesulfonic acid (PFPrS) ^{*N15}	0.01	ug/L	-	-	< 0.01	-
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	-	-	< 0.01	-
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	-	-	< 0.01	-
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	-	-	< 0.01	-
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	-	-	< 0.01	-
13C3-PFBS (surr.)	1	%	-	-	124	-
18O2-PFHxS (surr.)	1	%	-	-	120	-
13C8-PFOS (surr.)	1	%	-	-	88	-
PFASs Summations						
Sum (PFHxS + PFOS)*	0.01	ug/L	-	-	< 0.01	-
Sum of PFASs (n=30)*	0.1	ug/L	-	-	< 0.1	-
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	-	-	< 0.01	-
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	-	-	< 0.01	-
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	-	-	< 0.05	-
Perfluoroalkyl sulfonamido substances- Trace						
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
13C8-FOSA (surr.)	1	%	50	42	-	60
D3-N-MeFOSA (surr.)	1	%	31	23	-	33
D5-N-EtFOSA (surr.)	1	%	28	22	-	28
D7-N-MeFOSE (surr.)	1	%	26	27	-	36
D9-N-EtFOSE (surr.)	1	%	24	25	-	33
D5-N-EtFOSAA (surr.)	1	%	31	39	-	38
D3-N-MeFOSAA (surr.)	1	%	36	39	-	49
Perfluoroalkyl carboxylic acids (PFCAs) - Trace						
Perfluorobutanoic acid (PFBA) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
Perfluoropentanoic acid (PFPeA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorohexanoic acid (PFHxA) ^{N11}	0.001	ug/L	< 0.001	0.001	-	< 0.001
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.005	ug/L	< 0.005	< 0.005	-	< 0.005
Perfluorooctanoic acid (PFOA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorononanoic acid (PFNA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorodecanoic acid (PFDA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorotridecanoic acid (PFTTrDA) ^{N15}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001

Client Sample ID			0960_QC232_2 40522	0960_QC234_2 40523	0960_QC235_2 40523	0960_QC233_2 40522
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			L24-My0073387	L24-My0073388	L24-My0073389	L24-My0073390
Date Sampled			May 22, 2024	May 23, 2024	May 23, 2024	May 22, 2024
Test/Reference	LOR	Unit				
Perfluoroalkyl carboxylic acids (PFCAs) - Trace						
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
13C4-PFBA (surr.)	1	%	39	45	-	48
13C5-PFPeA (surr.)	1	%	69	73	-	90
13C5-PFHxA (surr.)	1	%	63	86	-	104
13C4-PFHpA (surr.)	1	%	70	88	-	108
13C8-PFOA (surr.)	1	%	64	73	-	100
13C5-PFNA (surr.)	1	%	58	65	-	93
13C6-PFDA (surr.)	1	%	50	51	-	75
13C2-PFUnDA (surr.)	1	%	42	48	-	72
13C2-PFDoDA (surr.)	1	%	30	42	-	53
13C2-PFTeDA (surr.)	1	%	14	18	-	22
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Trace						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.005	ug/L	< 0.005	0.012	-	< 0.005
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
13C2-4:2 FTSA (surr.)	1	%	71	79	-	115
13C2-6:2 FTSA (surr.)	1	%	74	80	-	133
13C2-8:2 FTSA (surr.)	1	%	55	53	-	89
13C2-10:2 FTSA (surr.)	1	%	37	45	-	62
Perfluoroalkyl sulfonic acids (PFSA)- Trace						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorononanesulfonic acid (PFNS) ^{*N15}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluoropropanesulfonic acid (PFPrS) ^{*N15}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
13C3-PFBS (surr.)	1	%	68	95	-	100
18O2-PFHxS (surr.)	1	%	51	70	-	92
13C8-PFOS (surr.)	1	%	56	60	-	80
PFASs Summations						
Sum (PFHxS + PFOS)*	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Sum of PFASs (n=30)*	0.005	ug/L	< 0.005	0.013	-	< 0.005
Sum of US EPA PFAS (PFOS + PFOA)*	0.001	ug/L	< 0.001	< 0.001	-	< 0.001
Sum of WA DWER PFAS (n=10)*	0.005	ug/L	< 0.005	0.013	-	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs) - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
Perfluoroalkyl sulfonamido substances - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
PFASs Summations - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	
Perfluoroalkyl sulfonamido substances- Trace - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
Perfluoroalkyl carboxylic acids (PFCAs) - Trace - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Trace - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days
Perfluoroalkyl sulfonic acids (PFSAs)- Trace - Method: Method ARL0510_ARL0511 PFAS in aqueous & solid samples by LC-MS/MS	Welshpool	May 28, 2024	28 Days



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Site# 2370

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Company Name:

Address:

Project Name:

Project ID:

Stantec Australia Pty Ltd (WA)

6F 226,Adelaide Terrace

Perth

WA 6000

WA_0960_PFASOMP_24

WA_0960_PFASOMP_24

Order No.:

Report #:

Phone:

Fax:

PFAS-OMP 304700525

1101229

0458 839 200

Received:

Due:

Priority:

Contact Name:

May 27, 2024 9:50 AM

Jun 4, 2024

5 Day

ALL INVOICES

Eurofins Analytical Services Manager :

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	0960_QC219_240522	May 22, 2024		Water	L24-My0073374		X	
2	0960_QC220_240522	May 22, 2024		Soil	L24-My0073375	X	X	
3	0960_QC221_240522	May 22, 2024		Soil	L24-My0073376	X	X	
4	0960_QC222_240522	May 22, 2024		Soil	L24-My0073377	X	X	
5	0960_QC223_240522	May 22, 2024		Soil	L24-My0073378	X	X	
6	0960_QC224_240522	May 22, 2024		Water	L24-My0073379			X
7	0960_QC225_240522	May 22, 2024		Water	L24-My0073380			X
8	0960_QC226_240522	May 22, 2024		Water	L24-My0073381		X	

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Page 10 of 21

Date Reported:Jun 07, 2024



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Company Name:

Address:

Project Name:

Project ID:

Stantec Australia Pty Ltd (WA)

6F 226,Adelaide Terrace

Perth

WA 6000

WA_0960_PFASOMP_24

WA_0960_PFASOMP_24

Order No.:

Report #:

Phone:

Fax:

PFAS-OMP 304700525

1101229

0458 839 200

Received:

Due:

Priority:

Contact Name:

May 27, 2024 9:50 AM

Jun 4, 2024

5 Day

ALL INVOICES

Eurofins Analytical Services Manager :

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370						X	X	X
External Laboratory								
9	0960_QC227_240522	May 22, 2024		Water	L24-My0073382		X	
10	0960_QC228_240522	May 22, 2024		Soil	L24-My0073383	X	X	
11	0960_QC229_240522	May 22, 2024		Water	L24-My0073384		X	
12	0960_QC230_240522	May 22, 2024		Water	L24-My0073385		X	
13	0960_QC231_240522	May 22, 2024		Water	L24-My0073386		X	
14	0960_QC232_240522	May 22, 2024		Water	L24-My0073387			X
15	0960_QC234_240523	May 23, 2024		Water	L24-My0073388			X
16	0960_QC235_240523	May 23, 2024		Water	L24-My0073389		X	
17	0960_QC233_240522	May 22, 2024		Water	L24-My0073390			X

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Page 11 of 21

Date Reported:Jun 07, 2024



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Company Name:	Stantec Australia Pty Ltd (WA)	Order No.:	PFAS-OMP 304700525	Received:	May 27, 2024 9:50 AM
Address:	6F 226,Adelaide Terrace Perth WA 6000	Report #:	1101229	Due:	Jun 4, 2024
		Phone:	0458 839 200	Priority:	5 Day
		Fax:		Contact Name:	ALL INVOICES
Project Name:	WA_0960_PFASOMP_24				
Project ID:	WA_0960_PFASOMP_24				

Eurofins Analytical Services Manager :

Sample Detail	Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)	Per- and Polyfluoroalkyl Substances (PFASs) - Trace
Perth Laboratory - NATA # 2377 Site # 2370	X	X	X
External Laboratory			
Test Counts	5	12	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl sulfonamido substances- Trace							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.005			0.005	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.005			0.005	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.005			0.005	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.005			0.005	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.005			0.005	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.005			0.005	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.005			0.005	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs) - Trace							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.005			0.005	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.001			0.001	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.001			0.001	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.005			0.005	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.001			0.001	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.001			0.001	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.001			0.001	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/L	< 0.001			0.001	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.001			0.001	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.001			0.001	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.001			0.001	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.001			0.001	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.005			0.005	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.001			0.001	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.001			0.001	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA)- Trace							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.001			0.001	Pass	
Perfluorononanesulfonic acid (PFNS)*	ug/L	< 0.001			0.001	Pass	
Perfluoropropanesulfonic acid (PFPrS)*	ug/L	< 0.001			0.001	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.001			0.001	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.001			0.001	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.001			0.001	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.001			0.001	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.05			0.05	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)*	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)*	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances- Trace							
Perfluorooctane sulfonamide (FOSA)	%	88			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	104			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	100			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	92			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	104			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	96			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	100			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs) - Trace							
Perfluorobutanoic acid (PFBA)	%	108			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	104			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	88			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	108			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	92			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	92			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	104			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	112			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	100			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	100			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	96			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	100			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	128			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	104			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	100			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSA)s- Trace							
Perfluorobutanesulfonic acid (PFBS)	%	96			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)*	%	72			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)*	%	116			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	116			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	92			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	104			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	92			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	68			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCA)s							
Perfluorobutanoic acid (PFBA)	%	87			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	85			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	107			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	92			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	94			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	93			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	100			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	103			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	101			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	150			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	97			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	89			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	121			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	103			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	92			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	92			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	93			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	96			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)s							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	92			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	121			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	106			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	96			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSA)s							
Perfluorobutanesulfonic acid (PFBS)	%	85			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)*	%	73			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)*	%	92			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	90			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	96			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	88			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	92			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	75			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1				
Perfluorobutanoic acid (PFBA)	L24-My0073389	CP	%	72		50-150	Pass	
Perfluoropentanoic acid (PFPeA)	L24-My0073389	CP	%	85		50-150	Pass	
Perfluorohexanoic acid (PFHxA)	L24-My0073389	CP	%	90		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	L24-My0073389	CP	%	93		50-150	Pass	
Perfluorooctanoic acid (PFOA)	L24-My0073389	CP	%	93		50-150	Pass	
Perfluorononanoic acid (PFNA)	L24-My0073389	CP	%	95		50-150	Pass	
Perfluorodecanoic acid (PFDA)	L24-My0073389	CP	%	97		50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	L24-My0073389	CP	%	97		50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	L24-My0073389	CP	%	91		50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	L24-My0073389	CP	%	132		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L24-My0073389	CP	%	89		50-150	Pass	
Spike - % Recovery								
Perfluoroalkyl sulfonamido substances				Result 1				
Perfluorooctane sulfonamide (FOSA)	L24-My0073389	CP	%	88		50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L24-My0073389	CP	%	91		50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L24-My0073389	CP	%	89		50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L24-My0073389	CP	%	89		50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L24-My0073389	CP	%	85		50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L24-My0073389	CP	%	95		50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L24-My0073389	CP	%	94		50-150	Pass	
Spike - % Recovery								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L24-My0073389	CP	%	101		50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L24-My0073389	CP	%	102		50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L24-My0073389	CP	%	90		50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L24-My0073389	CP	%	93		50-150	Pass	
Spike - % Recovery								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1				
Perfluorobutanesulfonic acid (PFBS)	L24-My0073389	CP	%	82		50-150	Pass	
Perfluorononanesulfonic acid (PFNS)*	L24-My0073389	CP	%	69		50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)*	L24-My0073389	CP	%	97		50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	L24-My0073389	CP	%	93		50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	L24-My0073389	CP	%	100		50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	L24-My0073389	CP	%	94		50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorooctanesulfonic acid (PFOS)	L24-My0073389	CP	%	84			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	L24-My0073389	CP	%	69			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl sulfonamido substances- Trace				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs) - Trace				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Trace				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L24-My0073412	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonic acids (PFASs)- Trace				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)*	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)*	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	L24-My0073412	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD		
Perfluorobutanoic acid (PFBA)	L24-My0073386	CP	ug/L	0.46	0.45	2.1	30%	Pass
Perfluoropentanoic acid (PFPeA)	L24-My0073386	CP	ug/L	1.00	1.0	4.0	30%	Pass
Perfluorohexanoic acid (PFHxA)	L24-My0073386	CP	ug/L	5.3	5.2	1.8	30%	Pass
Perfluoroheptanoic acid (PFHpA)	L24-My0073386	CP	ug/L	0.51	0.47	7.4	30%	Pass
Perfluorooctanoic acid (PFOA)	L24-My0073386	CP	ug/L	0.67	0.65	3.1	30%	Pass
Perfluorononanoic acid (PFNA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanoic acid (PFDA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroundecanoic acid (PFUnDA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorododecanoic acid (PFDoDA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotridecanoic acid (PFTrDA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotetradecanoic acid (PFTeDA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	L24-My0073386	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L24-My0073386	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L24-My0073386	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L24-My0073386	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L24-My0073386	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L24-My0073386	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L24-My0073386	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L24-My0073386	CP	ug/L	0.20	0.20	2.4	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Duplicate								
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	L24-My0073386	CP	ug/L	1.8	1.8	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)*	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)*	L24-My0073386	CP	ug/L	0.94	0.97	3.1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	L24-My0073386	CP	ug/L	2.8	2.7	2.1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	L24-My0073386	CP	ug/L	15	15	1.4	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	L24-My0073386	CP	ug/L	0.62	0.67	8.3	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	L24-My0073386	CP	ug/L	4.9	5.1	3.4	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	L24-My0073386	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

 Analytical Services Manager
 Senior Analyst-PFAS

General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request

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APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES



now



Monitoring Date	Monitoring Site ID	Sample ID	Screen Interval	Well type	TOC (mAHd)	Borelog Depth (m)	SWL (mBTOC)	RWL (mAHd)	Other Observations on Bore/Site	Sampling Method	R1 - Temp (°C)	R1 - DO (mg/L)	R1 - EC (us/Cm)	R1 - TDS (mg/L)	R1 - pH
22/05/2024	MW018	0960_MW018_240522	5.5-8.5	Single_Level	6.403	8.5	5.783	0.62		HydraSleeve	32.1	2.01	3056	1987	7.51
22/05/2024	MW021	0960_MW021_240522	5.6-8.6	Single_Level	6.745	8.6	6.092	0.653		HydraSleeve	31.1	3.59	3170	2060	7.72
23/05/2024	MW102	0960_MW102_240523	2.5-8.5	Single_Level	4.6266	8.5	3.98	0.647		HydraSleeve	27.6		95517	62086	6.86
23/05/2024	MW103	0960_MW103_240523	1.5-8	Single_Level	2.2785	5.8	2.24	0.038		HydraSleeve	29		78162	50314	6.86
22/05/2024	MW104	0960_MW104_240522	1-6.5	Single_Level	2.7256	6.5	2.59	0.136		HydraSleeve	28.7		82509	53662	7.04
22/05/2024	MW105	0960_MW105_240522	2-8	Single_Level	3.7272	8.0	3.45	0.277		HydraSleeve	27.7		44308	28802	6.87
22/05/2024	MW112	0960_MW112_240522	3-8	Single_Level	5.1191	8.0	5.056	0.063		HydraSleeve	30.9	1.65	10894	7081	7.02
22/05/2024	MW113	0960_MW113_240522	4-10	Single_Level	7.3165	10.0	6.629	0.688		HydraSleeve	30.8	2.99	11798	7670	6.77
22/05/2024	MW114	0960_MW114_240522	4-10	Single_Level	7.7467	10.0	7.015	0.732		HydraSleeve	30.4	3.84	8876	5769	6.9
22/05/2024	MW115	0960_MW115_240522	3-8	Single_Level	4.9133	8.0	4.958	-0.045		HydraSleeve	30.4	2.66	33542	21803	6.7
22/05/2024	MW122	0960_MW122_240522	1.7-7.7	Single_Level	3.9702	7.7	3.882	0.088		HydraSleeve	31.1	2.94	53332	34653	6.87
23/05/2024	MW124	0960_MW124_240523	1-6	Single_Level	2.9183	6.0	1.58	1.338	faulty dipper - RWL not used for GW contours	HydraSleeve	28.7		89500	58208	7.01
23/05/2024	MW126	0960_MW126_240523	2-8	Single_Level	4.5088	8.0	3.84	0.669		HydraSleeve	29.2		67638	44012	6.89
23/05/2024	MW127	0960_MW127_240523	2.5-8.5	Single_Level	5.6238	8.5	5.799	-0.175		HydraSleeve	27.9	2.49	67244	43734	6.71
22/05/2024	MW134	0960_MW134_240522	1-5.7	Single_Level	2.5155	5.7	2.13	0.385		HydraSleeve	29.4		34278	22277	7.15
23/05/2024	MW135	0960_MW135_4.5-5.0_240523	4.5-5	Multi_level	2.7828	5.0	2.79	-0.007		Peristaltic Pump	28.8	3.95	36009	23417	7.28
22/05/2024	MW137	0960_MW137_0.8-1.3_240522	0.8-1.3	Multi_level	2.1687	1.3	1.35	0.819		Peristaltic Pump	27	2.71	81317	52850	7.32
		0960_MW137_2.5-3.0_240522	2.5-3.0			3									
		0960_MW137_4.5-5.0_240522	4.5-5.0			5									
		0960_MW137_6.5-7.0_240522	6.5-7.0			7									
23/05/2024	MW138		3-3.5	Multi_level					All casings blocked replacement well installed						
23/05/2024	MW139	0960_MW139_240523	2-7	Single_Level	4.1386	7.0	2.089	2.05	faulty dipper - RWL not used for GW contours	HydraSleeve	28.3	3.65	67076	43607	6.89
23/05/2024	MW140	0960_MW140_1.5-2_240523	1.5-2	Multi_level	2.4916	2.0	1.775	0.717		Peristaltic Pump	26.8	1.64	101061	65723	7.08
22/05/2024	MW141	0960_MW141_1.5-2_240522	1.5-2.0	Multi_level	2.7999	2.0	2.03	0.77		Peristaltic Pump	26.8	2.62	38033	24722	7.36
		0960_MW141_3.0-3.5_240522	3.0-3.5			3.5									
		0960_MW141_5.0-5.5_240522	5.0-5.5			5.5									
		0960_MW141_7.0-7.5_240522	7.0-7.5			7.5									
23/05/2024	MW143	0960_MW143_3.0-3.5_240523	3-3.5	Multi_level	2.8174	3.5	2.859	-0.042		Peristaltic Pump	30.2	2.67	85777	55763	7.04
22/05/2024	MW144	0960_MW144_3.0-3.5_240522	3-3.5	Multi_level	3.0481	3.5	2.72	0.328		Peristaltic Pump	29.5		42347	27526	7.09
22/05/2024	MW145	0960_MW145_3.0-3.5_240522	3-3.5	Multi_level	3.1416	3.5	2.935	0.207		Peristaltic Pump	30.5	2.1	95455	62048	6.96
23/05/2024	MW146	0960_MW146_3.0-3.5_240523	3-3.5	Multi_level	2.7937	3.5	1.573	1.221	faulty dipper - RWL not used for GW contours	Peristaltic Pump	26.5	3.7	89119	57961	7.17
23/05/2024	MW147	0960_MW147_3.0-3.5_240523	3-3.5	Multi_level	2.9123	3.5	2.58	0.332		Peristaltic Pump	27.8	1.5	97770	63551	7.02
22/05/2024	MW148D	0960_MW148D_240522	14-20	Single_Level	3.5778	20.0	2.98	0.598		HydraSleeve	29.5		82347	53545	7.49
22/05/2024	MW148S	0960_MW148S_240522	2-8	Single_Level	3.6851	8.0	3.37	0.315		HydraSleeve	28.3		35364	22987	6.85
22/05/2024	MW151	0960_MW151_240522	2-8	Single_Level	4.0631	8.0	3.74	0.323		HydraSleeve	28.9		10191	6618	7.27
23/05/2024	MW159	0960_MW159_240523	3-9	Single_Level	4.1895	9.0	3.93	0.259		HydraSleeve	29.9		17797	11570	6.81
22/05/2024	MW162	0960_MW162_240522	17-20	Single_Level	6.856	20.0	6.482	0.374		HydraSleeve	29.6	4.37	12829	8339	6.31
22/05/2024	MW163		17-20	Single_Level	6.7808	20.0			Headworks and bore casing damaged. No sample take	HydraSleeve					
22/05/2024	MW164	0960_MW164_240522	17-20	Single_Level	6.7893	20.0	6.123	0.666		HydraSleeve	28.5	4.01	13588	8831	6.94
22/05/2024	MW165	0960_MW165_240522	3-9	Single_Level	6.1043	9.0	5.519	0.585		HydraSleeve	28	4.21	2094	1361	7.9
22/05/2024	MW166	0960_MW166_240522	2.5-8.5	Single_Level	5.7441	8.5	5.152	0.592		HydraSleeve	30.5	2.33	2756	1792	7.64
22/05/2024	MW167	0960_MW167_240522	2.5-8.5	Single_Level	6.2094	8.5	5.619	0.59		HydraSleeve	29.8	4.55	4774	3103	7.23
22/05/2024	MW168	0960_MW168_240522	2.5-8.5	Single_Level	6.1713	8.5	5.48	0.691	Do probe doesn't work	HydraSleeve	24.1		12192	7925	6.93
23/05/2024	MW170	0960_MW170_240523	2.5-8.5	Single_Level	5.639	8.5	5.34	0.299		HydraSleeve	30.9		35479	23063	7
23/05/2024	MW172	0960_MW172_240523	2.5-8.5	Single_Level	5.6193	8.5	5.2	0.419		HydraSleeve	31.8		34718	22568	7
22/05/2024	MW175	0960_MW175_4.0-4.5_240522	4-4.5	Multi_level	4.7916	4.5	4.05	0.742		Peristaltic Pump	27.7		2625	1698	7.16
23/05/2024	MW176	0960_MW176_1.5-2.0_240523	1.5-2.0	Multi_level	2.1274	2.0	1.976	0.151		Peristaltic Pump	31.2	3.13	58149	37766	6.98
		0960_MW176_3.5-4.0_240523	3.5-4.0			4									
		0960_MW176_6.0-6.5_240523	6.0-6.5			6.5									
		0960_MW176_8.5-9.0_240523	8.5-9.0			9									
23/05/2024	MW177	0960_MW177_1.5-2_240523	1.5-2.0	Multi_level	2.2299	2.0	1.739	0.491		Peristaltic Pump	30.6	3.24	92289	59920	6.93
		0960_MW177_3.5-4.0_240523	3.5-4.0			4									
		0960_MW177_6.0-6.5_240523	6.0-6.5			6.5									
		0960_MW177_8.5-9.0_240523	8.5-9.0			9									
	MW178		1.5-2.0	Multi_level		2.5			Dry						
23/05/2024		0960_MW178_4.0-4.5_240523	4.0-4.5		2.1614	4.5	1.952	0.209		HydraSleeve	28.6	2.31	90605	58899	7.01
		0960_MW178_6.0-6.5_240523	6.0-6.5			7.5									
		0960_MW178_8.5-9.0_240523	8.5-9.0			9.5									
22/05/2024	MW179	0960_MW179_1.0-1.5_240522	1.0-1.5	Multi_level	2.222	1.5	1.255	0.967		Peristaltic Pump	26.9	1.99	76778	51875	7.39
		0960_MW179_3.2-3.7_240522	3.2-3.7			3.7									
		0960_MW179_5.9-6.4_240522	5.9-6.4			6.4									
		0960_MW179_8.5-9.0_240522	8.5-9.0			9									
23/05/2024	MW180	0960_MW180_1-1.5_240523	1-1.5	Multi_level	1.9179	1.5	1.27	0.648		Peristaltic Pump	26	3.27	69766	45356	7.47
23/05/2024	MW181	0960_MW181_1.5-2_240523	1.5-2	Multi_level	2.2333	2.0	1.88	0.353		Peristaltic Pump	25.4	2.57	106823	69440	6.98
22/05/2024	MW211	0960_MW211_240522	NA	Single_Level	6.3409	NA	5.649	0.692		HydraSleeve	27.9	6.18	1898	1233	8.05
22/05/2024	MW233	0960_MW233_240522	4-7	Single_Level	6.262	7.0	5.756	0.506		HydraSleeve	31	2.09	12212	7938	7.3
22/05/2024	MW238	0960_MW238_240522	3-6	Single_Level	3.98	6.0	3.68	0.3		HydraSleeve	28.6		6217	4042	7.73
23/05/2024	OTH103	0960_OTH103_240523								Direct into bottle	24	4.18	56550	36792	7.96
22/05/2024	OTH106	0960_OTH106_240522								Direct into bottle	21.5	4.24	57215	37198	7.85
22/05/2024	OTH107	0960_OTH107_240522								Direct into bottle	21.4	4.67	57699	37503	7.87
23/05/2024	OTH129	0960_OTH129_240523								Direct into bottle	22.7	4.18	56385	36653	7.97
22/05/2024	OTH132	0960_OTH132_240522								Direct into bottle	24.9		60111	39061	7.84
22/05/2024	OTH134	0960_OTH134_240522								Direct into bottle	24.7		59667	38785	7.76
23/05/2024	POT103								Tap broken						
23/05/2024	POT105	0960_POT105_240523								Tap	29.9		1112	723	6.71
23/05/2024	POT106	0960_POT106_240523								Tap	30.1		1195	778	6.76
23/05/2024	POT107	0960_POT107_240523							Tap outside building	Tap	26.5	4.32	1940	1258	7.2
23/05/2024	POT108								No tap visible at location						
23/05/2024	POT109	0960_POT109_240523								Tap	20.8		595	3864	7.35
22/05/2024	POT110	0960_POT110_240522								Tap	27.6	3.09	1373	891	7.11

Monitoring Site ID	R1 - Eh (mV)	R2 - Temp (°C)	R2 - DO (mg/L)	R2 - EC (us/Cm)	R2 - TDS (mg/L)	R2 - pH	R2 - Eh (mV)	R3 - Temp (°C)	R3 - DO (mg/L)	R3 - EC (us/Cm)	R3 - TDS (mg/L)	R3 - pH	R3 - Eh (mV)	QC Dup Sample #	Odour Comments	colour
MW018	77.3															
MW021	88.1													QC130/230		
MW102	127.7															Brown
MW103	153															Brown
MW104	-73.2															Brown
MW105	-208.6															
MW112	114.7															
MW113	107.9															
MW114	111.2															
MW115	137.8															
MW122	112.8													QC127/227		
MW124	196.4															Brown
MW126	196.5															Brown
MW127	169.9															
MW134	-62.7															Brown
MW135	65.9															
MW137	92.8	27.5	3.2	81518	52985	7.3	120.2	27.5	3.19	81509	52985	7.3	119.9	QC125, QC225		Cloudy, Clear
MW138																
MW139	129.6															
MW140	83.4	27.4	2.21	103108	67062	7.06	87.2	27.2	1.99	103150	67052	7.07	88			Cloudy, Brown
MW141	119	26.8	2.61	38042	24725	7.37	118.3	26.8	2.61	3045	24729	7.37	117.7			Cloudy, Clear
MW143	152.9															
MW144	-16.4															Brown
MW145	109.1	30.5	2.14	96708	62870	6.95	104.2	30.5	2.11	96770	62908	6.95	104.1			Cloudy, Brown
MW146	150.8															
MW147	26.6	29.5	0.48	98693	64144	6.86	-59.3	29.4	0.43	98617	64095	6.86	-58.7			Cloudy, Brown
MW148D	22.1															Clear
MW148S	-140.9													QC126/226		Clear
MW151	-97.3															Brown
MW159	-113.7															Brown
MW162	113.4															
MW163																
MW164	106.3													QC131/231		
MW165	80.3															
MW166	89.8															
MW167	106.1															
MW168	-99.3													QC119/219		Brown
MW170	143.5															Brown
MW172	100.3															Brown
MW175	183.5															Brown
MW176	-39.8															
MW177	-61.3															
MW178																
	127.5													QC134/234		
MW179	13.1	27.3	1.53	85878	55819	7.09	42.7	27.3	1.51	85906	55840	7.09	43.3			Clear, Cloudy
MW180	99	25.8	2.69	87440	56850	7.15	102.9	25.7	2.72	87477	56863	7.15	102.7			Cloudy, Brown
MW181	91.1	24.8	2.66	106900	69524	6.98	91.2	24.7	2.68	107037	69591	6.99	91.2			Cloudy, Brown
MW211	62															
MW233	89															
MW238	-61.6													QC129/229		Brown
OTH103	108.4															Cloudy, Clear
OTH106	102.2															Clear
OTH107	144													QC132, QC232		Clear
OTH129	168.5															Clear
OTH132	-57.9															Clear
OTH134	92.5															Clear
POT103																
POT105	85.2															Clear
POT106	164															Clear
POT107	466.9															Clear
POT108																
POT109	112.1															Clear
POT110	66.8															

Monitoring Location	Date	Sample ID	Time	Sampling Method	Sample Depth (m)	WaterBody Depth (m)	Flow Rate	SW Site Comments ?	Temp (°C)	DO (mg/L)	EC (us/Cm)	TDS (mg/L)	pH	Eh (mV)	Water Colour
SW001	23/05/2024	0960_SW001_240523	11:32	Direct_into_Bottle	0.1		0.9 Slow		20.8	4.09	61279	39834	7.75	96.4	Clear
SW108	23/05/2024		12:53					Dry							
SW113	22/05/2024		08:51					Dry							
SW114	22/05/2024		08:48					Dry							
SW121	22/05/2024		14:59					Dry							
SW122	22/05/2024		08:22					Dry							
SW123	22/05/2024		12:10					Dry							
SW124	22/05/2024		15:38					Dry							
SW125	22/05/2024		15:43					Dry							
SW157	23/05/2024		11:54					Dry							
SW166	23/05/2024		12:21					Dry							
SW168	23/05/2024		12:43					Dry							
SW170	23/05/2024		12:54					Dry							
SW174	23/05/2024		14:22					Dry							
SW176	23/05/2024		13:56					Dry							
SW189	22/05/2024		13:31					Dry							
SW190	22/05/2024		14:15	Direct_into_Bottle				Dry							
SW192	22/05/2024	0960_SW192_240522	14:57	Direct_into_Bottle	0.1		0.3 Slow	QC133/233	27.8		59815	38885	8.04	120.1	Clear
SW193	22/05/2024	0960_SW193_240522	15:30	Direct_into_Bottle	0.1		0.5 Slow		26.4		62531	40643	8.22	111.9	Clear
SW198	22/05/2024		08:47					DRY							
SW199	23/05/2024		08:00					Dry							
SW200	23/05/2024		08:05					Dry							
SW205	22/05/2024	0960_SW205_240522	14:36	Direct_into_Bottle	0.1		0.2 Slow		26.8	3.77	70710	45997	7.94	127	Clear
SW207	22/05/2024	0960_SW207_240522	12:05	Direct_into_Bottle	0.15		1.3 Medium		24.8	3.26	58902	38277	7.95	98.3	Clear
SW208	22/05/2024	0960_SW208_240522	14:12	Direct_into_Bottle	0.15		1.4 Medium		22.7	3.81	57045	37085	7.93	98.3	Clear
SW209	22/05/2024	0960_SW209_240522	11:07	Direct_into_Bottle	0.1		0.2 Slow		23.7	3.28	58450	37993	7.86	103.5	Clear
SW210	22/05/2024	0960_SW210_240522	09:14	Direct_into_Bottle	0.1		0.35 Slow	QC124, QC224	19.2	2.2	66636	43310	7.74	113.3	Clear
SW211	23/05/2024	0960_SW211_240523	11:57	Direct_into_Bottle	0.1		0.2 Slow		21.7	3.98	74030	48131	7.97	85.6	Clear
SW219	23/05/2024		11:14					Dry							
SW227	22/05/2024		08:16					DRY							
SW231	22/05/2024		11:58					Dry							
SW234	22/05/2024		11:42					Dry							
SW235	23/05/2024		11:19					Dry							
SW243	23/05/2024		14:38					Dry							
SW265	23/05/2024		11:59					Dry							
SW277	22/05/2024		15:45					Dry							
SW278	22/05/2024		15:48					Dry							
SW279	23/05/2024		13:00					Dry							
SW288	23/05/2024		09:26					Dry							
SW291	22/05/2024		08:29					DRY							
SW292	22/05/2024		08:37					DRY							
SW293	22/05/2024		08:41					DRY							
SW298	22/05/2024		16:05					DRY							
SW300	23/05/2024	0960_SW300_240523	11:46	Direct_into_Bottle	0.1		0.35 Slow		21.1	4.43	73065	47495	7.98	94.6	Clear
SW301	22/05/2024	0960_SW301_240522	14:54	Direct_into_Bottle	0.1		0.15 Slow		25.2	3.74	67680	43996	8.01	99.6	Clear
SW302	22/05/2024	0960_SW302_240522	10:44	Direct_into_Bottle	0.15		0.55 Slow		21.4	3.36	66592	43277	7.8	89.7	Clear
SW303	23/05/2024	0960_SW303_240523	11:18	Direct_into_Bottle	0.15		1.3 Slow		22.8	3.78	57630	37461	7.89	95.6	Clear
SW304	23/05/2024	0960_SW304_240523	11:03	Direct_into_Bottle	0.15		0.3 Slow	QC135, QC235	23.1	3.82	58040	37739	7.82	126.6	Clear
SW305	22/05/2024	0960_SW305_240522	11:50	Direct_into_Bottle	0.1		0.3 Slow		24.9	3.17	57086	37112	7.93	75.7	Clear

Analysed for trace PFAS

Monitoring Location	Date	Sample ID	Depth of Sediment Sampling (m)	Sampling Method	Sample Condition	Sample Description	Comments
SS227	22/05/2024	0960_SS227_240522	0.1	Direct_into_Bottle	Dry	SAND, fine grained, red/brown	
SS291	22/05/2024	0960_SS291_240522	0.1	Direct_into_Bottle	Wet	Silty SAND, fine grained, red/brown	QC120, QC220
SS292	22/05/2024	0960_SS292_240522	0.1	Direct_into_Bottle	Dry	Silty SAND, fine grained, red/brown	
SS293	22/05/2024	0960_SS293_240522	0.1	Direct_into_Bottle	Dry	Silty SAND, fine grained, red/brown	
SS198	22/05/2024	0960_SS198_240522	0.1	Direct_into_Bottle	Dry	Sandy CLAY, med plasticity, red/brown, dry	
SD210	22/05/2024	0960_SD210_240522	0.15	Direct_into_Bottle	Wet	CLAY, grey, med plasticity, wet	QC123, QC223
SD302	22/05/2024	0960_SD302_240522	0.1	Direct_into_Bottle	Wet	CLAY, grey/brown, wet	
SD209	22/05/2024	0960_SD209_240522	0.1	Direct_into_Bottle	Wet	silty CLAY, black grey, wet	QC128, QC228
SD305	22/05/2024	0960_SD305_240522	0.1	Direct_into_Bottle	Wet	sandy CLAY, grey brown with shells, wet	
SD207	22/05/2024	0960_SD207_240522	0.15	Direct_into_Bottle	Wet	Sandy CLAY, dark brown, wet	
SD208	22/05/2024	0960_SD208_240522	0.15	Direct_into_Bottle	Wet	Gravelly SAND, fine to med course, yellow brown, with shells	
SD205	22/05/2024	0960_SD205_240522	0.1	Direct_into_Bottle	Wet	Silty CLAY, dark brown, wet	
SS301	22/05/2024	0960_SS301_240522	0.1	Direct_into_Bottle	Wet	CLAY, very soft, dark brown	
SS298	22/05/2024	0960_SS298_240522	0.1	Direct_into_Bottle	Dry	Clayey SAND, fine to med grained, red brown	
SS122	22/05/2024	0960_SS122_240522	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace silt, trace organics, trace gravels	QC121/221
SS114	22/05/2024	0960_SS114_240522	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, med plasticity, trace gravels	QC122/222
SS113	22/05/2024	0960_SS113_240522	0.1	Direct_into_Bottle	Dry	Clay, fine grained, orange brown, trace organics, trace fines	
SS234	22/05/2024	0960_SS234_240522	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels, trace organics	
SS231	22/05/2024	0960_SS231_240522	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace fines, trace organics	
SS189	22/05/2024	0960_SS189_240522	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace organics, trace fines	
SS190	22/05/2024	0960_SS190_240522	0.1	Direct_into_Bottle	Dry	Silty Clay, fine to med grained, brown, trace organics, trace shells, moist	
SS192	22/05/2024	0960_SS192_240522	0.1	Direct_into_Bottle	Wet	Sand, fine to med grained, beige, trace shells, trace gravels	
SS193	22/05/2024	0960_SS193_240522	0.1	Direct_into_Bottle	Wet	Clayey silty sand, fine to med grained, beige to brown, trace shells, trace fines	
SS123	22/05/2024	0960_SS123_240522	0.2	Direct_into_Bottle	Dry	Red orange	
SS121	22/05/2024	0960_SS121_240522	0.1	Direct_into_Bottle	Dry	Red orange	
SS124	22/05/2024	0960_SS124_240522	0.1	Direct_into_Bottle	Dry	Red orange	
SS125	22/05/2024	0960_SS125_240522	0.1	Direct_into_Bottle	Dry	Red orange	
SS277	22/05/2024	0960_SS277_240522	0.1	Direct_into_Bottle	Dry	Red orange	
SS278	22/05/2024	0960_SS278_240522	0.1	Direct_into_Bottle	Dry	Red orange	
SD304	23/05/2024	0960_SD304_240523	0.15	Direct_into_Bottle	Wet	Sandy CLAY, grey brown	
SD303	23/05/2024	0960_SD303_240523	0.1	Direct_into_Bottle	Wet	Sand CLAY, grey and dark brown	
SD301	23/05/2024	0960_SD301_240523	0.1	Direct_into_Bottle	Wet	CLAY, grey and dark brown, very soft	
SD300	23/05/2024	0960_SD300_240523	0.1	Direct_into_Bottle	Wet	CLAY, grey and dark brown, very soft	
SD211	23/05/2024	0960_SD211_240523	0.1	Direct_into_Bottle	Wet	CLAY, grey and dark brown, very soft	
SD200	23/05/2024	0960_SD200_240523	0.1	Direct_into_Bottle	Dry	Red orange	
SS288	23/05/2024	0960_SS288_240523	0.1	Direct_into_Bottle	Dry	Red orange	
SD199	23/05/2024	0960_SD199_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, med plasticity, trace gravels	
SS176	23/05/2024	0960_SS176_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels	
SS279	23/05/2024	0960_SS279_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels, trace fines	
SS174	23/05/2024	0960_SS174_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels	
SS170	23/05/2024	0960_SS170_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace organics, trace gravels	
SS243	23/05/2024	0960_SS243_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace organics, trace gravels	
SS108	23/05/2024	0960_SS108_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace fines, trace gravels trace gravels	
SS168	23/05/2024	0960_SS168_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels	
SS166	23/05/2024	0960_SS166_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels, trace organics	
SS265	23/05/2024	0960_SS265_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels, trace fines	
SS157	23/05/2024	0960_SS157_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels	
SS235	23/05/2024	0960_SS235_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels	
SD219	23/05/2024	0960_SD219_240523	0.1	Direct_into_Bottle	Dry	Clay, fine grained, brown orange, trace gravels	



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: [REDACTED]
Contact: [REDACTED]

Manufacturer: YSI
Instrument: Professional Plus with Quatro cable
Serial #: 21H104234
Cable length: 1m 23G100019

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	0.0.78
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	176.90 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 59.31
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 8 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	polarographic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (17A100010)	Check Temp NATA	Room Temp	22.3	-0.2	°C	NA	22.1	°C
pH (23F)	pH 7.00	392512	7.01	-15.90	mV	7.07	7.01	pH
pH (23F)	pH 4.00	394799	4.00	161.00	mV	4.02	4.00	pH
Conductivity (17A100010)	2764 µS/cm at 25°C	23/0602	2764	GLP	4.97	2791	2764	µS/cm
ORP (23E)	Zobell A & B	23/3006	235	235	mV	225	227.2	mV
Zero DO (23G100436)	NaSO3 in distilled water	10175	0.0	NA	NA	0.6	0.0	%
100% DO (23G100436)	100% Air Saturation	Air	100.0	5.5	uA	105.6	100.0	%

Calibrated by: [REDACTED]

Calibration Date: 20-Apr-24
Next Due: 17-Oct-24



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: XXXXXXXXXX
Contact: XXXXXXXXXX

Manufacturer: YSI
Instrument: Professional Plus with Quatro cable
Serial #: 23G103457
Cable length: 1m (23G100259)

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	4.0.0
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	175.00 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.63
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 8 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant 5.0 ± 1.0 in GLP file		✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µS/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	polarographic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature (20A100065)	Check Temp NATA	Room Temp	22.6	0	°C	NA	22.6	°C
pH (22M)	pH 7.00	392512	7.01	-15.20	mV	7.13	7.01	pH
pH (22M)	pH 4.00	394799	4.00	159.80	mV	4.1	4.00	pH
Conductivity (20A100065)	2764 µS/cm at 25°C	24/0602	2764	GLP	5.01	2699	2764	µS/cm
ORP (23A)	Zobell A & B	23/3006	234	234	mV	227	226.5	mV
Zero DO (23J100061)	NaSO3 in distilled water	10175	0.0	NA	NA	0	0.0	%
100% DO (23J100061)	100% Air Saturation	Air	100.0	5.4	uA	94.6	100.0	%

Calibrated by: XXXXXXXXXX

Calibration Date: 03-May-24
Next Due: 30-Oct-24



Calibration Report

Multi-Parameter Water Quality Instrument

Customer: XXXXXXXXXX
Contact: XXXXXXXXXX

Manufacturer: YSI
Instrument: Professional Plus with Quatro cable
Serial #: 21E103540
Cable length: 1m 15E100278

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used.
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	0.0.78
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	174.40 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.54
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 8 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant	5.0 ± 1.0 in GLP file	✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µs/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature(15E100002)	Check Temp NATA	Room Temp	21.8	-0.2	°C	NA	21.6	°C
pH (22M)	pH 7.00	392512	7.01	-21.60	mV	7.03	7.01	pH
pH (22M)	pH 4.00	394799	4.00	152.80	mV	4.04	4.00	pH
Conductivity (15E100002)	2764 µs/cm at 25°C	24/0602	2764	GLP	4.77	2923	2764	µs/cm
ORP (210614SIA605102)	Zobell A & B	23/3006	236	236	mV	226.7	228	mV
Zero DO (21J100574)	NaSO3 in distilled water	10175	0.0	NA	NA	1.9	0.0	%
100% DO (21J100574)	100% Air Saturation	Air	100.0	5.6	uA	103.1	100.0	%

Calibrated by: XXXXXXXXXX

Calibration Date: 23-Apr-24
Next Due: 20-Oct-24



Calibration Report

Multi-Parameter Water Quality Instrument

Customer:

Contact:

Manufacturer: YSI

Instrument: Professional Plus with Quatro cable

Serial #: 21G105322

Cable length: 1m 21F100351

Item	Test	Pass	Comments
Battery	2 x Alkaline C-cells	✓	Voltage reading above 2.9V
	Battery Saver	✓	Automatically turns off after 30 minutes if not used
Connections	Condition	✓	Good, clean
Cable	Condition	✓	Clean, no tears
Display	Operation	✓	
Firmware	Version	✓	0.0.78
Keypad	Operational	✓	
Display	Screen	✓	
Unit	Condition, seals and O-rings	✓	
Monitor housing	Condition	✓	
pH			
Condition		✓	Good, clean
pH millivolts for pH7 calibration range	0 mV ± 50 mV	✓	
pH 4 mV range + 165 to + 180 from 7 buffer mV value		✓	174.60 mV
pH slope		✓	55 to 60 mV/pH, ideal 59mV 58.61
Response time < 90 seconds		✓	
Calibrated and conforms to manufacturer's specifications		✓	
ORP			
Condition		✓	Good, clean
Response time < 90 seconds		✓	
within ± 80mv of reference Zobell Reading		✓	
Calibrated and conforms to manufacturer's specifications		✓	variance range ± 20mV 9 mV
Conductivity			
Condition		✓	Good, clean
Temperature		✓	°C
Conductivity cell constant 5.0 ± 1.0 in GLP file		✓	
Clean sensor reads less than 3 uS/cm in dry air		✓	
Calibrated and conforms to manufacturer's specifications		✓	µs/cm
Dissolved Oxygen			
Condition		✓	Good, clean
DO sensor in use		✓	Galvanic
1.25 mil PE membrane (yellow membrane):		✓	
DO Sensor Value		✓	(min 4.31 uA - max 8.00 uA) Avg 6.15 uA
Calibrated and conforms to manufacturer's specifications		✓	ppm

This is to certify that the above instrument has been calibrated to the following specifications:

Parameter	Standards	Reference	Calibration Point	Span	Units	Instrument Readings		
						Before	After	Units
Temperature	Check Temp NATA	Room Temp	21.6	-0.2	°C	NA	21.4	°C
pH (23J)	pH 7.00	392512	7.01	-11.50	mV	6.99	7.01	pH
pH (23J)	pH 4.00	394799	4.00	163.10	mV	3.97	4.00	pH
Conductivity (21G100029)	2764 µs/cm at 25°C	24/0602	2764	GLP	5.20	2560	2764	µs/cm
ORP (210715SIA605102)	Zobell A & B	23/3006	237	237	mV	223.5	228.3	mV
Zero DO (21G100131)	NaSO3 in distilled water	10175	0.0	NA	NA	1.5	0.0	%
100% DO (21G100131)	100% Air Saturation	Air	100.0	6.2	uA	125.4	100.0	%

Calibrated by:

Calibration Date: 04-May-24

Next Due: 31-Oct-24

Date of Bump Test	Site ID	Unit Brand/Model	Ambient Air Oxygen Calibration	Zero Oxygen Solution Calibration	Standard Concentrations	Ambient Temperature (°C)	Bump Test Reading	Bump Test Readings within ±5%?	Comment	Test by (Name)	(Signature)
22/5/24	0960	YSI #214104234	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N 2760 µS/cm	26.8	pH 4.00: 4.14 pH 7.00: 6.99 EC: 2804	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N	Pass		
22/5/24	0960	YSI #216105322	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N 2760 µS/cm	26.6	pH 4.00: 4.2 pH 7.00: 7.01 EC: 2914	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N	NO pipe broken		
22/5/24	0960	YSI #236103457	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N 2760 µS/cm	26.7	pH 4.00: 4.18 pH 7.00: 6.97 EC: 2744	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N	Pass		
		YSI #	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			
		YSI #	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1,413µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150µS/cm) Y / N			

Date of Bump Test	Site ID	Unit Brand/ Model	Ambient Air Oxygen Calibration	Zero % Oxygen Solution Calibration	Standard Concentrations	Ambient Temperature (°C)	Bump Test Reading	Bump Test Readings within ±5%?	Comment	Test by (Name)	(Signature)
21/05/24	0083-	YSI #216105322	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1.413 µS/cm Y / N 2760 µS/cm Y / N	27.9	pH 4.00: 4.14 pH 7.00: 6.95 EC: 2783	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150 µS/cm) ☒ Y / N	Pass		
21/05/24	0083-	YSI #216105322	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1.413 µS/cm Y / N 2760 µS/cm Y / N	27.7	pH 4.00: 4.18 pH 7.00: 7.00 EC: 2785	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150 µS/cm) ☒ Y / N	Do probe not working		
21/05/24	0083-	YSI #236103457	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1.413 µS/cm Y / N 2760 µS/cm Y / N	27.8	pH 4.00: 4.15 pH 7.00: 7.02 EC: 2799	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150 µS/cm) ☒ Y / N	Tick		
22/5/24	0083-	YSI #236103457	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1.413 µS/cm Y / N 2760 µS/cm Y / N	22.5	pH 4.00: 4.18 pH 7.00: 6.95 Temp: 26.3 EC: 2690	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150 µS/cm) ☒ Y / N	Pass		
22/5/24	0083-	YSI #216104334	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1.413 µS/cm Y / N 2760 µS/cm Y / N	22.5	pH 4.00: 4.19 pH 7.00: 7.00 Temp: 25.4 EC: 2715	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150 µS/cm) ☒ Y / N	Pass		
22/5/24	0083-	YSI #216105322	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1.413 µS/cm Y / N 2760 µS/cm Y / N	20.4	pH 4.00: 4.14 pH 7.00: 7.01 Temp: 25.2 EC: 2784	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150 µS/cm) ☒ Y / N	Do probe not work PASS working		
23/5/24	0083	YSI #216105322	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1.413 µS/cm Y / N 2760 µS/cm Y / N	20.8	pH 4.00: 4.20 pH 7.00: 7.02 Temp: 27.30 EC: 2730	pH 4.00: (± pH 0.2) ☒ Y / N pH 7.00: (± pH 0.2) ☒ Y / N EC: (± 150 µS/cm) ☒ Y / N	Pass		
		YSI #	100% Saturation? ☒ Y	0% Calibration? ☒ Y	pH 4.00 Y / N pH 7.00 Y / N EC: 1.413 µS/cm Y / N		pH 4.00: pH 7.00: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 7.00: (± pH 0.2) Y / N EC: (± 150 µS/cm) Y / N			

APPENDIX

E

DATA QUALITY REVIEW



now



Data Quality Review PFAS Ongoing Monitoring Plan May 2024 Monitoring Event

This appendix reviews the Quality Assurance (QA) and Quality Control (QC) documentation. Quality assurance encompasses the actions, procedures, checks and decisions undertaken to ensure sample integrity and representativeness, and the reliability and accuracy of analysis results. The QA documentation should also include an indication of the Data Quality Objectives sought in relation to each significant action, test or process involved in the assessment.

QC activities measure the effectiveness of the QA procedures by undertaking testing, and then comparing results to previously established objectives. QC work will include the internal laboratory testing as well as results of QC samples submitted such as trip blanks and duplicates. The quality of the information and/or data is deemed satisfactory when the QC results demonstrate that agreed objectives have been met.

QA/QC Aspects	Evidence & Evaluation
QA Documentation	
Project Quality Plan/Work Plan and Data Quality Objectives	The field investigation was carried out on the 22nd and 23rd May 2024 and is generally in accordance with the proposed scope of work, as documented in the SAQP (PFAS OMP SAQP RAAF Base Learmonth, Rev.12, Cardno, May 2024) issued to the client and in general compliance with Standards Australia 1998. AS/NZ 5667:1998 <i>Water quality – sampling</i>, NEPM <i>National Environment Protection (Assessment of Site Contamination) Measure</i> and PFAS NEMP 2.0. A quality control program was implemented during the Investigation and the quality assurance procedures used have been reiterated in the report (PFAS OMP May 2024 Factual Report). In addition, a safety, health and environment work method statement (SHEWMS) was also prepared. The Data Quality Objectives were expressed in terms of the purpose of the assessment and the relevant assessment criteria.
Data Representativeness	
Use of Composites	No Composites were used during the investigation
Holding Times	Chain of custody and laboratory reports provide evidence of holding times. Holding times were generally in compliance with required timeframes. The following exceptions were noted: Dissolved Major Cations (EP2407043, EP2407045, EP2407047, EP2407048, EP2407055, EP2407056) – 2 days overdue. The holding time exceedance for a minority of results are likely due to the remoteness of the site or laboratory workload. They are not considered to have adversely impacted the reliability of the results obtained, or the conclusions drawn from this assessment. The samples were chilled in eskies with ice and placed into fridges upon receipt by the laboratory.
Verification of field procedures	The methodology conducted during this investigation is documented in the body of the report and was in general conformance with the SAQP. Experienced field scientists familiar with the sampling procedures were involved in the field works. Non-disposable equipment was decontaminated between sample locations.
Laboratory Reports	The following laboratory reports were considered for this data quality review: - ALS reports: EP2407043, EP2407044, EP2407045, EP2407046, EP2407047, EP2407048, EP2407055, EP2407056, EP2407057, EP2407103, EP2407105, EP2407107, EP2407161, EP2407163, EP2407164, EP2407165. - Eurofins ARL report: 1101229

QA/QC Aspects

Evidence & Evaluation

Data Precision & Accuracy

QC sample Frequency

QC sample type	SAQP required frequency	Sample Collected
Blind duplicate	1 in 10 primary samples (10%)	9 for 75 groundwater samples (12%) 3 in 15 surface water samples (20%) 5 in 49 sediment samples (10.2%)
Interlab duplicate	1 in 10 primary samples (10%)	9 for 75 groundwater samples (12%) 3 in 15 surface water samples (20%) 5 in 49 sediment samples (10.2%)
Rinsate	1 per field personnel per day	6 for 2 day (3 field personnel) (100%)
Field Blank	1 per field personnel per day	6 for 2 day (3 field personnel) (100%)

The required QC frequency was achieved for all media sampled.

RPD Acceptance criteria

Magnitude of Results	Acceptable RPD range
< 10 x LOR	No limits
10 – 20 LOR	0% - 50%
> 20 x LOR	0% - 20%

QC Testing –
Blind Duplicates
(Primary Lab)

Groundwater

- Primary Groundwater Samples Analysed: 75
- Blind Duplicate Samples Analysed: 9

All RPDs were within acceptance criteria with the following exceptions:

- QC126/MW148S (PFBS – 32%, PFPeS – 29%, PFHxS – 35%, PFHpS – 21%, PFOS – 41%, PFPeA – 35%, PFHxA – 32%, PFPeA – 26%).
- QC130/MW021 (PFHxS – 26%, PFOS – 113%).
- QC131/MW164 (PFBS – 183%, PFPeS – 185%, PFHxS – 180%, PFHpS – 182%, PFOS – 140%, PFPeA – 174%, PFHxA – 182%, PFHpA – 171%, PFOA – 183%)

These exceedances are likely due to the low concentrations of analytes under review or the heterogeneity of the samples. All these results were within historical range. This is not considered to have impacted the validity of the interpretation drawn upon this dataset. The most conservative value (i.e. higher concentration) was adopted for the assessment.

Surface water

- Primary surface water Samples Analysed: 15
- Blind Duplicate Samples Analysed: 3

All RPDs were within acceptance criteria.

Sediment

- Primary Sediment Samples Analysed: 49
- Blind Duplicate Samples Analysed: 5

All RPDs were within acceptance criteria with the following exceptions:

- QC122/SS114 (PFOS – 24%).

This minor exceedance is likely due to the low concentrations of analytes under review or the heterogeneity of the samples. This is not considered to have impacted

QA/QC Aspects	Evidence & Evaluation
QC Testing – Interlab Duplicates (Secondary Lab)	the validity of the interpretation drawn upon this dataset. The most conservative value (i.e. higher concentration) was adopted for the assessment. Groundwater - Primary Groundwater Samples Analysed: 75 - Interlab Duplicate Samples Analysed: 9 All RPDs were within acceptance criteria with the following exceptions: - QC219/MW168 (PFPeS – 71%, PFHxS – 70%, PFOS – 54%, PFHxA – 55%). - QC226/MW148S (PFPeS – 37%, PFHxP – 32%, PFOS – 39%, PFPeA – 22%, PFHpA – 34%, PFOA – 50%). - QC229/MW238 (PFBS – 54%, PFPeS – 76%, PFHxS – 54%, PFOS – 48%, PFHxA – 35%, PFOA – 65%). - QC230/MW021 (PFBS – 78%, PFPeS – 82%, PFHxS – 84%, PFOS – 137%, PFHxA – 55%). - QC231/MW164 (PFBS – 183%, PFPeS – 185%, PFHxS – 180%, PFHpS – 182%, PFOS – 140%, PFPeA – 174%, PFHxA – 182%, PFOA – 183%). These exceedances are likely due the difference of methodologies between the primary and secondary laboratories and the low concentrations of analytes under review. The most conservative value (i.e. higher concentration) was adopted for the assessment. This is not considered to have impacted the validity of the interpretation drawn upon this dataset. Surface water - Primary surface water Samples Analysed: 15 - Interlab Duplicate Samples Analysed: 3 All RPDs were within acceptance criteria. Sediment - Primary sediment Samples Analysed: 49 - Interlab Duplicate Samples Analysed: 5 All RPDs were within acceptance criteria with the following exceptions: - QC220/SS291 (PFOS – 88%). - QC221/SS122 (PFOS – 25%, PFDS – 54%). - QC222/SS114 (PFOS – 66%) These exceedances are likely due the difference of methodologies between the primary and secondary laboratories and the low concentrations of analytes under review or the heterogeneity of the samples. This is not considered to have impacted the validity of the interpretation drawn upon this dataset. The most conservative value (i.e. higher concentration) was adopted for the assessment.
	Field Blanks Field Blanks were collected at a rate of one per fieldwork day. All field blank samples tested reported analytes below the laboratory limit of reporting.
	Evidence of the laboratories internal QC testing is present and complete in the reports. ALS (Primary) performed internal QC with adequate testing and satisfactory results for method blank, matrix spikes, laboratory control samples and laboratory duplicates. All Method Blank results were within acceptable range. All Matrix Spikes generally reported recoveries within the acceptance range with the exception of the following: - EP2407043, EP2407045, EP2407047, EP2407048: - Samples ID: SW302, MW168, Anonymous: Chloride and Sulfate matrix spike recoveries not determined due to the background concentrations exceeding 4x spike level. - Sample ID: Anonymous, MW105: PFHxS and 10:2 FTS matrix spike recoveries not determined due to the background concentrations exceeding 4x spike level. - EP2407055, EP2407056, EP2407103, EP2407105:

QA/QC Aspects	Evidence & Evaluation
	- Samples ID: MW122, Anonymous: Chloride and Sulfate matrix spike recoveries not determined due to the background concentrations exceeding 4x spike level. ▪ EP2407046, EP2407057: - Samples ID: QC122, Anonymous: PFOS matrix spike recovery not determined due to the background concentrations exceeding 4x spike level. The following laboratory duplicate outlier was reported: ▪ EP2407045, EP2407047, EP2407055: - Samples ID: MW151, Anonymous: PFOS RPD exceeds LOR based limits. The following quality control frequency outliers were reported: ▪ EP2407055, EP2407056: Laboratory Duplicates: PFAS by LCMSMS, expected frequency 10% not achieved. ▪ EP2407043, EP2407047, EP2407048, EP2407103, EP2407105, EP2407163, EP2407165: - Laboratory Duplicates: PFAS by LCMSMS, expected frequency 10% not achieved. - Matrix Spike: PFAS by LCMSMS, expected frequency 5% not achieved. The above outliers/exceptions are not considered to affect the reliability of the dataset.
Laboratory Method Detection Limit	Laboratory reports indicate the method detection limits were generally lower than the respective assessment criteria.
NATA endorsement of laboratory reports	Laboratory reports were stamped with the NATA endorsement stamp and signature. ALS Accreditation No. 825 Eurofins ARL Accreditation No. 1261
Calibration of Field Equipment	All equipment used during the investigation was calibrated by the supplier prior to use and daily readings of reference solutions (bump tests) were completed. The equipment calibration certificates, and daily field bump test records are provided in Appendix D.
Decontamination and Equipment Blanks	Rinsate blanks were collected at a rate of one per day per sampler when reusable equipment was used. All rinsate samples tested reported analytes concentrations below the laboratory LORs.
Data Comparability	
Standard Procedures	Fieldwork procedures are detailed in the SAQP and reports and are comparable for each phase of Investigation.
Qualified Personnel	Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.
Sample Integrity	Field Chain of Custody/Laboratory request forms can be found in Appendix C.
Data Completeness	
Completeness of test program	The scope of work undertaken was generally consistent with the SAQP.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection process and therefore, the data set used as the basis for groundwater, seepage water, surface water and sediment investigation is considered valid and complete.