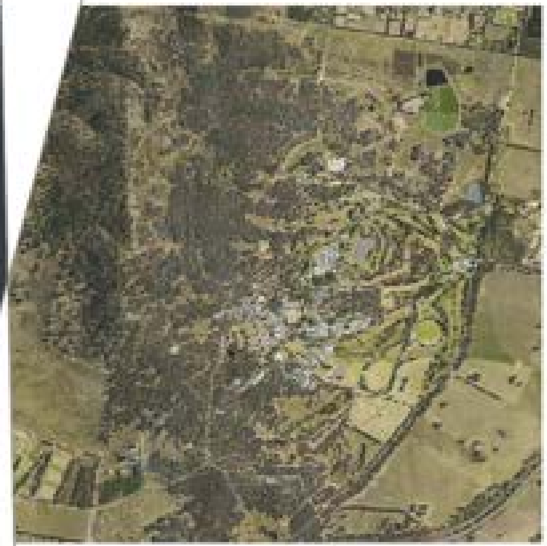
PFAS Ongoing Monitoring Report

July 2022 to June 2023

Blamey Barracks Kapooka OMP

DEF19008



Prepared for
Department of Defence

27 June 2024

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Document Information

Prepared for	Department of Defence
Project Name	Blamey Barracks Kapooka OMP
File Reference	OMP002_Kapooka_Ongoing_Monitoring_Report_2023_Rev0.docx
Job Reference	DEF19008
Date	27 June 2024
Version Number	0
Effective Date	27/06/2024

Author(s):

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[redacted] on behalf of

[redacted]

Approved By:

[redacted]

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
00	16/01/2024	Internal Draft	[redacted]	[redacted]
A	09/02/2024	External Draft	[redacted]	[redacted]
B	01/03/2024	Revised Draft Addressing LC Comments	[redacted]	[redacted]
C	01/04/2024	Revised Draft Addressing Defence Comments	[redacted]	[redacted]
D	08/04/2024	Revised Draft Addressing Defence Comments	[redacted]	[redacted]
E	20/05/2024	Preliminary Final	[redacted]	[redacted]
0	27/06/2024	Final	[redacted]	[redacted]

Executive Summary

Background

Cardno (now Stantec) were engaged by the Australian Department of Defence (Defence) to carry out the per- and poly-fluoroalkyl substances (PFAS) Ongoing Monitoring Plan (OMP) (Department of Defence, 2021a) at Blamey Barracks Kapooka, New South Wales ("the Base" or "the Site").

The OMP outlines the rationale and scope for the monitoring of the concentrations and extent of PFAS in groundwater, surface water and sediment originating from the Site. The monitoring program consists of biannual monitoring events.

The objective of the OMP is to assess the changes in the nature and extent of PFAS within the environment. The OMP used the monitoring network developed as part of the PFAS Management Area Plan (PMAP) (Department of Defence, 2021b) to monitor the extent of PFAS leaving the Site through groundwater, surface water or sediment. The PMAP was designed to target areas where there is a potential risk to a receptor (for example, people or an ecological environment) associated with Defence's historical use of legacy Aqueous Film Forming Foam (AFFF).

The OMP includes sampling and analysis of the Management Area, comprised of both On-Base and Off-Base areas. The On-Base Management Area incorporates a portion of the Base including the eastern built-up (or developed) area from the Former Quarry in the south to the Wastewater Treatment Plant (WTP) in the north. It extends as far west as the natural ridgeline that runs north to south through the middle of the Base and to the east to include the Kapooka Creek flow pathway. The Off-Base Management Area consists of the public land where Kapooka Creek flows, as well as the private properties that the creek flows through.

Monitoring Program

The scope of work comprised monitoring of nine groundwater wells, 16 surface water locations and 11 sediment locations, as specified in the OMP. Works were conducted in general accordance with the Sampling and Analysis Quality Plan (SAQP) (Cardno, 2023a).

The annual monitoring period for the OMP was completed between July 2022 and June 2023 and included biannual monitoring events in November 2022 (Monitoring Event 3), and April 2023 (Monitoring Event 4). Sampling under these different climatic conditions provides a better understanding of the potential influence of seasonal variability on the movement and concentrations of PFAS in the environment.

Interpretive Assessment

PFAS concentrations were generally stable across the Management Area and varied by less than one order of magnitude from previous monitoring events for groundwater, sediment and the majority of surface water locations. A number of localised first-time detections and new exceedances were reported, which are associated with known source areas and previously identified pathways. Surface water sampling locations within the On-Base Sewer Network reported fluctuating PFAS concentrations.

Overall, given the available data, the observed changes from the monitoring period are not considered to affect the risk profile within the Management Area. Results from these previous monitoring events can be found in publications located online at www.defence.gov.au/environment/pfas/Kapooka.

Groundwater Flow Direction

Groundwater consistently flows north to west toward the Murrumbidgee River, which is important to understand as direction of flow is used to monitor any movement of contamination. No significant changes in the groundwater flow regime have occurred over time.

Groundwater elevations varied across the monitoring period by less than 1 m, with the exception of MW625 which observed a difference of 2.4 m between events. Groundwater levels during the monitoring event were observed to be higher than historic groundwater levels during the corresponding seasons. Higher elevations may be from above mean monthly rainfall recorded between August 2022 and January 2023. Groundwater elevations and associated trends will continue to be confirmed during subsequent biannual monitoring events.

What is an 'order of magnitude'?

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

If a change is close to established health or environmental criteria, it will also be considered significant.

Groundwater PFAS Concentrations

> A first-time detection of Per-fluorooctane sulfonate + Perfluorohexane sulfonic acid (PFOS+PFHxS) and perfluorooctanoic acid (PFOA) occurred at MW103, an On-Site monitoring location in the WTP sampling area screened within the regional aquifer, during Monitoring Event 3. This first-time detection near the WTP suggests that PFAS migration between the shallow (perched) water layer and the deeper regional aquifer is potentially occurring. Ongoing monitoring of wells surrounding the WTP will aim to confirm if PFAS has migrated into the regional aquifer.

> PFAS results around the Former Commandants House sampling area support results reported within the PSI (Golder, 2017), and DSI (Jacobs, 2019), that the extent of any PFAS contamination in groundwater within this area is currently localised.

> Results within the Kapooka Creek sampling area are consistent with pre-OMP monitoring, potentially indicating PFAS migration from the perched water layer into the regional aquifer in this area is currently limited.

Surface Water PFAS Concentrations

> Several first-time detections and new exceedances of both drinking water criteria and ecological criteria were reported during the monitoring period.

> Within the Overland Drainage Pathways On-Base, notable results were reported as follows:

- SW106 reported a first-time detection of PFOS+PFHxS in Monitoring Event 3 and a first-time detection of PFOS in Monitoring Event 4.
- SW118 reported an order of magnitude decrease of PFOS+PFHxS to below adopted drinking water criteria in Monitoring Event 4.
- Defence will conduct further monitoring to determine any long-term trends at these locations.

> Within Kapooka Creek, notable results were reported as follows:

- SW677 was sampled for the first time in Monitoring Event 3, as it was found to be dry during previous sampling events. SW677 reported a first-time detection of PFOS+PFHxS and PFOS, however, these concentrations were below adopted human health criterion. This location was unable to be sampled in Monitoring Event 4 as it was dry. Within the On-Site Sewer Network, notable results were reported as follows:
- SW144 reported a new exceedance of PFOS+PFHxS and order of magnitude increase of PFOS+PFHxS and PFOS to above the adopted drinking water human health criterion in Monitoring Event 3. Results subsequently decreased, by almost an order of magnitude, to within historical range in Monitoring Event 4.
- SW148 reported an order of magnitude increase of PFOS+PFHxS and PFOS in Monitoring Event 3, followed by an order of magnitude decrease of both analytes in Monitoring Event 4.
- SW149 reported a new exceedance of human health drinking water criteria and ecological criteria for PFOS+PFHxS and PFOS respectively. In Monitoring Event 4 both analytes reported an order of magnitude decrease to below all adopted criteria and LOR. SW149 also reported a first-time detection of PFOA.

- Defence will conduct further monitoring to determine any long-term trends at these locations.

> Results from sampling locations within the Overland Drainage Pathways On-Base sampling area generally show lower concentrations than those historically reported. PFAS concentrations in the WTP Ponds and the Former Quarry appear generally stable and are consistent with historic results, whilst PFAS concentrations in the On-Site Sewer Network fluctuated without any clear trend. Overall, these results do not indicate a change in the risk profile.

Sediment PFAS Concentrations

> All sediment samples taken from the Overland Drainage Pathways On-Base reported PFOS+PFHxS and PFOS concentrations above the LOR, with one location reporting a decrease of an order of magnitude (SD136) in Monitoring Event 3. Two On-Base locations targeting the Fire Station reported a first-time detection for PFOA (SD103 and SD136). Overall, locations generally reported decreased concentrations of PFOS+PFHxS and PFOS during Monitoring Event 3 compared to historical results, whilst concentrations in Monitoring Event 4 were similar to historical.

> Concentrations of PFOS+PFHxS and PFOS reported along the Kapooka Creek flow path show either potentially decreasing or stable qualitative trends since sampling commenced in 2018.

> Concentrations of PFAS within the WTP ponds appear to be relatively stable and consistent with historical results.

Concentrations of PFOS+PFHxS and PFOS reported within the Former Quarry Overland Drainage Pathway reported minor increases in Monitoring Event 3 followed by decreases to below LOR in Monitoring Event 4.

Conceptual Site Model and Risk Profile

The November 2022 and April 2023 monitoring events did not identify any changes to the risk profile as described in the 2021 PMAP (available online at defence.gov.au/environment/pfas/Kapooka) for the Management Area.

The 2022/2023 monitoring results were generally within the same order of magnitude as historical data for all media tested, with the exception of locations within the On-Base Sewer Network which reported some fluctuations in PFAS concentrations. There were a few localised first-time detections/new exceedances of assessment criteria, but these generally didn’t indicate new sources or new pathways of PFAS transport. No new human health or ecological receptors or exposure pathways have been identified. However, detections of PFAS observed in the regional aquifer around the WTP indicates vertical migration of PFAS from the perched water layer may be occurring. These detections suggest that this potential pathway may be more significant than was outlined in the DSI (Jacobs, 2019), however ongoing monitoring is required to confirm this. This first-time detection does not indicate a change in the risk profile.

Conclusions

The November 2022 and April 2023 monitoring events met the objective of the OMP and were carried out in general accordance with the SAQP (Cardno, 2023a). As only four monitoring events have been completed, trends are difficult to identify. Further monitoring is required to monitor for any developing trends or potential changes to the risk profile.

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Appendices

Tables

Table of Abbreviations and Units

Chemical Names

DO	Dissolved Oxygen
PFAS	Per- and poly-fluoroalkyl substances
PFHxS	Perfluorohexane Sulfonate
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
TDS	Total Dissolved Solids (salinity of water)

Technical Terms

AFFF	Aqueous Film-Forming Foam
AHD	Australian Height Datum
AS	Australian Standard
BGL	Below Ground Level
COC	Chain of Custody
CSM	Conceptual Site Model
DSI	Detailed Site Investigation
DQI	Data Quality Indicator
DQO	Data Quality Objective
EC	Electrical Conductivity
EPA	Environment Protection Authority
LOR	Limit of Reporting
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan

Units

ha	Hectares
km	Kilometres
m	Metres
mBGL	Metres Below Ground Level
mbTOC	Metres Below Top of Casing
mg/kg	Milligram per Kilogram (approximately equivalent to ppm)
mg/L	Milligram per Litre
mm	Millimetres
ppm	Parts per Million
μg/L	Micrograms per Litre
μS/cm	Micro Siemens per Centimetre (Electrical Conductivity – Water)

Site Specific

Esdat	Environmental Data Management Software
OMP	Ongoing Monitoring Plan
PMAP	PFAS Management Area Plan
WTP	Wastewater Treatment Plant

1 Introduction

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; Department of Defence, 2021a) at Blamey Barracks, Kapooka ("the Base" or "the Site"). The Site is located in Kapooka (Wagga Wagga), New South Wales, as shown in 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, (2023), *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Blamey Barracks Kapooka (Rev 4),* Reference: DEF19008, April 2023.

For the purposes of this report:

- The "On-Base Management Area" is defined as a portion of the Base including the eastern built-up (developed) portion of the Base from the Former Quarry in the south to the Wastewater Treatment Plant (WTP) in the north. It extends as far west as the natural ridgeline that runs north to south through the middle of the Base and to the east to include the Kapooka Creek flow pathway (Figure 1, Appendix A);
- The "Off-Base Management Area" includes the Kapooka Creek flow pathway on public land and all private properties which have some portion of the flow pathway passing through them. This area stretches from the Base, north all the way to the Murrumbidgee River (Figure 1, Appendix A);
- The "Management Area" (MA) is comprised of the "On-Base Management Area" and the "Off-Base Management Area" (Figure 1, Appendix A).
- The "Monitoring Area" is defined as the Base and the surrounding Off-Base areas that collectively encompasses the network of OMP monitoring locations (Figure 3, Appendix A).

1.1 Purpose and Objective

The objective of the OMP is to assess the changes in the nature and extent of PFAS in groundwater, surface water and sediment within the Monitoring Area, 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 Aqueous Film Forming Foam (AFFF). The OMP will also provide confirmation of our current understanding of risk.

The purpose of this PFAS OMP Ongoing Monitoring Report (OMR) is to present and evaluate OMP data from the monitoring period (July 2022 to June 2023) within the context of the PFAS Management Area Plan (PMAP), historical monitoring data, and other ancillary information, to achieve the following objectives:

- Assess changes in the distribution, concentration, and transport of PFAS;
- Confirm or update the current understanding of risk for the purpose of protecting human health and environmental receptors; and
- Provide supporting data for the PMAP delivery and evaluation of management actions, where relevant.

1.2 Scope

Cardno carried out the following tasks to satisfy the purpose and objectives of this assessment:

- Reviewed monitoring data from the November 2022 (E3) and April 2023 (E4) OMP sampling events, and available data from the previous OMP events, PSI, DSI and HHERA;
- Undertook qualitative analysis of PFAS concentration trends; and
- Prepared this report to provide findings relevant to the objectives of the assessment.

Note that the OMR does not:

- Provide recommendations for changes to state or territory precautionary advice.
- Recommend changes or amendments to remediation measures or activities.
- Provide health advice, such as recommendations to limit PFAS exposure through food consumption.

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:

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

> 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].

> Department of Defence, (2019), *Contamination Management Manual* (DCMM), August 2019.

> Department of Defence, (2019b), *Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance – Routine Water Quality Monitoring*.

> EPA NSW, (2002), *The NSW State Groundwater Dependant Ecosystems Policy*, April 2002.

> EPA NSW, (2004), *Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales*, Publication 1669.2, March 2004

> NSW EPA, (2016), Designing Sampling Programs for Sites Potentially Contaminated by PFAS.

> Heads of Environmental Protection Authority's Australia and New Zealand (HEPA), (2020), *PFAS National Environmental Management Plan (NEMP)*, Version 2.0, January 2020.

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

> National Health and Medical Research Council (NHMRC), (2019), *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*, August 2019.

> Standards Australia, (1998), *AS/NZ 5667:1998, Water quality – sampling*.

> 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)*.

[1] AS 4482.1-2005 is currently 'Withdrawn', but the assessment will consider it still to be suitable as a state of knowledge document until superseded.

2 Site Setting

A detailed description of the Base is provided in the OMP (Department of Defence, 2021a), which is summarised below.

The Base is located approximately 5 km to the west of Wagga Wagga and 160 km west of Canberra. The Base is bound between the Sturt Highway to the north and the Olympic Highway to the east and south. Churches Plain Road runs along the western boundary.

The Base is owned by the Commonwealth of Australia and comprises an area of approximately 1,990 ha. The Army Recruit Training Centre (ARTC) is located on the Base, providing training to 3,500 Army regular and 2,000 Army Reserve recruits annually (KBR, 2013), in addition to providing specialist training for the Army and other battalions. Recruits are housed On-Base at Blamey Barracks, which comprises a range of functions and amenities. The Base includes approximately 220 buildings and accommodation for up to 1,800 staff (Golder, 2017). A private lease has been held for stock agistment across grassed areas of the Base for the purposes of fire vegetation management for approximately 20 years. The Base comprises the following areas (as shown in Figure 1, Appendix A):

> Range Complex, which includes 3 Open Ranges, 1 Categorisation Range, 2 Marksmanship Ranges, 1 Grouping and Zeroing Range, a Range Danger Area, and campsites (Jacobs, 2019).

> Field Training Areas, primarily used for movement exercises.

> Cantonment, including accommodation and administrative facilities, the WTP and Fire Station.

> Disused features, which include the Former Quarry, former informal Fire Training Areas and Fire Training Pad, Former Commandant's House, Former Incinerator, and Buried Waste Areas.

2.1 Site Description

2.1.1 Surrounding Land Uses and Zoning

Land surrounding the Base is zoned 'Primary Production (RU1)', 'General Residential (R5)', 'Conservation (E2)' and 'Public Recreation (RE1)' in the Wagga Wagga City Council municipality (City of Wagga Wagga, 2018). The surrounding land uses are outlined in Table 2-1.

Table 2-1 Current and Previous Surrounding Land Uses

Direction	Historical Land Use	Current Land Use
North	▪ Off-Site: The earliest aerial imagery is from 1966 which shows the Sturt Highway as consistent with its present-day layout. Land is largely undeveloped. Limited residential development occurred from 1979 to present.	▪ RU1 – Primary Production, around the Base and north of the Sturt Highway, consisting of cleared grassland with intermittent houses and farm dams, with primary agricultural activities identified as cattle, sheep and grain farming. ▪ R5 – Large Lot Residential, including San Isidore which is immediately adjacent to the north-eastern boundary of the Base. In addition to large, rural residential properties, it also contains a rural fire station, sporting field and church. ▪ RE1 – Public Recreation, at Pomingalarna Reserve to the north of Sturt Highway, north-east of Base.
West	▪ Off-Site: Aerial imagery from 1966 shows that land to the west was relatively undeveloped, with onlyfarmhouses. No substantial changes are considered to have occurred to the present day.	▪ RU1 – Primary Production, west of the Base towards Yarragundry, primarily consisting of cleared grassland with intermittent houses and farm dams, with primary agricultural activities identified as cattle, sheep and grain farming.
East	▪ On-Site: Aerial imagery shows that the layout of the Olympic Highway to be similar to the present day. Land underwent residential development between 1966 and 1986.	▪ C2 – Environmental Conservation, a strip which aligns with forested areas on the ridge to the east of the Base, between the Base and the City of Wagga Wagga. ▪ R1 – General Residential, approximately 3.6 km from the eastern boundary of the Base, where the westernmost suburbs of the City of Wagga Wagga are located.

Direction	Historical Land Use	Current Land Use
South	▪ Off-Site: Aerial imagery from 1966 shows the land as generally undeveloped, excavations occurred between 1986 and 1995, however, it is unclear as to what the purpose was.	▪ RU1 – Primary Production, south of the Base towards Uranqunity with intermittent housing, cultivated areas and irrigated pastures.

2.1.2 Environmental Setting

Key details defining the site are summarised in Table 2-2. See Figure 1, Appendix A for key features.

Table 2-2 Key Site Details

Setting	Description
Climate	The Bureau of Meteorology (BoM) Kapooka Defence station (074272) has been operational since September 2017, representing a record of only six years. The mean monthly maximum temperature in the last six years at this station is 14.0°C in July and 33.85°C in January. The highest average volume of rainfall typically occurs during the month of November (98.89 mm) with lower falls in July (28.5mm). Climate indicators have been recorded at nearby Wagga Wagga Aeronautical Meteorological Office (AMO) (072150) since 1941. Mean annual rainfall at this station in this period is 573.7 mm, with rain falling relatively evenly across the months of the year. The prevailing wind direction in the morning (9 am) is from the east while in the afternoon (3 pm) the prevailing winds are from the west and, to a lesser extent, the south-west[1].
Topography	The regional topography comprises ridges and tablelands stepping down westwards and breaking into detached hills with intervening alluvial valley floors. Locally, a ridgeline intersects the Base through the middle from north to south, comprising rocky outcrops, small hills and valleys. Elevations across the Base range from 190 m AHD at the northern extent to 370 m AHD at the peak towards the centre. To the east of the ridge, developed areas including the Barracks drop from approximately 270 m AHD to 230 m AHD from west to east (Jacobs, 2019).
Geology	Geology at the Base and surrounding areas consists of four main units including basement Ordovician aged metamorphic and sedimentary rock and Silurian aged Collingullie Granite. These basement lithologies are overlain by colluvial soils On-Base and to the south and alluvial sands and gravels interbedded with clay layers in the north associated with historical meanders of the Murrumbidgee River (Department of Defence, 2021b).
Acid Sulfate Soil	A review of the Acid Sulfate Soils (ASS) mapping, available on the Australian Soil Resource Information System (ASRIS)[3] online database indicates that there is no known occurrence of acid sulfate soils for the majority of the property with the exception of a small section of the eastern portion of the property which has a low probability of acid sulfate soil occurrence.
Hydrology	Watershed from rain is controlled by the central north to south trending ridgeline On-Base. To the east of the ridge, surface water drains from west to east in localised channels and feeds into Kapooka Creek. Kapooka Creek is ephemeral and begins in the south-eastern portion of Base as an unlined channel and runs in a northerly direction towards the Murrumbidgee River. Flow in the creek only occurs during heavy rain fall. Through San Isidore, Kapooka Creek transitions to a series of dams and low-lying areas. North of the Sturt Highway (near where the geology transitions from colluvial soils to alluvial deposits associated with the Murrumbidgee River), Kapooka Creek fans out and becomes discontinuous. Further to the east of Kapooka Creek is another north to south trending ridge line that forms the eastern extent of the valley in which the eastern portion of Base and San Isidore sit. Surface water from areas to the west of the central north to south trending ridge On-Base, including the Former Quarry and Former Commandants House, drain west towards Sandy Creek. Sandy Creek is also ephemeral and comprises a flow channel with intermittent farm dams. During heavy rainfall, Sandy Creek flows northwards and drains into the Murrumbidgee River approximately 7.5 km downstream (i.e. to the west) of Kapooka Creek. The Murrumbidgee River is a major river in the area flowing year-round from east to west and is approximately 80 m in width (Department of Defence, 2021b).
Hydrogeology	Hydrogeological units at the Base and surrounding areas can be grouped into the following: ▪ **Perched water On-Base surrounding the WTP, hosted in clay with some silt.** Findings in the DSI indicate this perched water isn't laterally continuous and is likely related to the adjacent WTP ponds (Department of Defence, 2021b).

Setting	Description

- **Perched water identified in MW601 along the Kapooka Creek flow path Off-Base.** Water in MW601 is hosted in colluvial soils at 13.0 mBGL associated with Kapooka Creek. The Department of Defence (2021b) notes that "below this is a consistent clay layer from 25.0 to 30.0 m BGL, which is sufficiently continuous to act as an aquiclude preventing migration of PFAS impacted perched water from Kapooka Creek downwards into regional groundwater". However, it is Stantecs opinion that this clay layer is more likely to act as an aquitard rather than an aquiclude. This is primarily due to the geophysical investigation being 'carried out in a small area of Kapooka Creek' (Jacobs, 2021), with insufficient data for the clay layer to conclusively be defined as an aquiclude.
- Regional groundwater is hosted in fractured rock aquifers to the south of the MA and On-Base. Groundwater wells in this unit are hosted in granite, shale and siltstone (Department of Defence, 2021b).
- Regional groundwater is hosted in alluvial deposits in the north of the Management Area, where the geology transitions to interbedded alluvial sandy gravels and clays associated with the Murrumbidgee River (Department of Defence, 2021b).

Surface Water and Groundwater Connection – Although existing groundwater information is sparse, it is inferred that regional groundwater flows north towards the Murrumbidgee River, localised flow driven by topography is also possible. This is consistent with the inferred groundwater flow direction observed from the DSI, and OMP events.

Groundwater Use – Regional groundwater is known to be used for domestic, residential and agricultural purposes (primarily for stock watering).

As detailed within the DSI, 46 registered Off-Base bores exist within the MA. Bores are registered for the following purposes:

Purpose	Number of bores
Water supply	11
Domestic, stock	10
Dewatering (Abandoned)	1
Exploration	4
Recreational	2
Monitoring	13
Irrigation	7
Unknown	1

A review of Australian Groundwater Explorer indicates that no additional bores have been constructed since the DSI was published in 2019[4].

Environmental Sensitive Areas

Sensitive receptors in the area include (but are not limited to):

- Mammals including the Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*), and the Squirrel Glider in the Wagga Wagga Local Government Area (*Petaurus norfolcensis*, endangered population)
- Birds including the Grey-crowned Babbler eastern subspecies (*Pmatostomus temporalis temporalis*), the Rainbow Bee-eater *(Merops ornatus*), the Magpie Goose (*Anseranas semipalmata*), and the White-bellied Sea-Eagle (*Haliaeetus leucogaster*)
- Reptiles including the Southern Bell Frog (*Litoria raniformis*), and Sloane's Froglet (*Crinia sloanei*)
- Semi-aquatic & aquatic biota including Murray Cod (*Maccullochella peelii*) & Trout Cod (*Maccullochella macquariensis*)
- Grass, trees & other vegetation including the Lower Murray River aquatic ecological community, Grey Box (*Eucalyptus microcarpa*), Grassy Woodlands and Derived Native Grasslands of south-eastern Australia (Department of Defence, 2021b)

1. Bureau of Meteorology, 072150, 1941 to 2023 (BoM, 2023) http://www.bom.gov.au, accessed (19/12/2023)
2. Bureau of Meteorology, 072150, 2017 to 2023 (BoM, 2023) http://www.bom.gov.au, accessed (19/12/2023)
3. Australian Soil Resource Information System, http://www.asris.csiro.au/mapping/viewer.htm, accessed (19/12/2023)
4. Australian Groundwater Explorer, http://www.bom.gov.au/water/groundwater/explorer/map.shtml, accessed (19/12/2023)

2.1.3 Rainfall

Monthly mean rainfall from January 2022 to November 2023, and the average monthly rainfall are presented in Figure 2-1 below. Significant amounts of rainfall, over two times the monthly average, were recorded preceding the E3 event in September and October 2022 and above average rainfall was also recorded during the sampling event (November 2022).

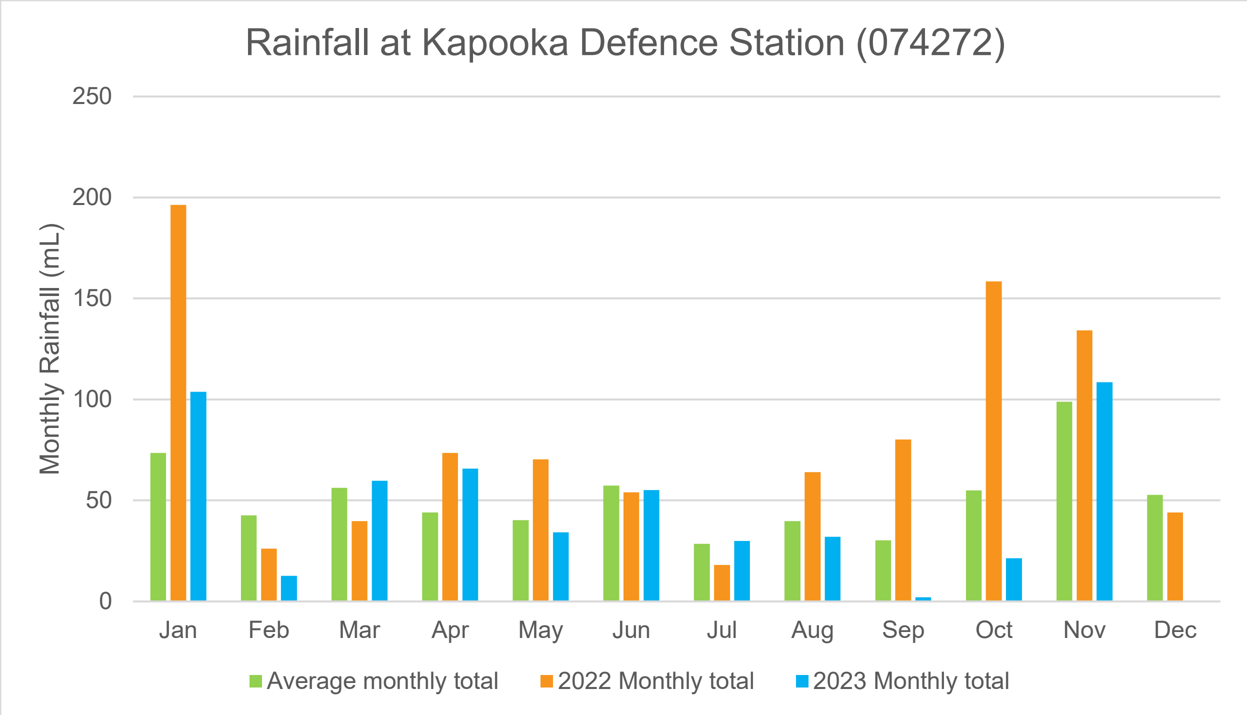

Figure 2-1 Total monthly rainfall data (Station 074272) (BoM, 2023).

2.2 Management Area

The OMP includes sampling and analysis not only from the Base, but also from Off-Base locations situated on public land. The Base and these surrounding areas which collectively encompasses the network of OMP monitoring locations, is referred to as the "Monitoring Area" (Cardno, 2021), as defined in Section 1. This has been based upon the management area description provided within the PMAP (Department of Defence, 2021b).

The 'On-Base Management Area' is defined as a portion of the Blamey Barracks Kapooka ("the Base" or "the Site") including the eastern built-up (or developed) portion of the Base from the Former Quarry in the south to the WTP in the north. It extends as far west as the natural ridgeline that runs north to south through the middle of the Base and to the east to include the Kapooka Creek flow pathway. The 'Off-Base Management Area' includes the Kapooka Creek flow pathway on public land and all private properties which have some portion of the flow pathway passing through them. This area stretches from the Base, north all the way to the Murrumbidgee River. The 'Management Area' is defined as comprising the On-Base Management Area, and the Off-Base Management Area.

The Management Area boundaries are presented in Figure 1, Appendix A.

2.3 Source Areas

The Site has been the subject of numerous PFAS investigations, as detailed in Section 1.2.

Historical use of firefighting foam products occurred at the Base until approximately 2008. The majority of primary source areas relate to storage or testing of firefighting foam equipment, including the Fire Station, Fire Training Pad, Fire Training Areas, the Parade Ground and the Former Quarry. Primary source areas also include several areas related to waste disposal including the Enhanced Land Force (ELF) Stockpiles and Buried Waste Areas. Two other primary source areas relate to singular or less frequent discharges of firefighting foam products including using firefighting foam on a waterslide at annual Christmas parties from 1995 and 2003, and in response to a fire at the Former Commandant's House in 2006.

Secondary source areas are related to waste treatment and discharge of treated effluent, including the WTP and grassy areas On-Base irrigated with treated effluent (Reused Effluent Irrigation Areas).

There are several Source Areas where PFAS has been detected in soil or groundwater at concentrations exceeding the adopted assessment levels. These have been detailed within the PMAP (2021b), and are shown in Figure 2, Appendix A, and include the following:

2.3.1 Primary Sources

- Fire Station (RMV0050-3)
- Former Fire Training Area #1 (RMV0050-3) and Inactive Incinerator (RMV0122)
- Former Fire Training Area #2 / Inactive Grenade Range (RMV0058)
- Buried Waste Area #3 (RMV0054)
- ELF Stockpiles
- Parade Ground
- Christmas Party Use Area
- Fire Training Pad
- Former Quarry (RMV0117)
- Former Commandants House

2.3.2 Secondary Sources

- Reused Effluent Areas
- WTP (RMV0051)

2.4 OMP Monitoring Locations

The network of On- and Off-Site groundwater locations sampled as part of the OMP (Department of Defence, 2021a) is summarised in Table 2-3 and shown in Figure 3, Appendix A. SW680, located along the Kapooka Creek flow path, was added to the monitoring network prior to the November 2022 event (E3). There have been no other changes to the monitoring network.

Table 2-3 Blamey Barracks Kapooka Groundwater Monitoring Network

Sampling Area	Frequency	Location (On-Base/ Off-Base)	Monitoring Well / Bore ID	Justification (from the OMP; Department of Defence, 2021a)
Wastewater Treatment Plant (WTP)	Once every six months	On-Base	MW103, MW104, MW107	MW103 and MW104 are adjacent to the WTP. MW104 is located on the northern boundary of the WTP. MW103 and MW104 are installed within the regional aquifer, and MW107 is installed within the perched water layer.
Former Commandants House		On-Base	MW008, MW109, MW110	MW008 near the Former Commandants House has had consistent detections of PFAS above laboratory LOR. MW109 and MW110 to be monitored to confirm extent of PFAS in groundwater associated with impacts detected at MW008.
		Off-Base	MW625	MW625 is located Off-Base and will be monitored to confirm extent of PFAS in groundwater associated with impacts detected at MW008 and potential for future migration down-gradient to the north-west.
Kapooka Creek flow pathway		Off-Base	MW601, MW624	MW601 installed in perched water associated with Kapooka Creek and has reported PFAS concentrations with an apparent increasing trend that needs to be assessed further. MW624, adjacent to Kapooka Creek, is screened in shale in the regional aquifer and has not reported PFAS above the laboratory LOR. Ongoing monitoring is required to monitor for the potential migration of PFAS from the perched water into the regional aquifer.

The network of On- and Off-Site surface water and sediment locations sampled as part of the OMP (Department of Defence, 2021a) is summarised in Table 2-4 and shown in Figure 3, Appendix A.

Table 2-4 OMP Surface Water and Sediment Monitoring Locations and Frequency

Sampling Area	Frequency	Location (On-Base/Off-Base)	Monitoring locations	Justification (from the OMP; Department of Defence, 2021a)
Overland drainage pathways On-Base	Once every six months	On-Base	SW/SD136 SW/SD103 SW/SD106 SW/SD107 SW/SD118	These sample locations are in surface water pathways on the eastern side of the Base that feed into Kapooka Creek. SW/SD136 and SW/SD103 are downstream near to the Fire Station and SW/SD107 is also downstream of the Fire Station and is located in a retention basin which has been considered for use as part of potential management actions in the PMAP. SW/SD106 is in the drainage pathway from treated effluent irrigation areas just prior to Kapooka Creek. SW/SD118 is near Kapooka Creek On-Base. These sampling locations provide an overview of the concentrations in surface water feeding into Kapooka Creek as a result of source areas on the eastern portion of the Base.
Kapooka Creek		On-Base	SW/SD121	Risks identified Off-Base in the HHERA are all associated with Kapooka Creek. The four proposed sampling locations include SW/SD121 in an On-Base dam just prior to Kapooka Creek flowing Off-Base into San Isidore, SW680 located Off-Base in a farm dam on private property, and two Off-Base locations on public land, approximately evenly spaced between the Base and the Murrumbidgee River. The two Off-Base locations (SW/SD614 and SW/SD677) are unlikely to have water present unless there has been recent rain. Therefore, it is proposed at a minimum that sediment samples are collected from these locations to assist with monitoring variability in PFAS levels along Kapooka Creek. SW680 was added to the OMP prior to November 2022 to provide additional data for surface water within the Kapooka Creek flow pathway.
		Off-Base	SW/SD614 SW/SD677 SW680	
Sewer		On-Base	SW140 SW144 SW148 SW149	Sewer samples SW140 and SW148 are adjacent to former Fire Training Areas. SW144 and SW149 are included as these locations are immediately upstream and downstream of SW148. Similar sampling locations are not available for SW140. Sewer sampling locations are grab samples of the effluent, and are taken from existing access pits along the sewer network, If results in the OMP are found to be consistent with those in the DSI, these sampling locations may be reviewed and possibly removed from future OMP monitoring rounds.
Wastewater treatment plant ponds	Once every six months	On-Base	SW/SD108 SW/SD111	The results from previous sampling rounds have shown a slight decreasing trend in PFOS + PFHxS concentration. The objective of these sampling locations is to assess this trend. As with the sewer samples, the need for sampling beyond the first OMP round should be reviewed based on results.
Overland drainage pathways – Former Quarry		On-Base	SW/SD127	Surface water and sediment sampling point downstream of the Former Quarry in the south-west area of the Base. The DSI identified that PFAS from the Former Quarry is considered to be localised and not migrating towards Sandy Creek to the west. The objective of this sampling point is to monitor this over time and provide a trigger for review if concentrations of PFAS increase and/or decrease over time.

3 Sampling and Analytical Methodology

3.1 Sampling and Analysis Methodology

The sampling and analysis methodology is outlined in the SAQP, presented in Appendix E.

3.2 Deviations from OMP SAQP

Deviations from the SAQP are summarised in Table 3-1.

Table 3-1 Deviations from the SAQP

Location	Sampling Event	Deviation	Comments	Impact on Existing Dataset & Program
Surface Water				
SW677	E4	Not Sampled	Location Dry	Potential data gap – historically, location is dry most of the times visited for sampling, with only one sample collected in November 2022 (E3). PFOS and Sum of PFHxS and PFOS results were reported above Limit of Reporting (LOR) but below criteria. This location is the most down-stream monitoring location along the Kapooka Creek pathway and thus closest to down-stream receptors. Consideration should be given on an alternative location to sample should this location be dry and/or first-flush sampling of this location.

4 Quality Assurance and Quality Control

4.1 Data Validation Process

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 (DQIs), as described in the SAQP, presented in Appendix E:

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

4.2 QA/QC Summary

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

Field quality assurance and quality control (QA/QC) was recorded on field sheets, and laboratory QA/QC were reported with sample results and reviewed in the Factual Report Data Quality Reviews. Standard sampling methods, handling, preservation and transport procedures were complied with as detailed in the SAQP. Quality control samples comprising blind replicate (duplicate or intra-laboratory sample), triplicate (inter-laboratory sample), rinsate blanks and trip blanks were collected during each field event, in accordance with the frequency outlined in the SAQP. Standard procedures and qualified personnel were used for each sampling event.

Field Chain of Custody forms are included in the Factual Reports and demonstrate sample integrity. The data collected is considered comparable for each sampling event and can be used for the assessment.

The data validation process (refer to the E3 and E4 factual reports in Appendix C and Appendix D) has concluded that there are no significant systematic errors in the data collection process or laboratory QC testing. Therefore, the data set used as the basis for this assessment is considered valid and complete.

5 Assessment Criteria

5.1 Groundwater and Surface Water

The assessment levels adopted for groundwater and surface water in this OMR are based upon the PFAS screening criteria specified in the OMP (Department of Defence, 2021a), which were adopted based on the guidance in the PFAS NEMP (HEPA, 2020). The adopted assessment criteria for groundwater and surface water are detailed in Table 5-1.

Table 5-1 PFAS Criteria for Groundwater and Surface Water

Exposure Scenario	Adopted Assessment Criteria		Guidance
	PFHxS / PFOS[4]	PFOA[4]	
	µg/L		
Human Health - Surface Water Recreational	2[2]	10	HEPA 2020
Human Health - Drinking Water Quality Guideline[1]	0.07[2]	0.56	HEPA 2020
Ecological – Freshwater direct toxicity, slightly to moderately disturbed ecosystems (95% species protection)	0.13[3]	220	HEPA 2020

1. Drinking Water screening guidelines have been adopted for screening purposes for Industrial Water use, Stock Water use and Agriculture/Parks/Gardens Water use.
2. Combined PFOS and PFHxS.
3. PFOS only.
4. Limit of reporting (LOR) 0.01 µg/L.

5.2 Sediment

There are currently no Australian regulatory endorsed assessment levels for risk posed to ecology or human health by PFAS in sediment.

6 Contextual and Ancillary Information

Blamey Barracks Kapooka is currently under further assessment by Jacobs Australia Pty Ltd (Jacobs) as Lead Consultant (LC) for the PMAP implementation. During the monitoring period (July 2022 to June 2023) Jacobs completed further investigation work across the Site to assess the presence, nature, extent and migration of PFAS. At a high level, the work consisted of a surface water mass flux study that commenced in December 2022 and was still running in July 2023. Sampling of key onsite surface water drainage lines via two installed autosamplers and the collection of grab samples from surface water bodies was conducted.

The works listed above are part of a larger scope of investigations which have not yet been completed, with some elements having only been internally reported.

In the next 12-months, remediation investigation works by Jacobs are expected to commence. The works will involve soil sampling and runoff testing at the fire training areas #1 and #2 and the treated effluent irrigation areas.

The above-mentioned works are not considered likely to influence the monitoring results and as such have been excluded from the interpretation of results.

No infrastructure or remediation projects have been completed within the monitoring period. A number of works are proposed to commence in December 2024 under the Riverina Redevelopment Program:

> Construction of a multi-function centre where the current Fire Station is situated. This is expected to enable the management of PFAS impacted soils via capping in the area to reduce surface water infiltration and runoff.

> Diversion of surface water runoff upgradient of the Fire Station area. This has the potential to reduce PFAS migration from this area to surface water and ultimately Kapooka Creek.

> Construction of a detention basin on Drainage Line 1 to manage increased stormwater discharges from the Site (a result of new hardstand surfaces included in the redevelopment). This presents an opportunity for surface water management or treatment.

> Diversion of surface water runoff around the WTP and increased capacity of the dam east of the plant. This is anticipated to reduce PFAS migration in periods high rainfall, which would ultimately reduce PFAS flows to Kapooka Creek and the surrounding areas.

These planned works will be considered in the interpretation of future results once the redevelopment works have commenced.

7 Monitoring Data Summary

7.1 Groundwater

7.1.1 Groundwater Quality Field Parameters

The groundwater quality field parameters recorded during E3 and E4 monitoring events are summarised in Table 7-1 below.

Table 7-1 Groundwater Quality Field Parameters

Location	Event	pH	DO (mg/L)	EC (µS/cm)	TDS[1] (mg/L)	ORP (mV)
On-Site	E3 (November 2022)	6.22 (MW104) – 6.81 (MW107) *Slightly acidic to near neutral*	0.52 (MW109) – 3.01 (MW008) *Anaerobic to aerobic conditions*	1,138 (MW109) – 2,138 (MW110)	739.7 (MW109) – 1,390.7 (MW110) *Generally fresh water*	-28.1 (MW103) – 191.5 (MW104) *Slightly reducing to moderately oxidising conditions*
	E4 (April 2023)	6.44 (MW103 & MW104) – 7.18 (MW107) *Slightly acidic to near neutral*	1.49 (MW103) – 7.39 (MW109) *Generally aerobic conditions*	16.4 (MW109) – 5,586 (MW104)	10.7 (MW109) – 3,630.9 (MW104) *Fresh to mildly brackish water*	-31.6 (MW107) - 178.9 (MW109) *Slightly reducing to moderately oxidising conditions*
Off-Site	E3 (November 2022)	6.34 (MW625) – 6.85 (MW601) *Slightly acidic to near neutral*	0.55 (MW624) – 2.88 (MW625) *Anaerobic to aerobic conditions*	645 (MW601) – 3,957 (MW624)	419.3 (MW601) – 2,572.1 (MW624) *Fresh to mildly brackish water*	-204.5 (MW624) – 118.4 (MW601) *Reducing to oxidising conditions*
	E4 (April 2023)	6.4 (MW625) – 7.28 (MW601) *Slightly acidic to near neutral*	0.94 (MW624) – 2.95 (MW601) *Slightly anaerobic to aerobic conditions*	757 (MW601) – 5,101 (MW624)	492.1 (MW601) – 3,315.7 (MW624) *Fresh to mildly brackish water*	-68.6 (MW624) – 85.7 (MW601) *Slightly reducing to slightly oxidising conditions*

[1] EC in µS/cm converted to TDS in mg/L by multiplying by 0.65.

Groundwater quality field parameters recorded during the groundwater sampling program are presented in Table B1, Appendix B.

In summary, the field parameter results indicate the following:

> On-Site: pH, Dissolved Oxygen (DO), Electrical Conductivity (EC) and Total Dissolved Solids (TDS) were higher during the E4. Oxidation-Reduction Potential (ORP) was higher during E3.

> Off-Site: pH, DO, EC and TDS were higher during the E4.

7.1.2 Groundwater Elevation and Flow Directions

Regional groundwater flow was interpreted to be generally in a north-westerly direction towards the Murrumbidgee River, consistent with previous investigations conducted by Jacobs (2019) and Golder (2017). Contour plans are included in Figures 4A-4B Appendix A. Consistent with previous investigations, MW107 and MW601 have been excluded from contouring as they are screened within the perched water layer. MW008 is not included in contouring as it is an open concrete well one metre in diameter, which could potentially allow for surface water infiltration near the base of the well and impact groundwater contours. Additionally, MW008 has not had the top of well surveyed. Gauging records are presented in Table B1,

Appendix B. A summary of the regional groundwater elevation range encountered during each monitoring event is presented in Table 7-2.

Table 7-2 Regional Groundwater Elevation Range Summary

Event	Groundwater Elevation Range (mAHD)
DSI (February 2019)	195.803 (MW104) – 199.77 (MW103)
E1 (October 2021)	166.202 (MW625) – 200.707 (MW103)
E2 (April 2022)	166.942 (MW625) – 201.220 (MW103)
E3 (November 2022)	168.346 (MW625) – 202.275 (MW103)
E4 (April 2023)	170.783 (MW625) – 202.733 (MW103)

Groundwater elevations between E3 and E4 were relatively consistent with the exception of MW625 which observed an increase of 2.4 m between events. Groundwater elevations in E4 were also compared to the corresponding biannual event elevations from E1 and E2. Increased groundwater levels were observed across the monitoring area during E3 and E4, with the maximum height difference observed to be 2.9 m (MW008).
As discussed within Section 2.1.3, above average rainfall was recorded in 2022 and 2023 and this may have led to the increased groundwater levels observed during both events.

7.1.3 Laboratory Results

Groundwater sampling locations have been indicatively grouped with respect to major PFAS sampling areas across the site:

> Wastewater Treatment Plant.

> Former Commandants House.

> Kapooka Creek flow pathway.

These locations were used to identify trends in PFAS concentrations laterally along indicative groundwater flow paths and vertically from perched water into the deeper aquifer. Justification for the grouping of sampling locations into individual sampling areas is provided within the PMAP (Department of Defence, 2021b). For each sampling area, Table 7-3 through Table 7-5 present the PFOS+PFHxS, PFOS and PFOA results from the OMP monitoring period and the range of concentrations from historical results. Wells are generally ordered from hydraulically up-gradient to down-gradient and PFAS concentration changes are highlighted where first-time detections, new exceedances, significant concentration changes, new maximums or new minimums are observed.

Laboratory analytical results were compared to the adopted assessment criteria, and are presented in Table B4, Appendix B. The PFOS+PFHxS concentrations in groundwater from 2017 to 2023 are mapped in Figures 5A-5H, Appendix A.

Laboratory certificates of analysis and chain of custody (COC) documentation are included in the Factual Reports, presented in Appendix C and Appendix D.

7.1.3.1 Wastewater Treatment Plant

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at groundwater monitoring locations associated with the WTP sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-3.

Table 7-3 Wastewater Treatment Plant – Groundwater PFOS+PFHxS, PFOS and PFOA Concentrations (µg/L)

Location ID	Aquifer	Analyte	Historical Concentration Range*	OMP Monitoring	
				E3 (Nov 2022)	E4 (Apr 2023)
MW103	Regional Aquifer	PFOS+PFHxS	<0.01	0.06	<0.01
		PFOS	<0.01	<0.01	<0.01
		PFOA	<0.01	0.02	<0.01
MW104	Regional Aquifer	PFOS+PFHxS	<0.01	<0.01	<0.01
		PFOS	<0.01	<0.01	<0.01
		PFOA	<0.01	<0.01	<0.01

Location ID	Aquifer	Analyte	Historical Concentration Range*	OMP Monitoring	
				E3 (Nov 2022)	E4 (Apr 2023)
MW107	Perched Water Layer	PFOS+PFHxS	0.07 – 0.14	0.09	0.09
		PFOS	<0.01 – 0.02	0.01	0.01
		PFOA	<0.01 – 0.02	<0.01	0.01

New maximum	New minimum	New Exceedance	First-time Detection

Notes:

* Inclusive of QC Results

<0.01 Limit of Reporting

A review of Table 7-3 indicates:

> PFOS+PFHxS concentrations in the regional aquifer in the WTP sampling area ranged from less than the LOR of 0.01 (MW104) to 0.06 µg/L (MW103) during E3 and E4. PFOA concentrations ranged from below the LOR of 0.01 to 0.02 µg/L.

> In the perched water layer (MW107), PFOS+PFHxS was consistently reported at 0.09 µg/L in both E3 and E4. PFOA concentrations changed from <0.01 to 0.01 µg/L.

> MW103 reported a first-time detection of PFOS+PHFxS and PFOA in E3. Concentrations returned to below LOR in E4.

> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.1.3.2 Former Commandants House

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at groundwater monitoring locations associated with the Former Commandants House sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-4.

Table 7-4 Former Commandants House – Groundwater PFOS+PFHxS, PFOS and PFOA Concentrations (µg/L)

Location ID	Aquifer	Analyte	Historical Concentration Range*	OMP Monitoring	
				E3 (Nov 2022)	E4 (Apr 2023)
MW008	Regional Aquifer	PFOS+PFHxS	0.10 – 0.23	0.13	0.11
		PFOS	0.02 – 0.09	0.04	0.02
		PFOA	<0.0005 - <0.01	<0.01	<0.01
MW109		PFOS+PFHxS	<0.01	<0.01	<0.01
		PFOS	<0.01	<0.01	<0.01
		PFOA	<0.01	<0.01	<0.01
MW110		PFOS+PFHxS	<0.01	<0.01	<0.01
		PFOS	<0.01	<0.01	<0.01
		PFOA	<0.01	<0.01	<0.01
MW625 (Off-Base)		PFOS+PFHxS	<0.01	<0.01	<0.01
		PFOS	<0.01	<0.01	<0.01
		PFOA	<0.01	<0.01	<0.01

New maximum	New minimum	New Exceedance	First-time Detection

Notes:

* Inclusive of QC Results

<0.01 Limit of Reporting

A review of Table 7-4 indicates:

> PFOS+PFHxS concentrations around the Former Commandments House ranged from <LOR to 0.11 µg/L during both monitoring events. PFOA was reported <LOR during E3 and E4.

> No locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.1.3.3 Kapooka Creek Flow Pathway

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at groundwater monitoring locations associated with the Kapooka Creek Flow Pathway sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-5.

Table 7-5 Kapooka Creek Flow Pathway: Groundwater PFOS+PFHxS, PFOS and PFOA Concentrations (µg/L)

Location ID	Aquifer	Analyte	Historical Concentration Range*	OMP Monitoring	
				E3 (Nov 2022)	E4 (Apr 2023)
MW601 (Off-Base)	Perched Water Layer	PFOS+PFHxS	0.1 – 0.89	0.77	0.57
		PFOS	0.01 – 0.20	0.34	0.21
		PFOA	<0.01 – 0.01	<0.01	<0.01
MW624 (Off-Base)	Regional Aquifer	PFOS+PFHxS	<0.01	<0.01	<0.01
		PFOS	<0.01	<0.01	<0.01
		PFOA	<0.01	<0.01	<0.01

New maximum	New minimum	New Exceedance	First-time detection

Notes:
* Inclusive of QC Results
<0.01 Limit of Reporting

A review of Table 7-5 indicates:

> PFAS concentrations in regional groundwater within the Kapooka Creek flow pathway were reported <LOR during both monitoring events. In the perched water layer PFOS+PFHxS concentrations ranged from 0.57 to 0.77 µg/L and PFOA was reported <LOR during E3 and E4.

> MW601 reported a new maximum for PFOS in E3.

> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.2 Surface Water

7.2.1 Surface Water Quality Field Parameters

The stabilised surface water quality field parameters recorded during E3 and E4 monitoring events are summarised in Table 7-6 below. Stabilised water quality field parameters, water colour and turbidity observations recorded during the surface water sampling program are presented in Table B2, Appendix B.

Table 7-6 Summary of Surface Water Quality Field Parameters

Location		pH	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	ORP (mV)
On-Site	E3 (November 2022)	5.2 (SW127) – 8.75 (SW111) *Slightly acidic to slightly alkaline conditions*	0.94 (SW148) – 6.76 (SW111) *Slightly anaerobic to aerobic conditions*	69.6 (SW127) – 841 (SW148)	45.2 (SW127) – 546.7 (SW148) *Fresh water*	16 (SW144) – 216.2 (SW127) *Oxidising conditions*
	E4 (April 2023)	6.7 (SW106) – 9 (SW108) *Near neutral to alkaline conditions*	1.04 (SW148) – 8.51 (SW149) *Generally aerobic conditions*	33.9 (SW118) – 1,396 (SW148)	18.2 (SW118) – 817.3 (SW148) *Fresh water*	-169.6 (SW148) – 161.9 (SW121) *Reducing to oxidising conditions*

Location		pH	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	ORP (mV)
Off-Site	E3 (November 2022)	6.75 (SW614) – 7.48 (SW680) *Near neutral conditions*	5.13 (SW680) – 6.11 (SW677) *Aerobic conditions*	113 (SW614) – 124.3 (SW680)	73.5 (SW614) – 80.8 (SW680) *Fresh water*	-33.2 (SW677) 28.4 (SW614) *Slightly reducing to slightly oxidising conditions*
	E4 (April 2023)	7.2 (SW680) – 7.57 (SW614) *Near neutral conditions*	2.64 (SW680) – 5.43 (SW614) *Aerobic conditions*	95.2 (SW614) – 198.5 (SW680)	50.4 (SW614) – 104.6 (SW680) *Fresh water*	77.8 (SW680) – 110.6 (SW614) *Oxidising conditions*

In summary, the field parameter results indicate the following:

> On-Site: pH, DO, EC and TDS were overall higher during E4. ORP was higher during E3.

> Off-Site: pH, EC, TDS and ORP were overall higher during E4.

7.2.2 Laboratory Results

Surface water sampling locations have been indicatively grouped with respect to major PFAS sampling areas across the site:

> Overland drainage pathways On-Base.

> Kapooka Creek.

> Sewer.

> Wastewater treatment plant ponds.

> Overland drainage pathways – Former Quarry.

These locations were used to identify trends in PFAS concentrations laterally along indicative surface water flow paths, with justification for the grouping of sampling locations into individual sampling areas provided within the PMAP (Department of Defence, 2021b). For each sampling area, Table 7-7 through Table 7-11 present the PFOS+PFHxS, PFOS and PFOA results from the OMP monitoring period and the range of concentrations from historical results. Surface water results are generally ordered from hydraulically upstream to downstream and PFAS concentration changes are highlighted where first-time detections, new exceedances, significant concentration changes, new maximums or new minimums are observed.

Laboratory analytical results were compared to the adopted assessment criteria, and are presented in Table B5, Appendix B and summarised in Table 7-7 to Table 7-11 below. The PFOS+PFHxS concentrations in surface water from 2017 to 2023 are mapped in Figures 6A-6F, Appendix A.

Laboratory certificates of analysis and COC documentation are included in the Factual Reports, presented in Appendix C and Appendix D.

7.2.2.1 Overland Drainage Pathways On-Base

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at surface water monitoring locations associated with the Overland Drainage Paths On-Base sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-7.

Table 7-7 Overland Drainage Paths On-Base – Surface Water PFOS+PFHxS, PFOS and PFOA Concentrations (µg/L)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring E3 (Nov 2022)	OMP Monitoring E4 (Apr 2023)
SW136	PFOS+PFHxS	0.08 - 4.15	0.30	0.06
	PFOS	0.06 - 1.48	0.17	0.04
	PFOA	<0.01 - 0.11	0.02	<0.01
SW103	PFOS+PFHxS	0.28 - 1.31	0.36	0.32[1]
	PFOS	0.19 – 1.00	0.22	0.23[1]

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring E3 (Nov 2022)	OMP Monitoring E4 (Apr 2023)
	PFOA	<0.01 - 0.05	0.02	<0.01
SW106	PFOS+PFHxS	<0.01	0.02	0.04
	PFOS	<0.01	<0.01	0.02
	PFOA	<0.01	<0.01	<0.01
SW107	PFOS+PFHxS	0.20 - 0.65	0.25	0.20
	PFOS	0.15 - 0.43	0.14	0.13
	PFOA	<0.01 - 0.03	<0.01	<0.01
SW118	PFOS+PFHxS	0.07 – 0.67	0.23	0.02[#]
	PFOS	0.07 – 0.52	0.13	0.02
	PFOA	<0.01 – 0.02	<0.01	<0.01

New maximum	New minimum	New Exceedance	First-time detection

Notes:

* Inclusive of QC Results

[1] Duplicate/Triplicate value adopted

[#]Order of magnitude decrease

<0.01 Limit of Reporting

A review of Table 7-7 indicates:

> PFOS+PFHxS concentrations ranged from 0.02 µg/L (SW106) to 0.36 µg/L (SW103) in the overland drainage pathways On-Base during E3 and E4. PFOA concentrations ranged from <LOR to 0.02 µg/L.

> A first-time detection of PFOS+PFHxS was reported during E3 at SW106. In the following event (E4) a first-time detection of PFOS and new maximum concentration of PFOS+PFHxS was also reported at SW106.

> An order of magnitude decrease of PFOS+PFHxS was reported at SW118 in E4.

> New minimum concentrations of PFOS+PFHxS were reported at SW136 and SW118 in E4.

> New minimum concentrations of PFOS were reported at SW136, SW107 and SW118 in E4.

7.2.2.2 Kapooka Creek

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at surface water monitoring locations associated with the Kapooka Creek sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-8.

Table 7-8 Kapooka Creek – Surface Water PFOS+PFHxS, PFOS and PFOA Concentrations (µg/L)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring E3 (Nov 2022)	OMP Monitoring E4 (Apr 2023)
SW121	PFOS+PFHxS	0.21 - 0.39	0.13	0.28[1]
	PFOS	0.16 - 0.28	0.09	0.22[1]
	PFOA	<0.01 - 0.02	<0.01	<0.01
SW680	PFOS+PFHxS	0.12	0.07	0.13
	PFOS	0.08	0.04	0.10
	PFOA	<0.01	<0.01	<0.01
SW614	PFOS+PFHxS	0.03 – 0.35	0.07	0.07
	PFOS	0.03 – 0.27	0.05	0.07
	PFOA	<0.01	<0.01	<0.01
SW677	PFOS+PFHxS	NS – Dry	0.06	NS – Dry

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
	PFOS	NS – Dry	0.04	NS – Dry
	PFOA	NS - Dry	<0.01	NS - Dry
New maximum	New minimum		New Exceedance	First-time detection

Notes:
* Inclusive of QC Results
[1] Duplicate/Triplicate value adopted
<0.01 Limit of Reporting
NS - Not Sampled

A review of Table 7-8 indicates:

> PFOS+PFHxS concentrations ranged from 0.06 µg/L (SW677) to 0.28 µg/L (SW121) along Kapooka Creek during E3 and E4. PFOA concentrations remained <LOR during both sampling events.
> A first-time detection of PFOS+PFHxS and PFOS were reported at SW677 in E3.
> New minimum concentrations of PFOS+PFHxS were reported at SW121 and SW680 in E3.
> New maximum concentration of PFOS+PFHxS were reported at SW680 in E4.
> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.2.2.3 Sewer

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at surface water monitoring locations associated with the Sewer sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-9.

Table 7-9 Sewer – Surface Water PFOS+PFHxS, PFOS and PFOA Concentrations (µg/L)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SW140	PFOS+PFHxS	0.02 - 0.25	0.05[1]	0.02
	PFOS	<0.01 - 0.03	0.01[1]	<0.01
	PFOA	<0.01	<0.01	<0.01
SW144	PFOS+PFHxS	<0.01 - 0.03	0.17^	0.02
	PFOS	<0.01 - 0.01	0.12^	0.02
	PFOA	<0.01	<0.01	<0.01
SW148	PFOS+PFHxS	<0.01 - 0.61	0.16^	0.01#
	PFOS	<0.01 - 0.47	0.16^	0.01#
	PFOA	<0.01 - 0.01	<0.01	<0.01
SW149	PFOS+PFHxS	<0.01 – 0.02	0.16	<0.01#
	PFOS	<0.01 – 0.02	0.16	<0.01#
	PFOA	<0.01	0.01	<0.01
New maximum		New minimum	New Exceedance	First-time detection

Notes:
* Inclusive of QC Results
[1] Duplicate/Triplicate value adopted
^ Order of magnitude increase
# Order of magnitude decrease
<0.01 Limit of Reporting

A review of Table 7-9 indicates:

> PFOS+PFHxS concentrations from samples collected from the sewer network reported concentrations that ranged from <LOR (SW149) to 0.17 µg/L (SW144). PFOA concentrations were reported ranging from <LOR to 0.01 µg/L.

> A new exceedance of PFOS+PFHxS drinking water criteria was reported at SW144 and SW149 in E3.

> A new exceedance of PFOS ecological water criteria, and first-time detection of PFOA were reported at SW149 in E3.

> An order of magnitude increase of PFOS+PFHxS and PFOS was reported at SW144 and SW148 in E3.

> A new maximum PFOS concentration was reported at SW144 in E3.

> An order of magnitude decrease of PFOS+PFHxS and PFOS was reported at SW148 and SW149 in E4.

> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.2.2.4 Wastewater Treatment Plant Ponds

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at surface water monitoring locations associated with the Wastewater Treatment Plant Ponds sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-10.

Table 7-10 Wastewater Treatment Plant Ponds – Surface Water PFOS+PFHxS, PFOS and PFOA Concentrations (µg/L)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SW108	PFOS+PFHxS	0.02 - 0.06	0.03	0.03
	PFOS	0.01 - 0.02	0.01	0.01
	PFOA	<0.01 - 0.02	<0.01	<0.01
SW111	PFOS+PFHxS	0.04 - 0.11	0.04	0.04
	PFOS	0.02 - 0.03	0.02	0.01
	PFOA	<0.01 - 0.02	<0.01	<0.01
New maximum		New minimum	New Exceedance	First-time detection

Notes:
* Inclusive of QC Results
<0.01 Limit of Reporting

A review of Table 7-10 indicates:

> PFOS+PFHxS concentrations ranged from 0.03 (SW108) to 0.04 µg/L (SW111) in the WTP ponds during E3 and E4. PFOA concentrations remained below the LOR of 0.01 µg/L during both sampling events.

> SW111 reported a new minimum for PFOS in E3.

> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.2.2.5 Overland Drainage Pathways – Former Quarry

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at surface water monitoring locations associated with the Overland Drainage Pathways – Former Quarry sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented Table 7-11.

Table 7-11 Overland Drainage Pathways – Former Quarry – Surface Water PFOS+PFHxS, PFOS and PFOA Concentrations (µg/L)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SW127	PFOS+PFHxS	<0.01	<0.01	<0.01
	PFOS	<0.01	<0.01	<0.01

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
	PFOA	<0.01	<0.01	<0.01

New maximum	New minimum	New Exceedance	First-time detection

Notes:

* Inclusive of QC Results

<0.01 Limit of Reporting

A review of Table 7-11 indicates:

> PFAS concentrations in the Overland Drainage Pathways – Former Quarry were reported <LOR during both monitoring events.

> No locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.3 Sediment

7.3.1 Summary of Field Observations

Between E3 and E4 no significant changes to odour or sediment colour were identified, and observations were generally consistent with previous event observations. Field observations are presented in Table B3, Appendix B.

7.3.2 Laboratory Results

Sediment sampling locations have been indicatively grouped with respect to major PFAS sampling areas across the site:

> Overland drainage pathways On-Base.

> Kapooka Creek.

> Wastewater Treatment Plant Ponds.

These locations were used to identify trends in PFAS concentrations laterally along indicative surface water paths, with justification for the grouping of sampling locations into individual sampling areas provided within the PMAP (Department of Defence, 2021b). For each sampling area, Table 7-12 through Table 7-15 present the PFOS+PFHxS, PFOS and PFOA results from the OMP monitoring period and the range of concentrations from historical results. Sediment results are generally ordered from hydraulically up-stream to down-stream and PFAS concentration changes are highlighted where first-time detections, significant concentration changes, maximums or minimums are observed.

National assessment criteria were not established for PFAS in sediment. Laboratory analysis results have been compared against historical results, and are presented in Table B6, Appendix B. The PFOS+PFHxS concentrations in sediment are presented in Figures 7A-7E, Appendix A.

Laboratory certificates of analysis and COC documentation are included in the Factual Reports, presented in Appendix C and Appendix D.

7.3.2.1 Overland Drainage Pathways On-Base

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at sediment monitoring locations associated with the Overland Drainage Pathways On-Base sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-12.

Table 7-12 Overland Drainage Pathways On-Base – Sediment PFOS+PFHxS, PFOS and PFOA Concentrations (mg/kg)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SD136	PFOS+PFHxS	0.0050 – 0.0631	0.0030#	0.0282
	PFOS	0.0046 – 0.0606	0.0030#	0.0246
	PFOA	<0.0002 - <0.005	<0.0002	0.0003

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SD103	PFOS+PFHxS	0.0096 – 0.0175	0.0066	0.014[1]
	PFOS	0.0086 – 0.0163	0.0063	0.014[1]
	PFOA	<0.0002 - <0.005	<0.0002	0.0002
SD106	PFOS+PFHxS	0.0042 - 0.008	0.0040	0.0055
	PFOS	0.0042 - 0.0076	0.0040	0.0053
	PFOA	<0.0002 – 0.0002	<0.0002	<0.0002
SD107	PFOS+PFHxS	0.0042 - 0.0149	0.0027	0.0033
	PFOS	0.0037 - 0.0142	0.0027	0.0033
	PFOA	<0.0002	<0.0002	<0.0002
SD118	PFOS+PFHxS	0.0037 – 0.0077	0.0025	0.0058
	PFOS	0.0037 – 0.0077	0.0025	0.0058
	PFOA	<0.0002	<0.0002	<0.0002
New maximum		New minimum		First-time detection

Notes:

* Inclusive of QC Results

[1] Duplicate/Triplicate value adopted

[#] Order of magnitude decrease

<0.01 Limit of Reporting

A review of Table 7-12 indicates:

> During E3 and E4, PFOS+PFHxS concentrations in the overland drainage pathways On-Base ranged between 0.0025 (SD118) and 0.0282 mg/kg (SD136). PFOA concentrations ranged from less than the LOR of 0.0002 to 0.0003 mg/kg throughout the sampling events.

> SD136 reported an order of magnitude decrease and new minimum concentrations of PFOS+PFHxS and PFOS in E3.

> New minimum PFOS+PFHxS and PFOS concentrations were also reported at SD103, SD106, SD107 and SD118.

> SD136 and SD103 reported first-time detections of PFOA in E4.

> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.3.2.2 Kapooka Creek

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at sediment monitoring locations associated with the Kapooka Creek sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-13.

Table 7-13 Kapooka Creek – Sediment PFOS+PFHxS, PFOS and PFOA Concentrations (mg/kg)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SD121	PFOS+PFHxS	0.0009 – 0.033	0.0017	0.0039[1]
	PFOS	0.0009 – 0.033	0.0017	0.0039[1]
	PFOA	<0.0002 - <0.005	<0.0002	<0.0002
SD614	PFOS+PFHxS	0.0077 – 0.0114	0.0073	0.0092
	PFOS	0.0075 – 0.011	0.0073	0.0090
	PFOA	<0.0002	<0.0002	<0.0002

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SD677	PFOS+PFHxS	0.0052 – 0.0075	0.0074	0.0066
	PFOS	0.0052 – 0.0075	0.0074	0.0066
	PFOA	<0.0002	<0.0002	<0.0002
New maximum		New minimum		First-time detection

Notes:
* Inclusive of QC Results
[1] Duplicate/Triplicate value adopted
<0.01 Limit of Reporting

A review of Table 7-13 indicates:

> PFOS+PFHxS concentrations along Kapooka Creek ranged from 0.0017 (SD121) to 0.0092 mg/kg (SD614) during E3 and E4. Concentrations of PFOA were reported less than the LOR of 0.0002 mg/kg during both sampling events.

> SD614 reported new minimum concentrations of PFOS+PFHxS and PFOS in E3.

> SD677 reported new minimum concentrations of PFOS+PFHxS and PFOS in E4.

> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.3.2.3 Wastewater Treatment Plant Ponds

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at sediment monitoring locations associated with the WTP sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-14.

Table 7-14 Wastewater Treatment Plant Ponds – Sediment PFOS+PFHxS, PFOS and PFOA Concentrations (mg/kg)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SD108	PFOS+PFHxS	<0.0002 - 0.0004	0.0006	0.0005
	PFOS	<0.0002 - 0.0004	0.0006	0.0005
	PFOA	<0.0002	<0.0002	<0.0002
SD111	PFOS+PFHxS	0.0005 - 0.0045	0.0004	0.0008
	PFOS	0.0005 - 0.0041	0.0004	0.0008
	PFOA	<0.0002	<0.0002	<0.0002
New maximum		New minimum		First-time detection

Notes:
* Inclusive of QC Results
<0.01 Limit of Reporting

A review of Table 7-14 indicates:

> During E3 and E4, PFOS+PFHxS concentrations in the WTP ponds ranged between 0.0004 (SD111 in E3) and 0.0008 mg/kg (SD111 in E4). PFOA concentrations were less than the LOR of 0.0002 mg/kg throughout both events.

> SD108 reported new maximum concentrations of PFOS+PFHxS and PFOS in E3.

> SD111 reported new minimum concentrations of PFOS+PFHxS and PFOS in E3.

> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.3.2.4 Overland Drainage Pathways – Former Quarry

A summary of the PFOS, PFOA and PFOS+PFHxS concentrations at sediment monitoring locations associated with the Overland Drainage Pathways – Former Quarry sampling area for the monitoring period, and the concentration range across all historical monitoring events, are presented in Table 7-15.

Table 7-15 Overland Drainage Pathways – Former Quarry – Sediment PFOS+PFHxS, PFOS and PFOA Concentrations (mg/kg)

Location ID	Analyte	Historical Concentration Range*	OMP Monitoring	
			E3 (Nov 2022)	E4 (Apr 2023)
SD127	PFOS+PFHxS	<0.0002 - 0.0007	0.0014[1]	<0.0002
	PFOS	<0.0002 - 0.0007	0.0014[1]	<0.0002
	PFOA	<0.0002	<0.0002	<0.0002

New maximum	New minimum	First-time detection

Notes:
* Inclusive of QC Results
[1] Duplicate/Triplicate value adopted
<0.01 Limit of Reporting

A review of Table 7-15 indicates:

> During E3 and E4, PFOS+PFHxS concentrations in the Overland Drainage Pathways – Former Quarry ranged between <LOR and 0.0011 mg/kg. PFOA concentrations were less than the LOR of 0.0002 mg/kg throughout both events.

> SD127 reported new maximum concentrations of PFOS+PFHxS and PFOS in E3.

> No other locations reported a first-time detection, new exceedance of assessment criteria, an order of magnitude change or a new maximum/minimum during the monitoring period.

7.4 Summary

A summary of the maximum PFOS+PFHxS concentrations historically recorded and the maximum concentrations recorded during the monitoring period are presented in Table 7-16 for each media assessed and investigation area.

Table 7-16 Maximum detected PFOS+PFHxS concentrations

Sampling Area	Phase	PFOS+PFHxS Maximums		
		Groundwater (µg/L)	Surface Water (µg/L)	Sediment (mg/kg)
Wastewater Treatment Plant	Historical	0.14 (MW107)	0.11 (SW111)	0.0045 (SD111)
	2022/2023	0.9 (MW107)	0.04 (SW111)	0.0008 (SD111)
Former Commandants House	Historical	0.23 (MW008)	-	-
	2022/2023	0.13 (MW008)	-	-
Kapooka Creek flow pathway	Historical	0.89 (MW601)	-	-
	2022/2023	0.77 (MW601)	-	-
Overland drainage pathways On-Base	Historical	-	4.15 (SW136)	0.0631 (SD136)
	2022/2023	-	0.36 (SW103)	0.0282 (SD136)
Kapooka Creek	Historical	-	0.39 (SW121)	0.033 (SD121)
	2022/2023	-	0.28 (SW121)	0.0092 (SD614)
Sewer	Historical	-	0.61 (SW148)	-
	2022/2023	-	0.17 (SW144)	-
Overland drainage pathways – Former Quarry	Historical	-	<0.01 (SW127)	0.0007 (SD127)
	2022/2023	-	<0.01 (SW127)	0.0014 (SD127)

It is noted that concentration maximums from the monitoring period are of the same order of magnitude as historical data with the following exception:

> Overland drainage pathways On-Base: the maximum surface water concentration was an order of magnitude lower than the historical data.

It is also noted that concentration maximums from the monitoring period were lower than their corresponding historical maximums in all sampling areas and for all media types with the following exception:

> Overland drainage pathways – Former Quarry: surface water concentration maximums from the monitoring period were equal to historical maximums (<0.01) and sediment concentration maximums from the monitoring period were slightly higher than the historical maximum.

8 Interpretive Analysis

This section discusses the results of the November 2022 and April 2023 monitoring events in the context of observed apparent trends in concentrations or plume migration patterns.

It should be noted that there is limited temporal data available for the media/locations sampled at this stage. However, where possible, data was reviewed and observed from a qualitative perspective, based on results presented in Section 7.

8.1 Groundwater

8.1.1 Groundwater Quality Field Parameters

Measurements presented in Table 7-1 indicate that both On-Site and Off-Site groundwater conditions are generally:

> Slightly acidic to near neutral.

> Anerobic to aerobic.

> Fresh to mildly brackish.

> Slightly reducing to moderately oxidising.

Redox measurements were somewhat inconsistent with DO readings, which is not uncommon. This likely reflected the microbial ecology where complex assemblages of microbes influence the redox conditions at various microscales in the pore space of the aquifers.

8.1.2 Changes in the Groundwater Flow Regime

Groundwater levels have generally varied by less than 0.80 m (with the exception of MW625) between the two monitoring events. Despite the change in groundwater levels there have been no significant changes in the groundwater flow regime, with groundwater consistently flowing in a north-westerly direction toward the Murrumbidgee River. Field observations obtained and presented within the scope of this OMR are relatively consistent with those from the PSI (Golder, 2017), DSI (Jacobs, 2019), and 2022 OMR (Cardno, 2023).

8.1.3 Groundwater PFAS Concentrations Over Time

Groundwater PFAS concentrations from 2017 to April 2023 are presented in Figures 5A to 5H, Appendix A.

Overall, PFAS concentrations appeared generally consistent between each monitoring event, with observed trends discussed within the following subsections.

As discussed within Section 7.1.3, PFAS results were arranged into three groups based on sampling area:

> Wastewater Treatment Plant (MW107 starting point).

> Former Commandants House (MW008 starting point).

> Kapooka Creek flow pathway (MW601 starting point).

Each sampling area and inferred down-gradient locations are discussed in the following sections.

8.1.3.1 Wastewater Treatment Plant

Upon review of Table 7-3 and the locations of wells adjacent to the WTP, the following evaluations were made:

> Concentrations of PFAS in the perched water table, east of the WTP (MW107), remained relatively stable and within historical ranges throughout both monitoring events, with PFOS+PFHxS reported slightly above drinking water criteria. Due to the proximity of MW107 to the WTP, the direction of groundwater flow (north-westerly), and the reporting of PFAS concentrations above LOR in the WTP ponds, the observed PFAS concentrations at MW107 may be a result of leakage from the WTP, which is understood to be clay lined (Golder, 2017).

> As outlined within the DSI (Jacobs, 2019), PFAS observed within perched water at MW107 may also be a result of rainwater infiltration. Further monitoring following periods of lower rainfall will allow for a greater understanding relating to how rainwater infiltration may be influencing observed PFAS concentrations.

> A first-time detection of PFOS+PFHxS and PFOA was reported at MW103 (screened in the regional aquifer), east of the WTP during E3. Concentrations did not exceed any adopted assessment criteria. In

the following event, all PFAS analytes reported concentrations below the LOR. This is the first-time PFAS has been detected within the regional aquifer within the Monitoring Area, with the exception of MW008 where impacts may be a result of surface water infiltration through the base of the well. The presence of PFAS at MW103 suggests that vertical migration between the perched water layer and the regional aquifer is potentially occurring. This is in contrast with observations made during the DSI and HHERA that the connection between the perched water and regional aquifer is limited by the clay geology. Future monitoring will be conducted to confirm if this trend is on-going.

> While PFAS has been detected in the regional aquifer at MW103, the northernmost regional groundwater well On-Site (MW104) continues to report concentrations less than the LOR. This suggests that PFAS impacts around the WTP are currently localised to the area and are unlikely to be extending Off-Site. However, additional data would be required to confirm presence/absence of PFAS concentrations in groundwater Off-Site, further down-gradient of MW104.

Results from sampling locations within the WTP sampling area currently indicate that PFAS is present within the perched water layer adjacent to the WTP and may also be migrating into the regional aquifer. PFAS in groundwater from around the WTP appears to be currently localised at this time. Further monitoring is required to determine any long-term trends.

8.1.3.2 Former Commandants House

Upon review of Table 7-4 and the locations of wells adjacent to the Former Commandants House, the following evaluations were made:

> Concentrations of PFOS+PFHxS and PFOA remained stable and within historical ranges at MW008 during both monitoring events. PFOA concentrations were below the LOR, consistent with historical results. It is possible that the presence of PFAS at MW008 is a result of surface water infiltration, due to MW008 being an open concrete well one metre in diameter with unknown construction, which could potentially allow for surface water infiltration near the base of the well as hypothesised within the DSI (Jacobs, 2019). Alternatively, PFAS may have migrated through the sand and gravel alluvial deposits found to be prevalent within this area from the Former Commandants House and Shed, which are located uphill relative to MW008.

> MW109, MW110 and MW625 did not report PFAS above the LOR in either event, consistent with historical monitoring results. As these wells were installed to monitor potential migration of PFAS sourced from MW008, the absence of PFAS in these wells potentially indicates that the extent of any PFAS contamination and migration in groundwater is currently limited to the area surrounding MW008 between these three wells (less than ~0.15 km^2), as discussed in the DSI (Jacobs, 2019).

Results from sampling locations within the Former Commandants House sampling area are consistent with PFAS results obtained from the HHERA (Jacobs, 2021), and previous OMP monitoring events which showed that the extent of PFAS in groundwater associated with MW008 is currently limited. Ongoing monitoring is required to assess any potential PFAS migration from MW008 towards the north-west.

8.1.3.3 Kapooka Creek

Upon review of Table 7-5 and the locations of wells within the Kapooka Creek flow pathway, the following evaluations were made:

> .

> During the E3 event, MW601 (perched water layer) reported a new maximum for PFOS. Results indicate a potential increasing trend for PFOS since 2019 when monitoring commenced. PFOS concentrations in E4 were lower than E3, but still marginally higher than the historical range. An apparent increasing trend was also noted for PFOS+PFHxS based on pre-OMP results, however results from the E3 and E4 appear to be slightly lower than those reported during the HHERA (Jacobs, 2021), and concentrations appear to be stable when compared to results from E1 and E2. PFOA results were reported <LOR across both events. Further monitoring is required to determine any long-term trends.

> In the regional aquifer (MW624) no detections of PFAS above the LOR were reported in either event, consistent with OMP and pre-OMP monitoring. This is likely caused by the clay layer between the perched water layer and the regional aquifer restricting the downward migration of PFAS into the regional groundwater in this area. The clay layer varies in thickness across the MA, hence why migration of PFAS from the perched aquifer to the regional aquifer is limited in this area, but was observed to be occurring around the WTP (see Section 8.1.3.1).

> Overall, PFAS concentrations were generally consistent with previous monitoring events. The potential increasing trend in MW601 will continue to be revisited and assessed during subsequent monitoring events.

Results from sampling locations within the Kapooka Creek sampling area are generally consistent with historical results indicating PFAS concentrations within perched water associated with Kapooka Creek are generally stable or increasing. No PFAS detections within the regional aquifer were reported, consistent with historical results, indicating that PFAS migration from perched water associated with Kapooka Creek into the underlying regional aquifer is currently limited. Ongoing sampling is required to monitor for potential future migration.

8.2 Surface Water

8.2.1 Surface Water Quality Field Parameters

Field parameters presented in Table 7-6 indicate that sampled surface water (including sewer) conditions were generally:

> Slightly acidic to slightly alkaline.

> Slightly anerobic to aerobic.

> Fresh.

> Reducing to oxidising.

Water was freshest within the overland drainage pathways On-Base, with surface water encountered adjacent to the WTP and within the sewer network having the highest salinity. Redox measurements varied between events and were inconsistent with DO readings, such as negative redox readings coupled with high DO readings. This poor correlation between redox measurements and DO is not uncommon and reflects the complex reactions that control the redox conditions.

8.2.2 Surface Water – Groundwater Interaction

Detections of PFAS in the regional aquifer (MW103) and observed lower EC values (see Table B1, Appendix A) suggest that vertical migration from perched water into the underlying regional aquifer is potentially beginning to occur around the WTP. Kapooka Creek has been identified as a losing system, with downward migration of surface water into the underlying perched water aquifer likely occurring (Jacobs, 2019). It is noted that a mass flux assessment is currently being undertaken across the Site as part of the PMAP actions, which may provide further insight into surface water – groundwater interactions.

8.2.3 Surface Water PFAS Concentrations Over Time

Surface water PFAS concentrations from 2018 to April 2023 are presented in Figures 6A to 6F, Appendix A.

Overall, PFAS concentrations appeared generally consistent between each monitoring event, with observed trends discussed within the following sections.

As discussed within Section 7.2.2, PFAS results were arranged into five groups based on sampling area:

> Overland drainage pathways On-Base.

> Kapooka Creek.

> Sewer.

> Wastewater treatment plant ponds.

> Overland drainage pathways – Former Quarry.

Each sampling area and inferred down-gradient locations are discussed in the following sections.

8.2.3.1 Overland Drainage Pathways On-Base

Upon review of Table 7-7 and the locations of surface water monitoring locations within the Overland Drainage Pathways On-Base, the following evaluations were made:

> SW136, SW103 and SW107 reported results which were similar or lower than historical results for all PFAS analytes. SW107 reported a new minimum concentration of PFOS during the E4 sampling event. SW136 reported new minimum concentrations for PFOS+PFHxS (also below adopted drinking water criteria) and PFOS during E4. Concentrations remained within one order of magnitude of historical results at all locations.

> At SW106, a drainage pathway to Kapooka Creek from treated effluent irrigations areas, first-time detections of PFOS+PFHxS in E3 and PFOS in E4 were reported. As this location was dry during E1 and E2, it has previously only been sampled once during the DSI when results were reported <LOR. Concentrations remained below applicable human health drinking water and ecological criteria during both sampling events. Further monitoring is required to determine any long-term trends.

> An order of magnitude decrease of PFOS+PFHxS concentrations was reported in E4 at SW118. These concentrations are a new minimum and are below adopted drinking water criteria for the first-time at this location.

Results from sampling locations within the Overland Drainage Pathways On-Base sampling area generally show similar or lower concentrations than those historically reported. Further monitoring is required to determine any long-term trends.

8.2.3.2 Kapooka Creek

Upon review of Table 7-8 and the locations of surface water monitoring locations within the Kapooka Creek flow pathway, the following evaluations were made:

> SW121 reported new minimum concentrations for PFOS+PFHxS and PFOS during the E3 event, although still within the same order of magnitude as historical results. Concentrations in E4 were within the historical range. PFOS+PFHxS levels remain in exceedance of the adopted drinking water human health criterion but are below recreational water criterion.

> PFOS+PFHxS and PFOS concentrations in a private dam along Kapooka Creek (SW680) reported a new minimum in E3, followed by a new maximum in E4, noting that it was only sampled once before (E2) and that concentrations reported relatively small fluctuations over time. PFOS+PFHxS concentrations were equal to and in exceedance of adopted drinking water human health criterion in E3 and E4 respectively. The increased concentrations of PFAS reported in E4 may have been influenced by the smaller volume of water present leading to increased concentrations in the dam during this sampling event (i.e. evapoconcentration).

> PFOS+PFHxS concentrations at SW614 had decreased five times in E3 from a historical maximum in E2 and were more in line with those reported during the DSI. PFOS+PFHxS concentrations were equal to drinking water criterion throughout both events. Concentrations remained stable between events and were reported within the historical range.

> SW677 was sampled for the first-time in E3 (location was previously dry) and first-time detections of PFOS+PFHxS and PFOS were reported. Concentrations were reported below adopted drinking water human health and ecological criteria. This location represents the furthest down-stream location sampled as part of the OMP and suggests that surface water PFAS impacts are potentially delineated to below human health and ecological criteria down-gradient of the Base. This location was unable to be sampled in the following event (E4) as it was dry. Ongoing monitoring is required to determine any long-term trends.

> Concentrations of PFAS along Kapooka Creek were highest at the location On-Base (SW121) and progressively decreased with distance from the Base, with the lowest concentrations observed at SW677 (furthest downstream location).

Results from sampling locations within the Kapooka Creek generally showed concentrations that were consistent with historical results.

8.2.3.3 Sewer

Upon review of Table 7-9 and the locations of surface water monitoring locations within the Sewer network, the following evaluations were made:

> New exceedances of adopted human health drinking water criteria for PFOS+PFHxS were reported at two locations (SW144 and SW149) in E3, although the concentrations reported remain below recreational criteria.

  - At SW144 PFOS+PFHxS and PFOS concentrations had increased an order of magnitude from a previous result of <LOR to 0.17 and 0.12 µg/L respectively (the highest PFOS+PFHxS concentrations reported throughout the sewer network). During the following event (E4) PFOS+PFHxS and PFOS concentrations had decreased to 0.02 µg/L (below drinking water criteria), consistent with historical sampling results.
  - At SW149, PFOS+PFHxS concentrations decreased an order of magnitude to <LOR in the following event (E4). SW149 also reported a new exceedance of adopted ecological criteria for PFOS and first-

time detection of PFOA during E3. During the following event (E4) an order of magnitude decrease of PFOS was observed and the concentrations of all PFAS analytes were reported below the LOR. As other PFAS species have been historically observed at this location, this first-time detection of PFOA is not considered to be associated with a new source or impact any receptors. The new exceedance of ecological criteria for PFOS is not considered to pose a risk to ecological receptors at this sampling point as it is a closed sewer section and inaccessible to any wildlife.

- As discussed in the HHERA (Jacobs, 2021), as purposeful direct contact (swimming or drinking) is not expected to be made with the sewer water, these new exceedances of human health drinking water criteria do not indicate a change in the associated risk to receptors. Ongoing monitoring is required to determine any long-term trends.

> PFAS concentrations at SW148 remained within the historical range during both sampling events. PFOS+PFHxS and PFOS increased by an order of magnitude during E3 and decreased by an order of magnitude in the following event (E4). During E3, PFOS+PFHxS and PFOS concentrations were reported to exceed the adopted human health drinking water and ecological criteria. As discussed in the DSI (Jacobs, 2019), this section of the sewer is open to the air and accessible to wildlife and is considered a potential risk to ecological receptors. Further monitoring is required to determine any long-term trends.

> Results collected during the E3 monitoring event do not support the hypothesis drawn in the DSI (Jacobs, 2019) that high concentrations observed at SW148 are likely attributed to the former Fire Training Areas in the vicinity of these locations. This hypothesis was originally formed in the DSI due to upstream (SW144) and downstream (SW149) locations reporting concentrations less than or near to the LOR whilst SW148 reported higher PFAS concentrations. During E3 however, both SW144 and SW149 reported concentrations of PFAS similar and/or higher than those reported at SW148. Further monitoring is required to determine any long-term trends.

> Concentrations at all locations were observed to have increased during the E3 sampling event and decreased during E4. The cause of this variation and the source of the higher PFAS concentrations in E3 remains unclear, however may be influenced by the higher rainfall, water volume and flow conditions observed during the E3 sampling event. Further monitoring is necessary to determine any long-term trends.

Consistent with historical sampling results, PFAS was present in all samples collected from the sewer network, with exception of SW149 in E4. However, no discernible pattern in concentration can be identified at this stage.

Results from sampling locations within the Sewer On-Base sampling area generally saw increased concentrations relative to historical results during E3, while concentrations reported in E4 were lower than E3 and similar to those observed in E1 and E2. Further monitoring is required to determine any long-term trends.

8.2.3.4 Wastewater Treatment Plant Ponds

Upon review of Table 7-10 and the locations of surface water monitoring within the WTP ponds, the following evaluations were made:

> SW111 reported a decrease in PFOS concentrations to a new minimum during the E4 event, although being within the same order of magnitude as historic concentrations.

> Concentrations at all other locations were reported within the historical ranges.

Results from sampling locations within the Wastewater Treatment Plant Ponds sampling area were generally consistent with historical results and concentrations of PFAS appear to be relatively stable. Further monitoring is required to determine any long-term trends.

8.2.3.5 Overland Drainage Pathways – Former Quarry

Upon review of Table 7-11 and the location of the surface water monitoring location within the Former Quarry Overland Drainage Pathway, the following evaluations were made:

> SW127 reported PFOS, PFOA and PFOS+PFHxS concentrations below the LOR for both E3 and E4, consistent with historical concentrations. This potentially indicates that there is limited migration of PFAS from the Former Quarry via the surface water drainage pathway, supporting results obtained from sampling during the DSI (Jacobs, 2018).

Results from the sampling location within the Overland Drainage Pathways – Former Quarry sampling area were consistent with pre-OMP results, indicating that PFAS from the Former Quarry is localised and not currently migrating via the surface water drainage pathway to Sandy Creek to the west. Ongoing sampling is required to monitor for potential future migration. However, should another year of monitoring report results below LOR, an assessment to remove this location from the OMP should be made.

8.3 Sediment

8.3.1 Sediment Field Observations

Field observations are presented in Table B3, Appendix B. Overall, sediment samples taken were similar between the E3 and E4 event. No visible evidence of contamination was identified, consistent with observations during previous OMP events and the DSI. No significant changes to odour or sediment colour were identified, when compared to historical field observations.

8.3.2 Sediment PFAS Concentrations Over Time

Sediment PFAS concentrations from 2018 to April 2023 are presented in Figures 7A to 7E, Appendix A.

Overall, PFAS concentrations appeared generally consistent between each monitoring event, with observed trends discussed within the following sections.

As discussed within Section 7.3.2, PFAS results were arranged into four groups based on sampling area:

> Overland drainage pathways On-Base.

> Kapooka Creek.

> Wastewater treatment plant ponds.

> Overland drainage pathways – Former Quarry.

Each sampling area and inferred down-gradient locations are discussed in the following sections.

8.3.2.1 Overland Drainage Pathways On-Base

Upon review of Table 7-12 and the locations of sediment monitoring locations within the Overland Drainage Pathways On-Base, the following evaluations were made:

> All On-Base overland drainage pathway locations reported new minimum concentrations of PFOS+PFHxS and PFOS during the E3 sampling event. This may be attributed to the above average rainfall in the months prior to and during the event (see Section 2.1.3) mobilising the PFAS in the sediment, however, PFAS concentrations in downstream sediment locations (e.g. SD121, SD614 and SD677) did not report any noticeable increases in E3. The higher water volumes observed, see Table B2 Appendix B, may have also contributed to decreased PFAS concentrations.

> SD136, targeting the Fire Station, reported an order of magnitude decrease and new minimum of PFOS+PFHxS and PFOS in E3. In the following event (E4) concentrations increased nine times back to similar concentrations as E2. The variability in sediment concentrations at this location may be partially attributed to the inherent variability associated with sediment sampling, due to the inherent heterogeneous nature of the sample matrix, and fluctuations as a result of rainfall.

> Two first-time detections of PFOA were reported during E4 at locations targeting the Fire Station (SD136 and SD103). The reported concentrations were equal to or just above LOR (0.0002 and 0.0003 mg/kg respectively). PFOA was detected in surface water at both locations during E3, however concentrations were reported less than the LOR during E4. As other PFAS species have been observed in the sediment at these locations historically, this is not considered to be associated with a new source or impact any receptors. Downstream locations (SD107, SD118) continue to report PFOA concentrations less than the LOR. Further monitoring is required to establish potential trends.

Results from sampling locations within the Overland Drainage Pathways On-Base sampling area generally reported stable or decreased concentrations of PFOS+PFHxS, and stable or slightly increased concentrations of PFOA. Further monitoring is required to determine any long-term trends.

8.3.2.2 Kapooka Creek

Upon review of Table 7-13 and the locations of sediment monitoring locations within the Kapooka Creek flow pathway, the following evaluations were made:

> Concentrations of PFOS+PFHxS at the most downstream On-Base location along the Kapooka Creek pathway (SD121) remained within the historical range during both sampling events. Concentrations at this location appear to show a slight decreasing qualitative trend since sampling commenced in 2018. Ongoing monitoring is required to determine any long-term trends.

> At Off-Base locations along Kapooka Creek, new minimum PFOS+PFHxS and PFOS concentrations were reported during E3 (SD614) and E4 (SD677). Concentrations at both locations remained within the same order of magnitude.

> During both E3 and E4, concentrations of PFOS+PFHxS within the Kapooka Creek flow pathway were lowest On-Base (SD121) and higher Off-Base (SD614 and SD677). This distribution of PFAS mass along the Kapooka Creek flow path is likely influenced by the depth and volume of the water body, rainfall and flow rate.

Results from sampling locations within the Kapooka Creek sampling area were generally consistent or slightly lower than historical results. Further monitoring is required to determine any long-term trends.

8.3.2.3 Wastewater Treatment Plant Ponds

Upon review of Table 7-14 and the locations of sediment monitoring locations within the WTP ponds, the following evaluations were made:

> Concentrations of PFOS+PFHxS at SD108 reported a slight increase during E3 and E4, with new maximum concentrations reported in E3 (0.0006mg/kg). Concentrations remained within the same order of magnitude as historical results and the limit of reporting.

> Concentrations of PFOS+PFHxS and PFOS at SD111 reported a new minimum in E3, within the same order of magnitude as historical results. Concentrations in E4 were consistent with results reported in E1 and E2, slightly lower than pre-OMP concentrations.

Results from sampling locations within the WTP ponds sampling area appear to show relatively stable PFOS+PFHxS concentrations. Further monitoring is required to determine any long-term trends.

8.3.2.4 Overland Drainage Pathways – Former Quarry

Upon review of Table 7-15 and the location of the sediment monitoring location within the Former Quarry Overland Drainage Pathway, the following evaluations were made:

> During E3, concentrations of PFOS+PFHxS and PFOS reported a new maximum (0.0014mg/kg) at SD127. These concentrations are within one order of magnitude of historical results and the limit of reporting (0.0002mg/kg).

> During the following event (E4), concentrations of both analytes reduced to below LOR. This is consistent with surface water results at the same location. Further monitoring is required to determine any long-term trends.

Results from the sampling location within the Overland Drainage Pathways – Former Quarry sampling area saw a minor increase in PFOS+PFHxS and PFOS concentrations in E3 followed by a decrease in E4. These results indicate that PFAS migration from the Former Quarry via the surface water drainage pathway to Sandy Creek to the west is currently limited. Ongoing sampling is required to monitor for potential future migration.

9 Discussion

9.1 Conceptual Site Model

Jacobs (2019) developed a CSM for the Site as part of the DSI, which has been reviewed by Cardno considering the new datasets available. The following has been considered:

> Is there evidence of new PFAS source areas?
> Is there evidence of new pathways via groundwater or surface water?
> Is there evidence of new receptors?

9.1.1 New PFAS Source Areas

A small number of first-time detections and new exceedances of assessment criteria in groundwater and surface water have been recorded since the DSI. However, none of these results indicate new PFAS sources. New maximums and new minimums were both reported during the monitoring period, as well as order of magnitude increases and decreases.

No new sources were identified from the ancillary information provided by the Base or the Lead Consultant.

9.1.2 New Pathways

Although some concentration changes have been observed, these are not considered to indicate new pathways of PFAS transport via groundwater, surface water or sediment, and therefore, no new pathways of PFAS transport were identified.

Vertical migration of PFAS from the perched water layer into the regional aquifer has been recognised as a potential pathway in previous assessments (DSI, HHERA). This pathway has generally been considered limited due to the clay geology surrounding the WTP and the absence of any PFAS detections within the regional aquifer. Detections of PFAS were reported for the first time within the regional aquifer around the WTP during the monitoring period. These detections suggest that this potential pathway may be more significant than was outlined in the DSI (Jacobs, 2019), however ongoing monitoring is required to confirm this.

9.1.3 New Receptors

No new receptors have been identified.

9.1.4 CSM Revisions

While no new PFAS sources, new pathways, or new receptors have been identified as discussed above, the migration pathway of PFAS transport via groundwater in the regional aquifer On-Base may be more significant than is outlined in the DSI (Jacobs, 2019), however further monitoring is required. Detections of PFAS observed in the regional aquifer around the WTP indicates vertical migration of PFAS from the perched water layer may be occurring.

9.2 Risk Profile

9.2.1 Summary of Risk Profile

A summary of “elevated” or “unable to be excluded” current and potential risks identified in the Human Health and Ecological Risk Assessment (HHERA) report (Jacobs, 2021a) are provided below.

Current risks:

> Consumption of fish from private dams by residents.
> Consumption of home-slaughtered lamb for meat consumption by residents.
> Cumulative exposure risk to residents through consumption of multiple produce types.
> Direct toxicity to lower order species.
> Bioaccumulation and effects on higher order species.

Potential risks:

> Consumption of home-grown duck eggs by residents.

- Consumption of home-slaughtered pigs for meat consumption by residents.
- Consumption of milk from dairy cattle raised by residents.

Potential risk sources have been identified and have been categorised as either Primary or Secondary source areas:

9.2.1.1 Primary Source Areas

- Areas where PFAS was detected in soil or groundwater exceeding the adopted assessment levels include areas associated with waste disposal including the ELF Stockpiles and Buried Waste Areas; areas which relate to the use or testing of firefighting foam equipment, including the Fire Station, Fire Training Pad, Former Fire Training Areas, the Parade Ground and the Former Quarry; and two other primary source areas which relate to singular or less frequent discharges of firefighting foam, including the waterslide at the site of annual Christmas parties from 1995 and 2003, and in response to a fire at the Former Commandant's House in 2006.

9.2.1.2 Secondary Source Areas

- Secondary source areas are related to waste treatment and the discharge of treated effluent, including the WTP and Reused Effluent Irrigation Areas.

9.2.2 Consideration of Monitoring Results on Risk Profile

Qualitative assessment of PFAS concentrations from E3 and E4 compared to the historical data indicate results are generally inconclusive.

New maximums and new minimums were reported during the monitoring period, with this occasionally occurring at the same sampling location over subsequent events, with order of magnitude increases and decreases also reported. Given the limited dataset at the majority of locations, plus the potential influence on concentrations, particularly surface water, due to the above mean rainfall in 2022, additional data and further monitoring are required to establish any long-term trends and assess any potential changes to the risk profile.

Given the first-time detections of PFAS in groundwater, reported within the regional aquifer surrounding the WTP at MW103, the existing risk profile associated with the potential migration of PFAS from the perched water layer into the regional aquifer has been reviewed to consider these new results.

As discussed in the PSI (Golder, 2017), DSI (Jacobs, 2019) and HHERA (Jacobs, 2021), groundwater extraction is undertaken On-Site for stock, irrigation and army training purposes. The closest of these bores is located approximately 0.5 km northwest, hydraulically downgradient, from MW103. Off-Site in areas surrounding the Base, regional groundwater is understood to be used for stock, irrigation, and non-potable uses including showering, laundering clothes and flushing toilets. Given that use of groundwater for drinking water was not identified in the DSI (Jacobs, 2019) and the availability of mains water in areas surrounding the Base, the exposure pathway to human health receptors via drinking of groundwater is considered unlikely to be realised. Furthermore, PFOS+PFHxS concentrations in the regional aquifer On-Site (MW103) were reported below adopted human health drinking water and ecological criteria throughout both events.

Down gradient well MW104 appears to be located in a semiconfined hydrogeological environment with an upper clay confining layer and a water bearing siltstone layer beneath this. Based on the limited data from the DSI and borelogs, it appears water levels in MW104 are equalising in the clay layer whilst MW103 is equalising in the siltstone. However, the wells are likely hydraulically connected as the bottom of the MW104 screen and filter pack intercepts the top of the siltstone layer, which is the anticipated source of the water in the well. Thus the two wells are expected to intercept the same groundwater present in the regional aquifer in the siltstone. MW104 reported PFAS concentrations below the LOR throughout both events suggesting the PFAS impacts are relatively delineated On-Base by MW104[2]. Additionally, PFAS impacts in groundwater in the regional aquifer surrounding the Former Commandants House had already been identified at MW008, and were therefore considered in the development of the risk profile outlined in the HHERA. The review has therefore determined that there is no change to the risk profile at this stage. However, this will be considered further as part of PMAP implementation works. Further monitoring will allow for assessment of any changes

[2] It is noted that the location of MW104 is inadequate for monitoring any potential vertical migration of PFAS from the southeastern WTP ponds into the regional groundwater aquifer. Should further detects and/or increasing concentrations be reported at MW103 and/or MW104, additional delineation wells should be considered.

in the movement and extent of these groundwater impacts, for the establishment of long-term trends, and to consider any potential future changes to the risk profile.

9.3 Assessment of Current OMP

Cardno assessed the OMP (Department of Defence, 2021a) in consideration of the findings of this interpretive report to identify if a review of the OMP is required. As outlined in the Defence Annual Interpretive Report Guidance (Defence, 2022), the following are triggers which may require an OMP Review:

- Policy:
  - Internal or external policy changes.
  - Updates to guidance.
- Regulations or stakeholder considerations:
  - Changes to regulatory requirements.
  - Changes to regulator advice on exposure-minimisation behaviours e.g. precautionary advice.
  - Feedback and information received as a result of community consultation.
- Site conditions:
  - Changes or refinements to the monitoring network, frequency and parameters.
  - Interpretive analysis presented in the OMR.
  - Changes to the CSM or risk profile.
  - Significant changes of land use within the Monitoring Area or adjoining land.
  - The impacts of remediation work.
  - The requirements of a post-remediation Site Management Plan.

As per the OMP, the need for continued monitoring at numerous locations has been assessed now that four rounds of the OMP have been completed. Notably, the need for ongoing monitoring at surface water locations within the sewer network (SW140, SW144, SW148 and SW149) was assessed. As discussed within Section 8.2.3.3, PFAS concentrations at SW144, SW148 and SW149 varied between events and when compared to historic results, with new exceedances being reported at two locations (SW144 and SW149) and a first-time detection reported at SW149. As these results are not consistent with the DSI and previous OMP events, further monitoring is recommended.

The need for SW/SD108 and SW/SD111 was also reviewed based upon results as per the OMP. Both locations (SW/SD108 and SW/SD111) are generally consistent with historic results. SW111 exceeded the drinking water guidelines for PFHxS+PFOS during the DSI but has dropped below them during all OMP events (E1-E4). SD108 recorded a new maximum concentration, however results remained within an order of magnitude of historical concentrations. These locations were included within the OMP to assess trends within the WTP, in addition to assisting in understanding any changes within the sewer network. As only four rounds have been completed within the OMP, during which fluctuations in concentrations have been observed within the Sewer sampling locations, further sampling of these locations is recommended.

10 Conclusions

Cardno undertook the November 2022 and April 2023 biannual groundwater, surface water and sediment monitoring events at Blamey Barracks Kapooka as part of the PFAS OMP. Results from these events have been compared to adopted assessment criteria and historical data to address the objectives of the PFAS OMP OMR:

> To provide a succinct summary of the November 2022 and April 2023 monitoring data;
> To determine trends in the distribution, concentration, and transport of PFAS;
> To evaluate the current CSM and understanding of risk; and
> To provide supporting data for the assessment of management actions, where relevant.

The November 2022 and April 2023 monitoring and interpretive assessments have met the overall objective of the OMP 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 AFFF. While there have been some deviations from the original OMP program as outlined within Section 3.2, monitoring has been carried out in general accordance with the SAQP to the extent possible.

Per the requirements outlined in the Defence Annual Interpretive Report Guidance (Defence, 2021), quantitative trend analysis of groundwater, surface water and sediment was not performed.

10.1.1 Groundwater

Overall, the PFAS concentrations reported during the November 2022 and April 2023 monitoring events for the On-Site monitoring wells were generally similar to historical results.

Results from this OMP monitoring period suggest that vertical migration of PFAS from perched water associated with the WTP ponds into the underlying regional aquifer is potentially occurring. However, these impacts appear to be currently delineated down-hydraulic gradient of the WTP. Ongoing monitoring of wells surrounding the WTP will aim to confirm vertical migration of PFAS into the regional aquifer and enable delineation of these impacts.

PFAS results around the Former Commandants House sampling area support conclusions drawn within the PSI (Golder, 2017) and DSI (Jacobs, 2019), that the extent of any PFAS contamination and migration in groundwater within this area is currently limited.

Results within the Kapooka Creek sampling area are consistent with pre-OMP monitoring, potentially indicating that PFAS migration from the perched water layer into the regional aquifer is currently limited.

Overall, 2023 groundwater monitoring results do not indicate a change to the risk profile.

10.1.2 Surface Water

Several first-time detections and new exceedances of assessment criteria were reported during the November 2022 and April 2023 monitoring events.

Results from sampling locations within the Overland Drainage Pathways On-Base sampling area generally showed similar or lower concentrations than those historically reported.

Concentrations of PFAS along Kapooka Creek were highest On-Base and progressively decreased with distance from the Base. Results from sampling locations within the Kapooka Creek generally showed concentrations that were consistent with historical results.

Results from sampling locations within the Sewer On-Base sampling area fluctuated without any clear trend.

Overall, these results do not indicate a change in the risk profile.

No exceedances of the adopted assessment criteria for PFOA were reported at any surface water location.

10.1.3 Sediment

Sediment samples taken from the Overland Drainage Pathways On-Base locations generally reported decreased concentrations of PFOS+PFHxS and PFOS during E3 compared to historical results, whilst concentrations in E4 were similar to historical.

Concentrations of PFOS+PFHxS and PFOS reported along the Kapooka Creek flow path show either potentially decreasing or stable qualitative trends since sampling commenced in 2018.

Concentrations of PFAS within the WTP ponds appear to be relatively stable and consistent with historical results.

Concentrations of PFOS+PFHxS and PFOS reported within the Former Quarry Overland Drainage Pathway reported minor increases in E3 followed by decreases to below LOR in E4. These results indicate that PFAS migration from the Former Quarry via the surface water drainage pathway to Sandy Creek to the west is currently limited.

Overall, sediment monitoring results from 2023 do not indicate a change to the risk profile.

10.2 Conceptual Site Model & Risk Profile

The November 2022 and April 2023 monitoring events were carried out in general accordance with the OMP and SAQP. Results generally did not identify any changes to the risk profile for the MA. The 2022/2023 monitoring results were generally within the same order of magnitude as historical data for all media tested, with the exception of locations within the On-Base Sewer Network which reported some fluctuations in PFAS concentrations. There were a few localised first-time detections/new exceedances of assessment criteria, but these generally didn’t indicate new pathways of PFAS transport. However, detections of PFAS observed in the regional aquifer around the WTP indicates vertical migration of PFAS from the perched water layer may be occurring. These detections suggest that this potential pathway may be more significant than was outlined in the DSI (Jacobs, 2019). Ongoing monitoring is required to confirm this. The impact of this first-time detection on the risk profile will be assessed following collection of more data. At present, this detection does not indicate a change in the risk profile.

As only four monitoring events have been completed, trends are difficult to identify. Further monitoring is required to monitor for any developing trends or potential changes to the risk profile.

11 References

General References

1. Australian and New Zealand Guidelines, (2018), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*
2. Australian Groundwater Explorer, http://www.bom.gov.au/water/groundwater/explorer/map.shtml, accessed (19/12/2023).
3. Australian Soil Resource Information System, http://www.asris.csiro.au/mapping/viewer.htm, accessed (19/12/2023).
4. 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*.
5. Bureau of Meteorology, 072150, 1941 to 2023 (BoM, 2023) http://www.bom.gov.au, accessed (19/12/2023).
6. Bureau of Meteorology, 072150, 2017 to 2023 (BoM, 2023) http://www.bom.gov.au, accessed (19/12/2023).
7. City of Wagga Wagga (2018), *WaggaEX Intramaps*, (https://maps.wagga.nsw.gov.au/intramaps90/default.htm?project=WaggaEx).
8. Department of Defence, (2019a), *Contamination Management Manual – Annex L Guidance on Data Management*, July 2018, amended August 2019.
9. Department of Defence, (2019b), *Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring.*
10. Department of Defence, (2022), *PFAS OMP Annual Interpretive Report Guidance – Version 0.4. October 2022.*
11. Department of Defence, Department of Energy, (2018), *Quality System Manual Schedule B15 USEPA DQO Process.*
12. Heads of Environmental Protection Authority's Australia and New Zealand, (HEPA; 2020), *National Environmental Management Plan (NEMP),* Version 2.0, January 2020.
13. National Environment Protection Council, (NEPC; 1999), *National Environmental Protection (Assessment of Site Contamination) Measure* (as amended), registered May 2013.
14. National Health and Medical Research Council, (NHMRC; 2019), *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water,* August 2019.
15. 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'*.
16. U.S. Environmental Protection Agency, (USEPA; 2000), *Guidance for the Data Quality Objectives Process (EPA QA/G-4).*
17. USEPA, (2002), *Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8),* November 2002.

Site Specific References

18. KBR, (2013), *Kapooka Training Area Sustainability Monitoring and Reporting Plan (No. MEN208-TDEV-GEB-0005 Rev0)*, Kellogg Brown & Root Pty Ltd.
19. Golder, (2017), *Preliminary Site Investigation for PFAS Blamey Barracks Kapooka (0315) (No.1669283_001_R_Rev1)*, Golder Associates Pty Ltd.
20. Jacobs, (2019), *Blamey Barracks Comprehensive PFAS Investigation – Detailed Site Investigation (No. IS253200-040-NP-RPT-0002 Rev4)*, Jacobs Group (Australia) Pty Ltd.
21. Cardno, (2023a), *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP), Blamey Barracks Kapooka*, Prepared for Department of Defence, 6 April 2023.

22. Cardno, (2023b), *PFAS OMP Factual Report*: *Biannual Sampling Event November 2022*, 13 April 2023.
23. Cardno, (2023c), *PFAS OMP Factual Report*: *Biannual Sampling Event April 2023*, 27 June 2023.
24. Cardno, (2024), *Draft PFAS OMP Ongoing Monitoring Report October 2021 & April 2022*, 31 January 2024.
25. Department of Defence, (2021a), *PFAS Ongoing Monitoring Plan (OMP) - Blamey Barracks Kapooka*, June 2021.
26. Department of Defence, (2021b), *PFAS Management Area Plan (PMAP) – Blamey Barracks Kapooka*, June 2021.
27. Jacobs, (2021), *Blamey Barracks Comprehensive PFAS Investigation – Human Health and Ecological Risk Assessment (No. IS253200-040-NP-RPT-0006 Rev4,* June 2021.

APPENDIX

A

FIGURES

Cardno

now

Stantec

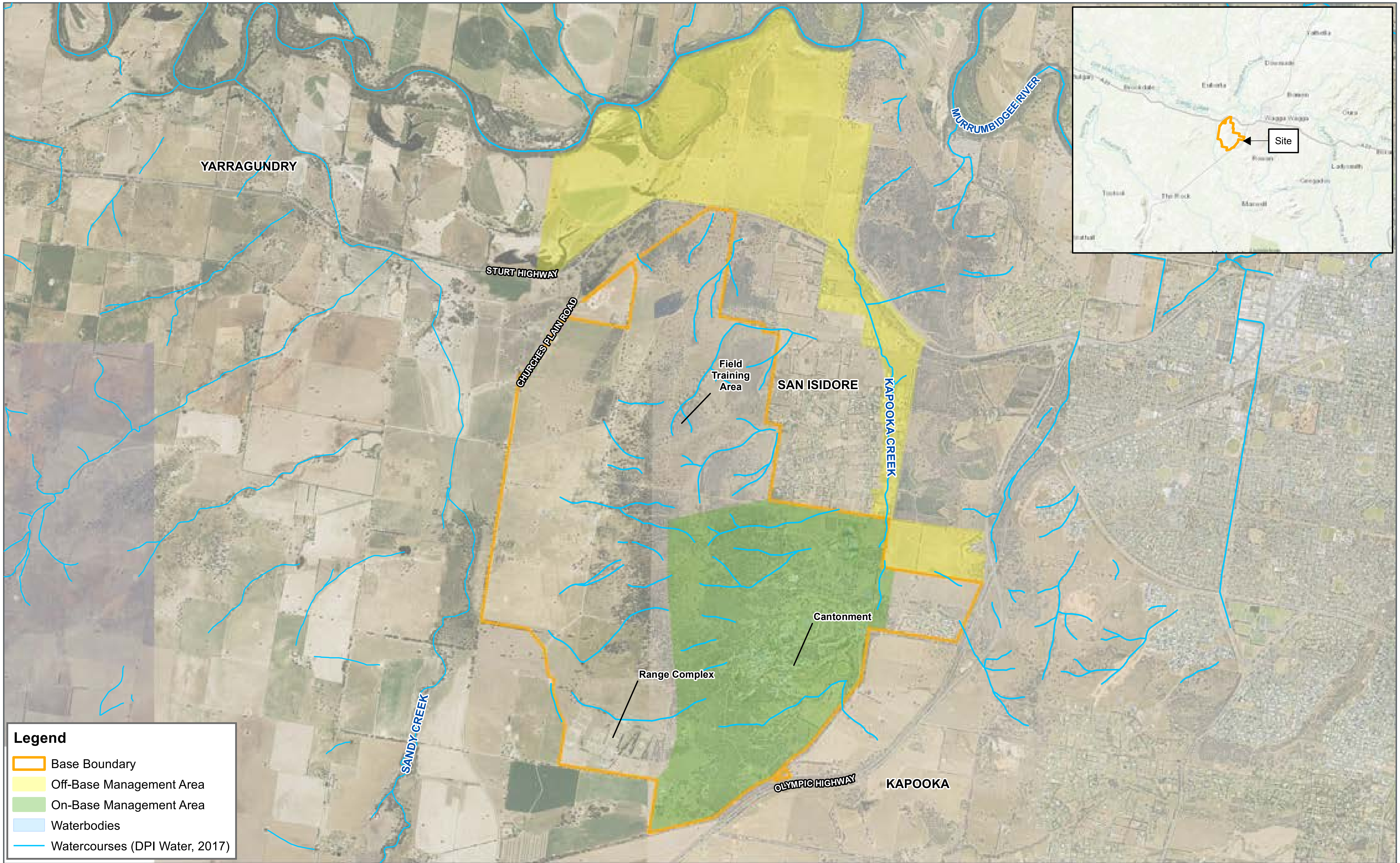

FIGURE 1

1:40,000 Scale at A3

Metres: 0 — 1,000 — 2,000

Site Locality Plan & Management Areas

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Map Produced by Cardno now Stantec
Date: 2023-12-05 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0164-SiteLocalityPlan_K.mxd 02
Aerial Imagery Supplied by Metromap (February, 2022)

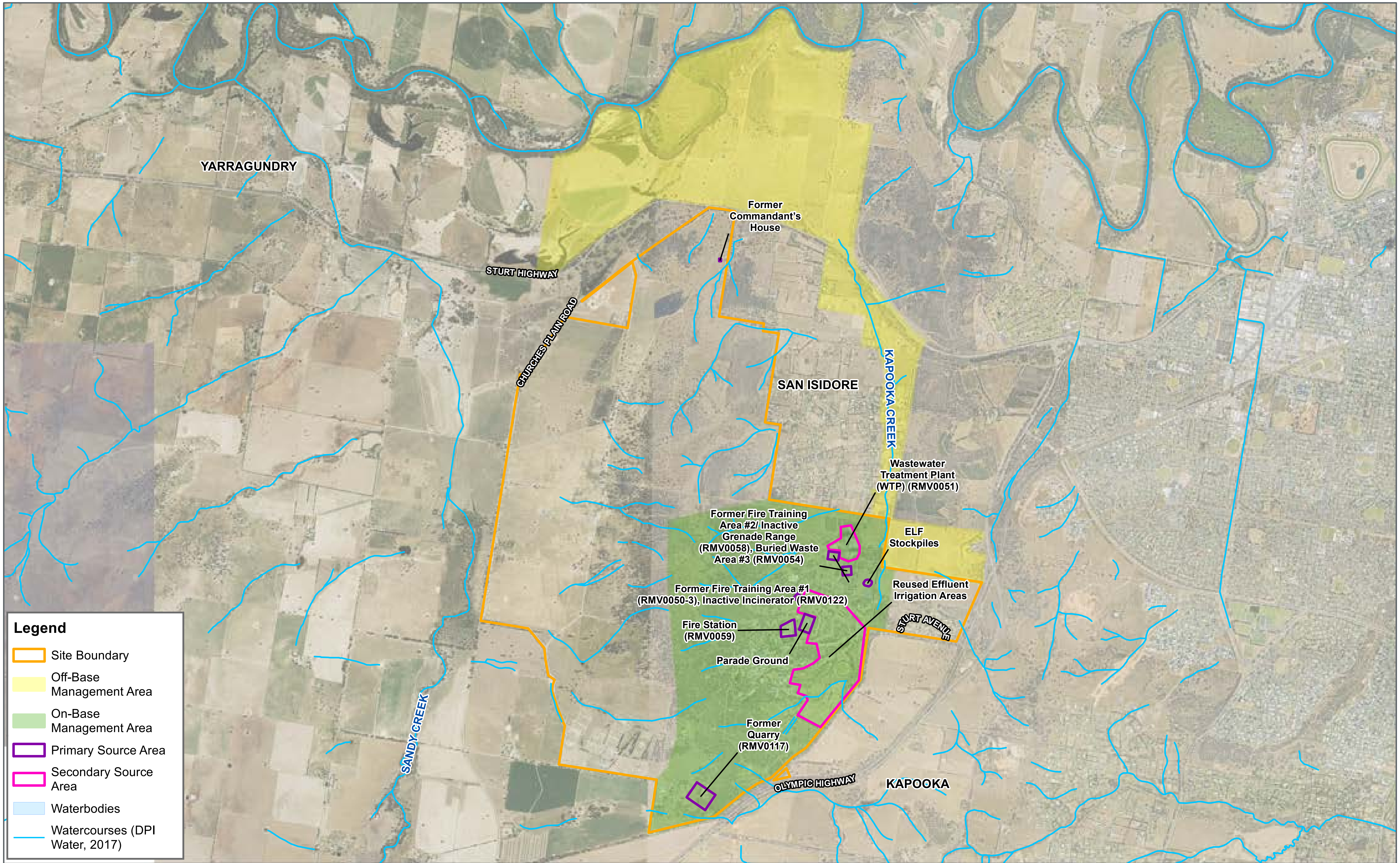

FIGURE 2

1:40,000 Scale at A3

Metres 0 1,000 2,000

Source Areas

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-12-05 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0165-SourceAreas_K.mxd 02
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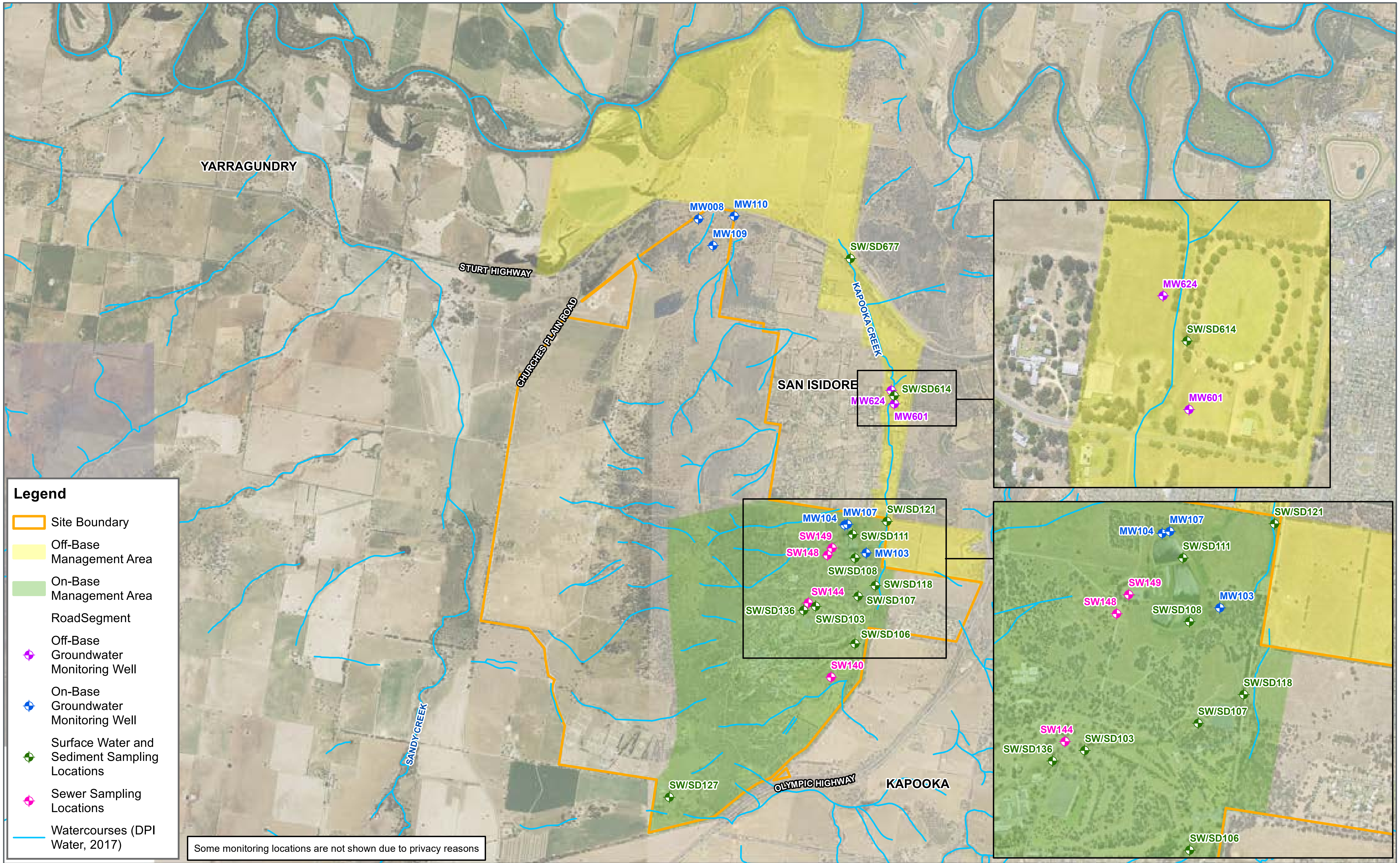

FIGURE 3

1:40,000 Scale at A3

Metres

0 1,000 2,000

Sampling Locations

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno — Stantec

Map Produced by Cardno now Stantec
Date: 2024-02-05 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0166-SampleLocationsN_K.mxd 04
Aerial Imagery Supplied by Metromap

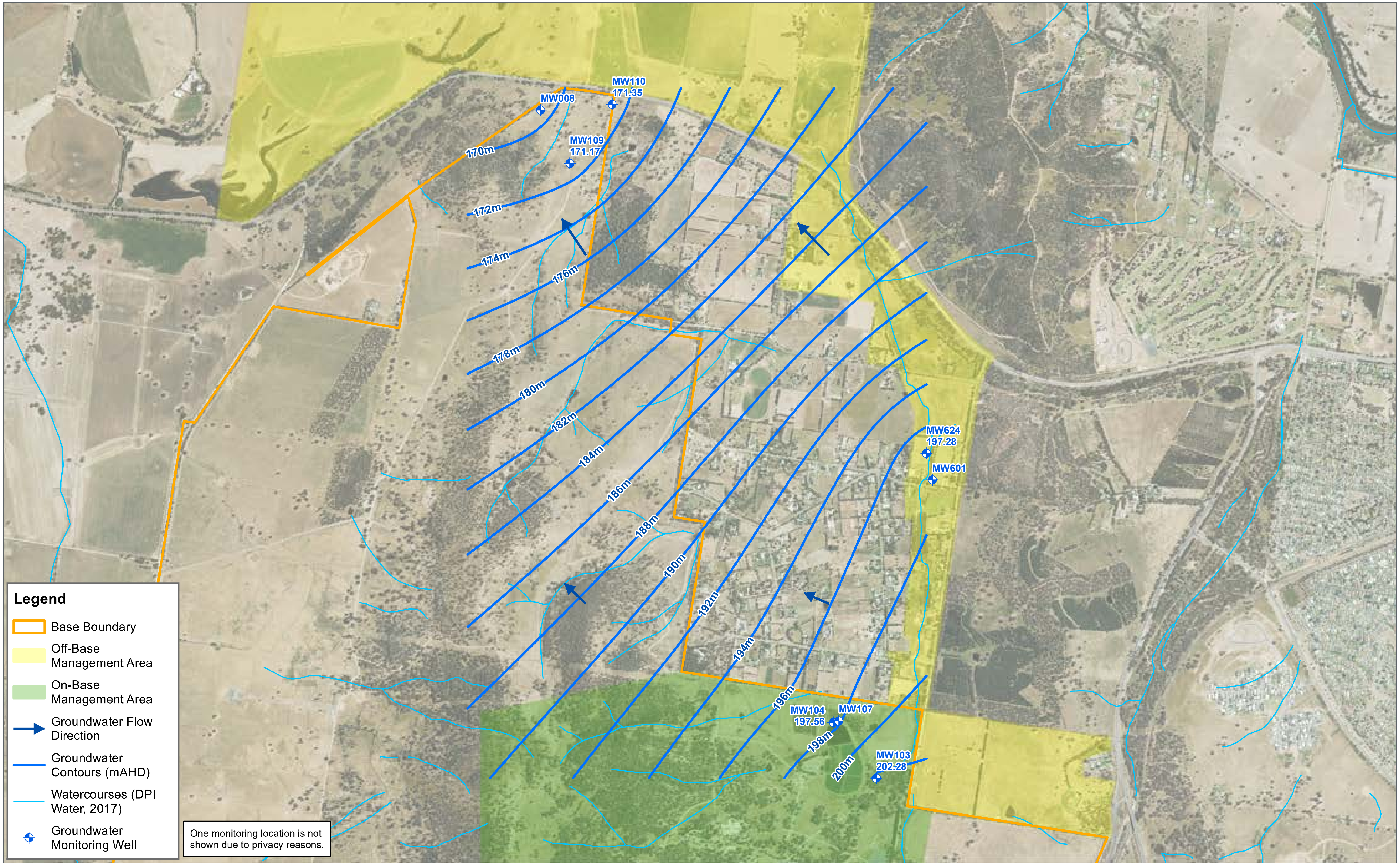

FIGURE 4A

1:20,000 Scale at A3

Metres 0 500 1,000

Groundwater Elevation Contours (November, 2022)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-05-19 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0259-GW_Contours_E3_K.mxd 01
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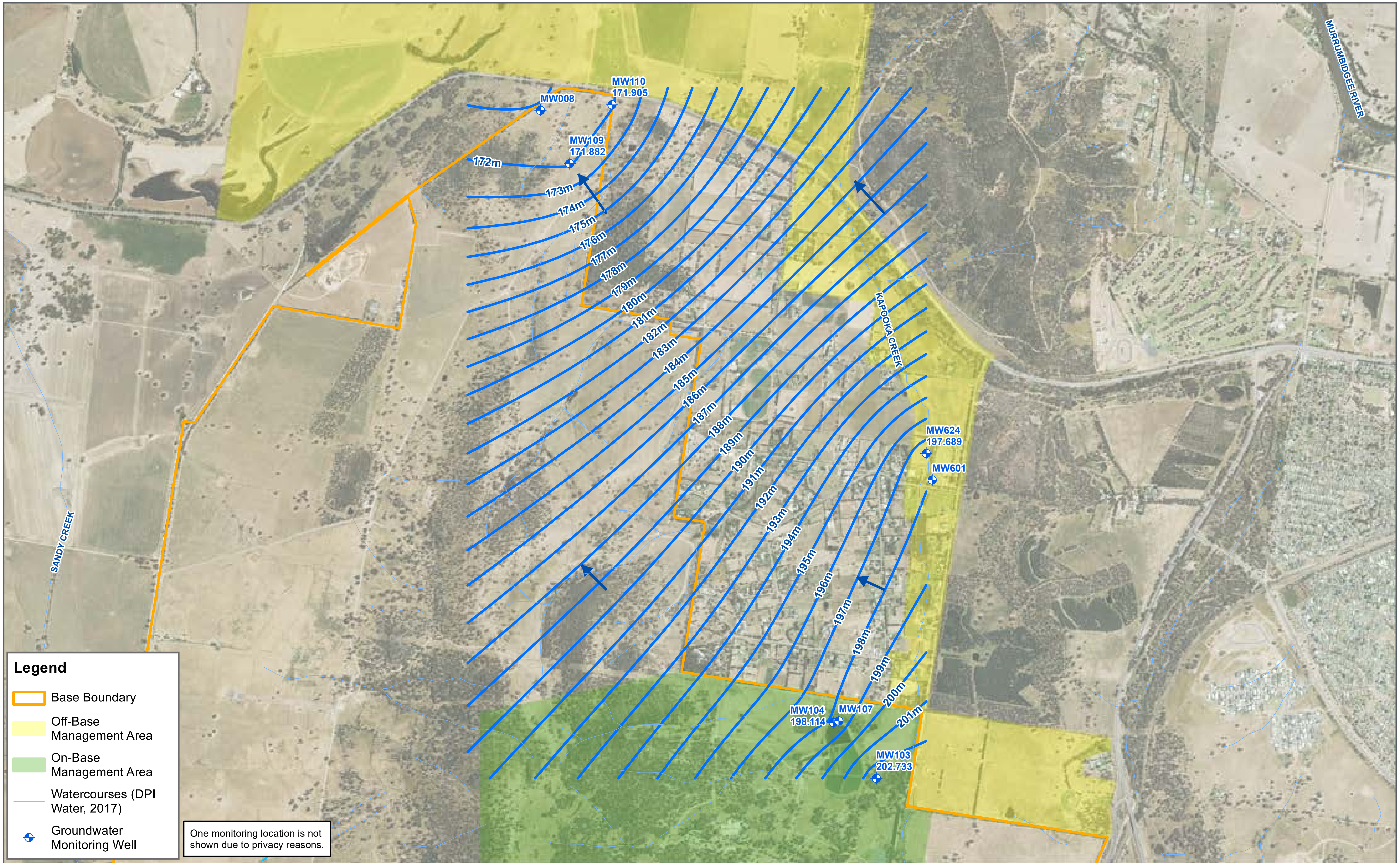

FIGURE 4B

1:20,000 Scale at A3

Metres
0 500 1,000

Groundwater Elevation Contours (April, 2023)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno — Stantec

Map Produced by Cardno now Stantec
Date: 2023-06-20 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0335-GW_Contours_E4_K.mxd 01
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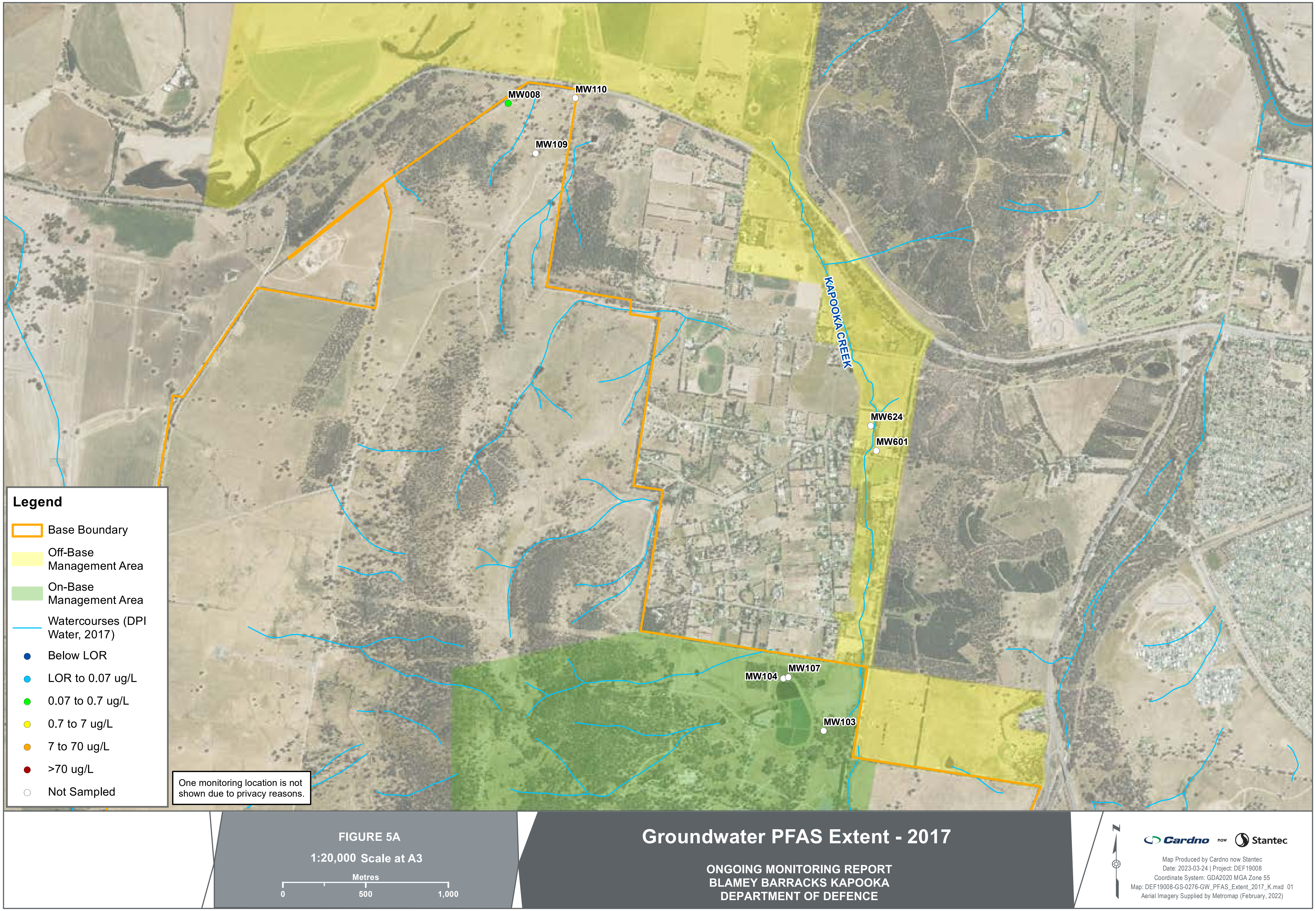

FIGURE 5A

1:20,000 Scale at A3

Groundwater PFAS Extent - 2017

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-03-24 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0276-GW_PFAS_Extent_2017_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

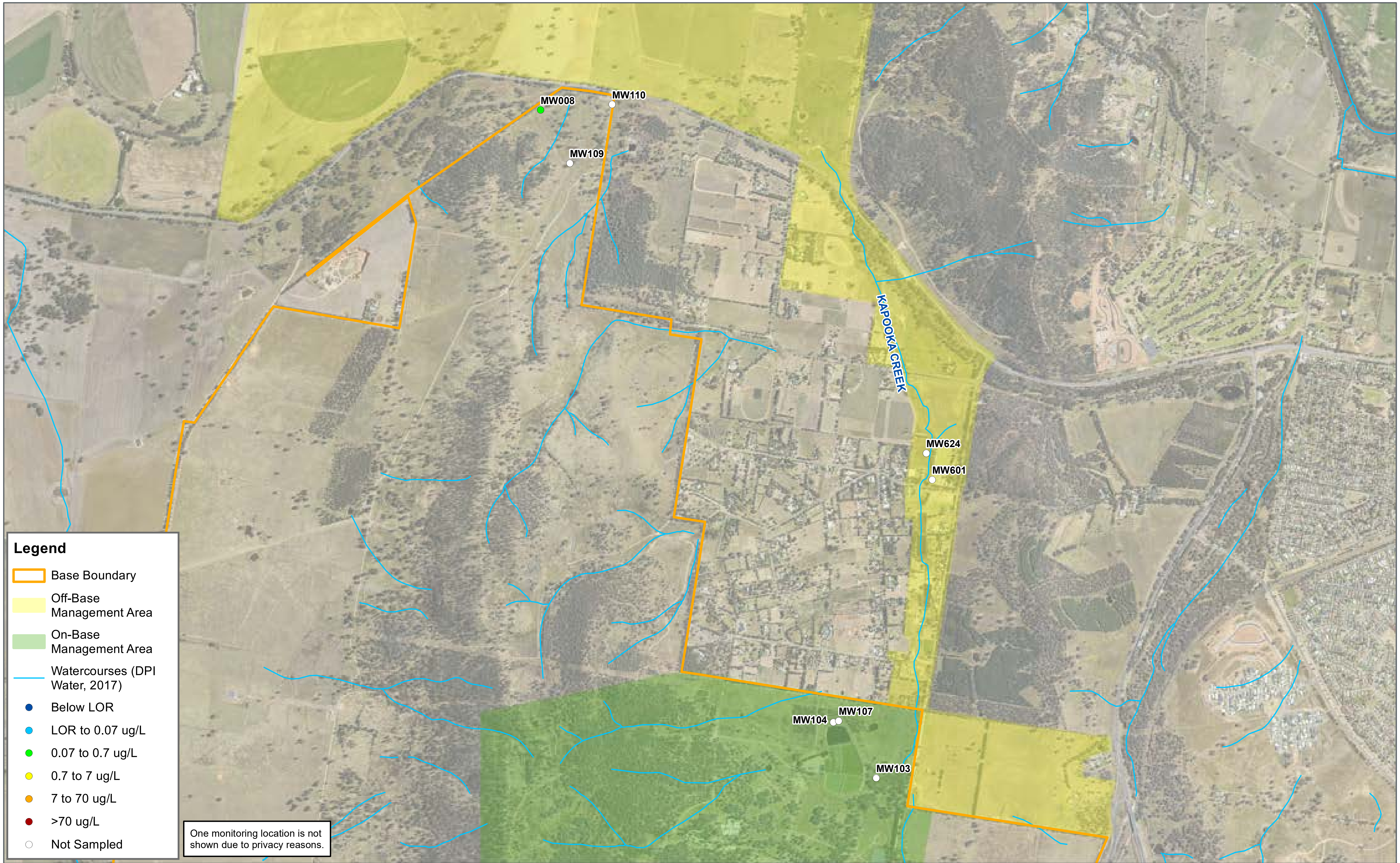

FIGURE 5B

1:20,000 Scale at A3

Metres 0 500 1,000

Groundwater PFAS Extent - 2018

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-01-30 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0277-GW_PFAS_Extent_2018_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

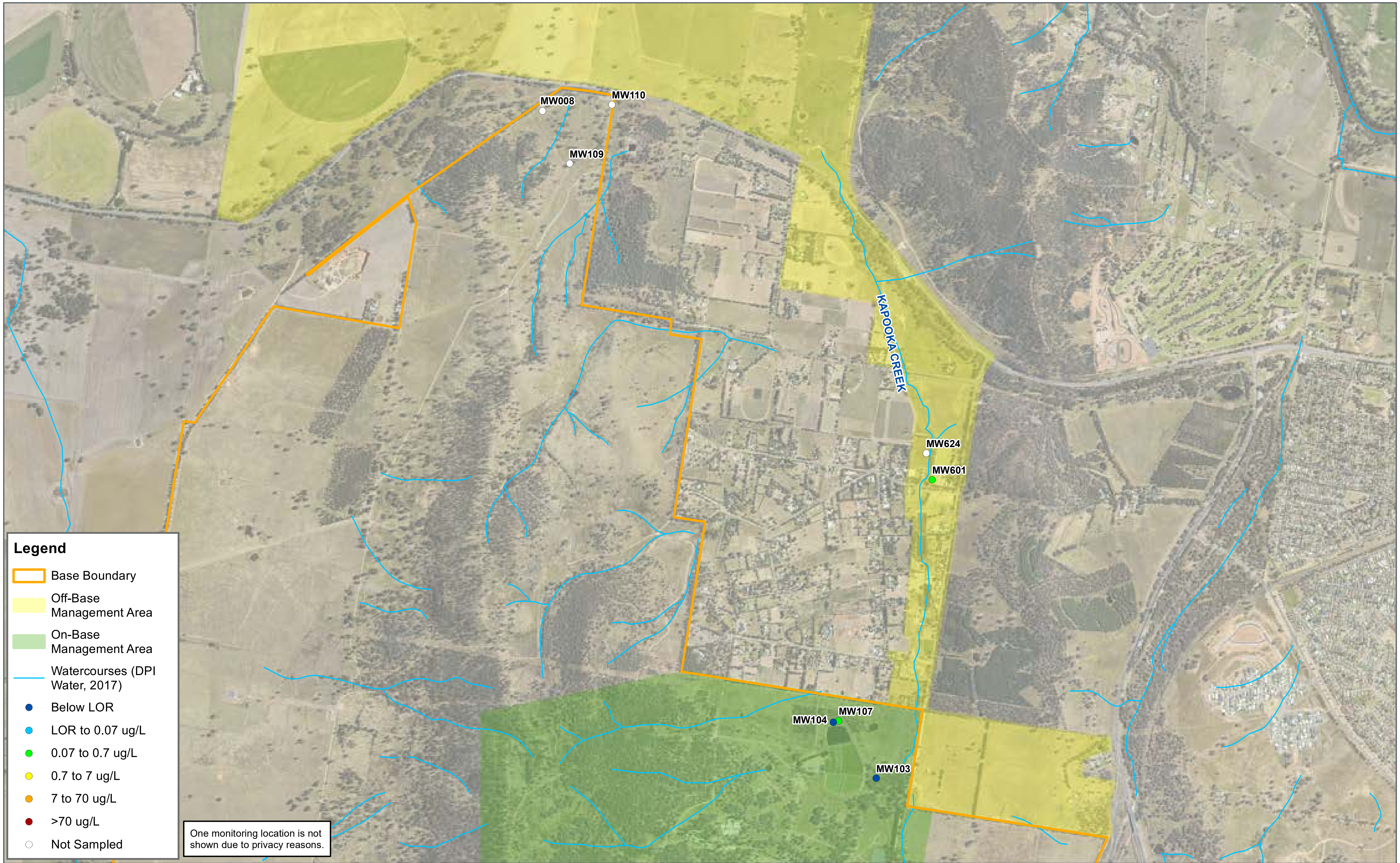

FIGURE 5C

1:20,000 Scale at A3

Metres 0 500 1,000

Groundwater PFAS Extent - 2019

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-01-30 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0278-GW_PFAS_Extent_2019_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

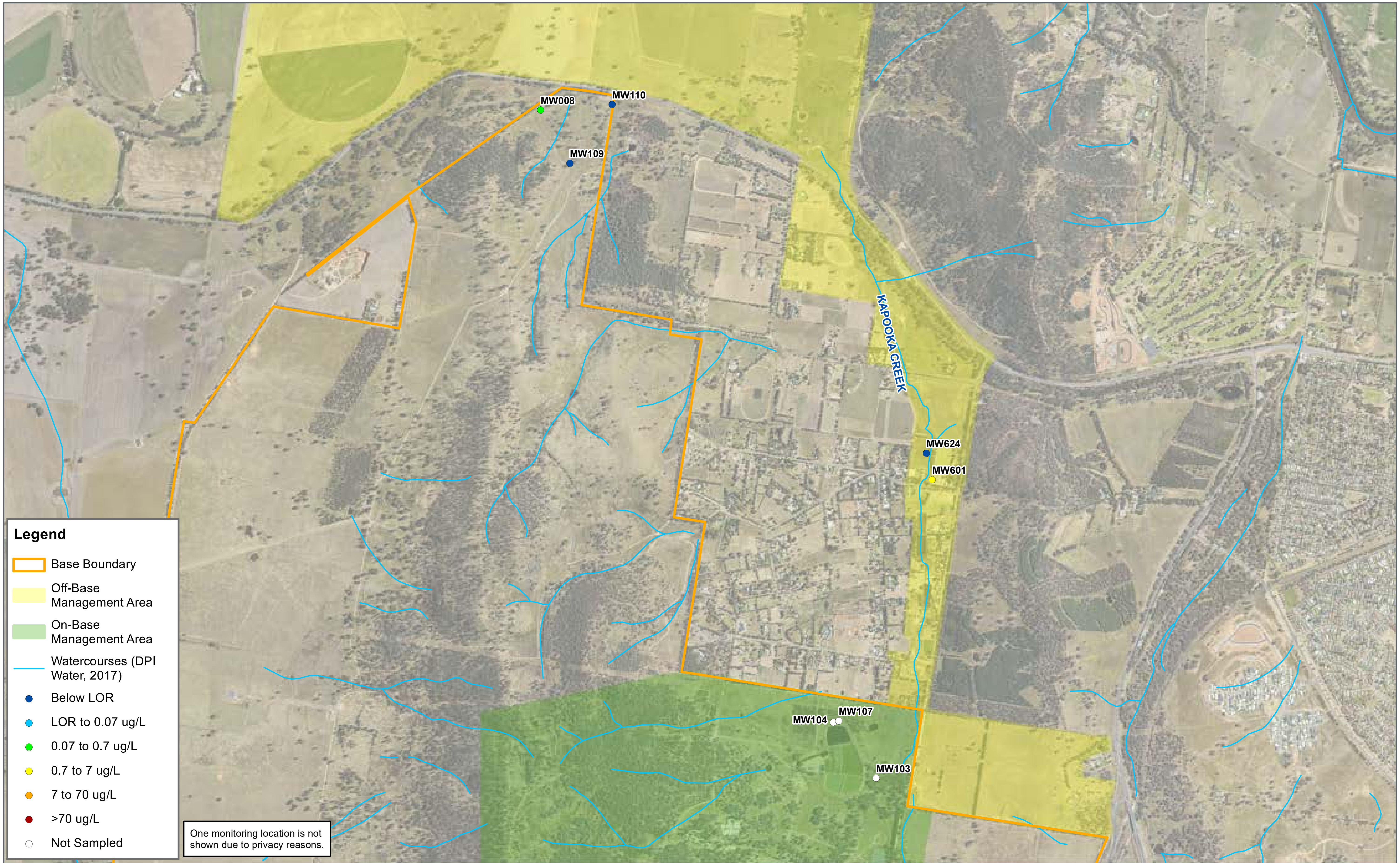

FIGURE 5D

1:20,000 Scale at A3

Metres 0 500 1,000

Groundwater PFAS Extent - 2020

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-02-06 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0279-GW_PFAS_Extent_2020_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

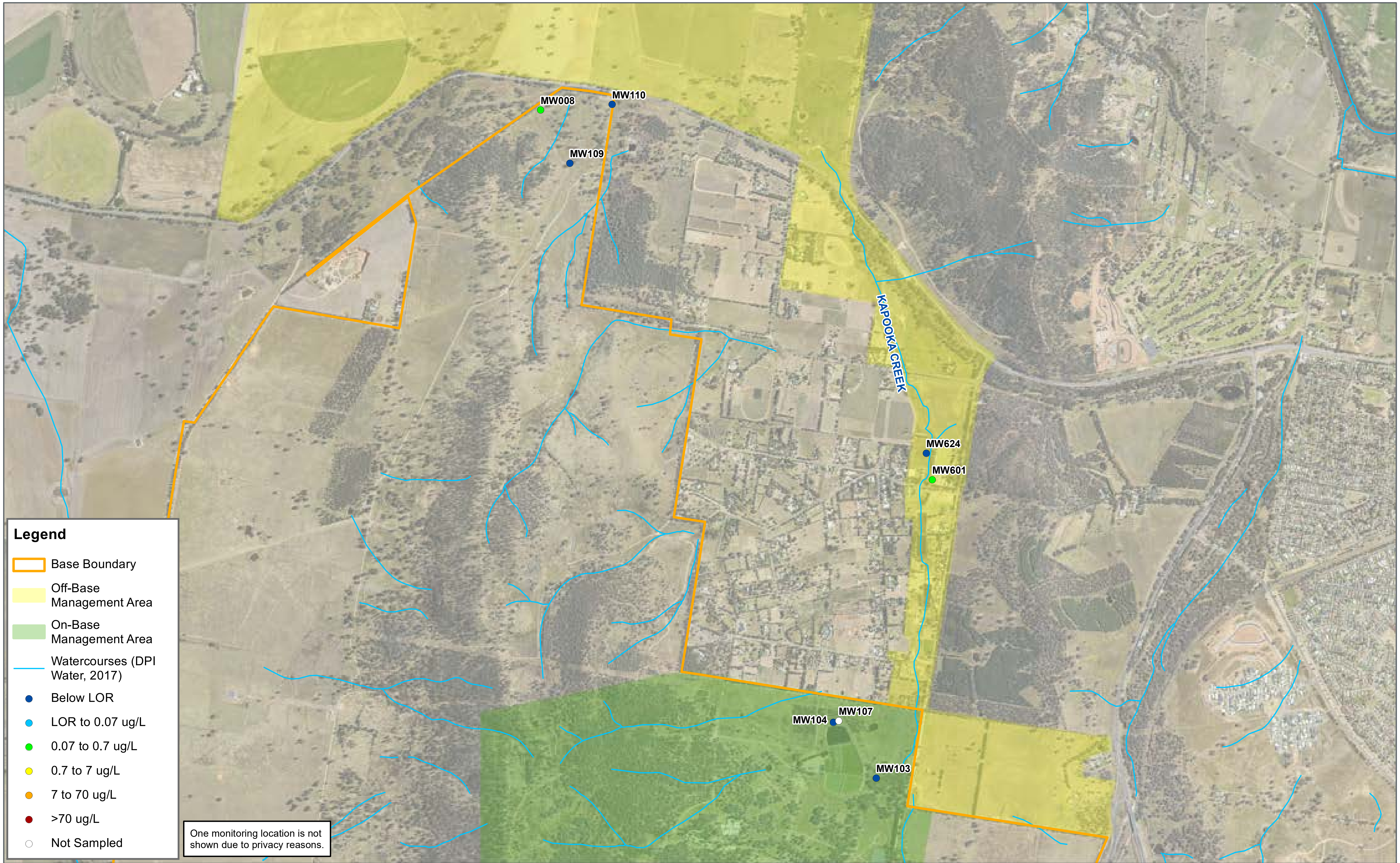

FIGURE 5E

1:20,000 Scale at A3

Groundwater PFAS Extent - 2021 (E1)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-02-06 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0289-GW_PFAS_Extent_2021_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

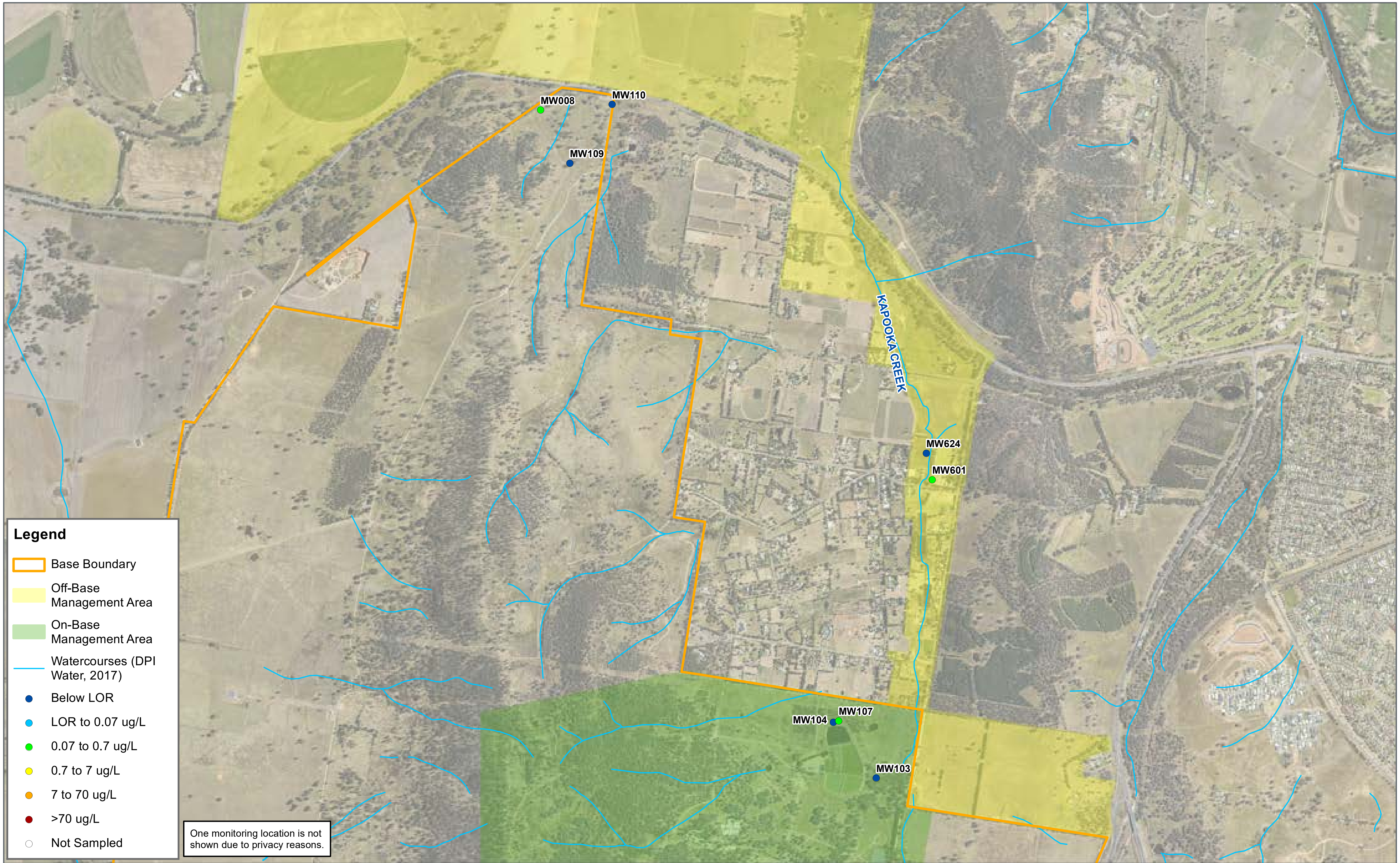

FIGURE 5F

1:20,000 Scale at A3

Metres
0 500 1,000

Groundwater PFAS Extent - 2022 (E2)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-02-06 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0290-GW_PFAS_Extent_2022_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

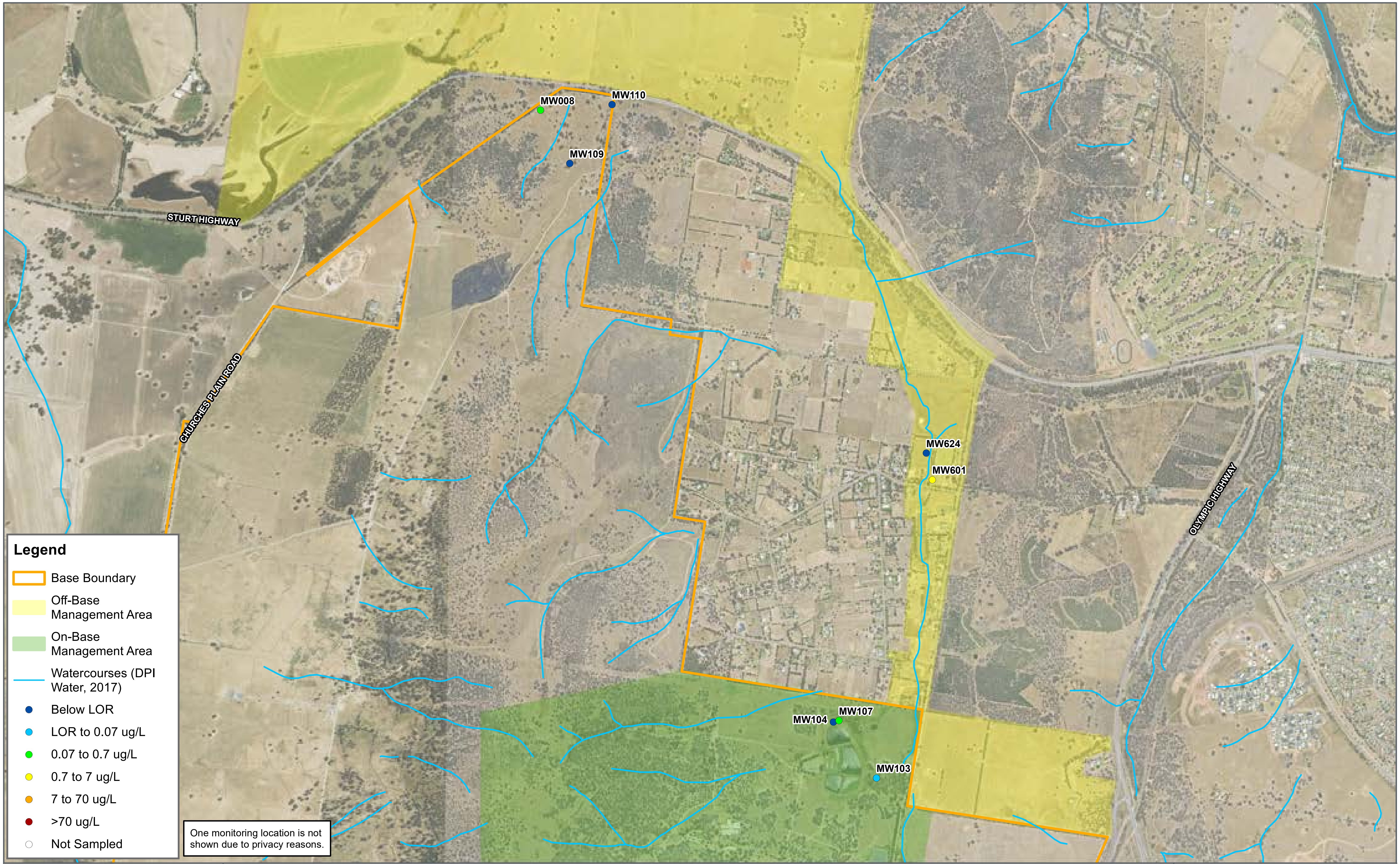

FIGURE 5G

1:20,000 Scale at A3

Groundwater PFAS Extent (November, 2022)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno — Stantec

Map Produced by Cardno now Stantec
Date: 2024-02-20 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0413-GW_PFAS_Extent_Nov2022_K.mxd 02
Aerial Imagery Supplied by Metromap (February, 2022)

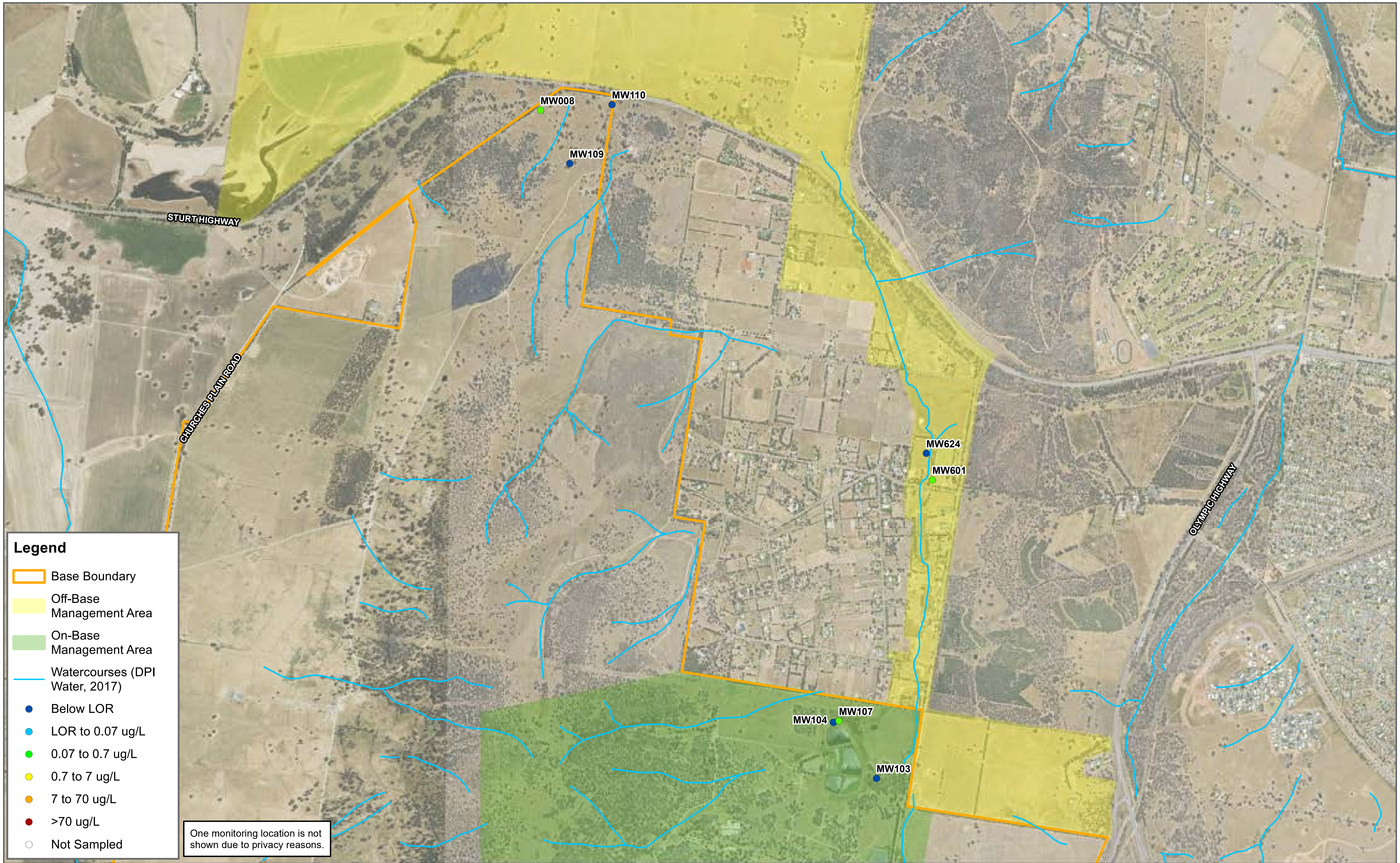

FIGURE 5H

1:20,000 Scale at A3

Metres 0 500 1,000

Groundwater PFAS Extent (April, 2023)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Map Produced by Cardno now Stantec
Date: 2024-02-05 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0414-GW_PFAS_Extent_Apr2023_K.mxd 01
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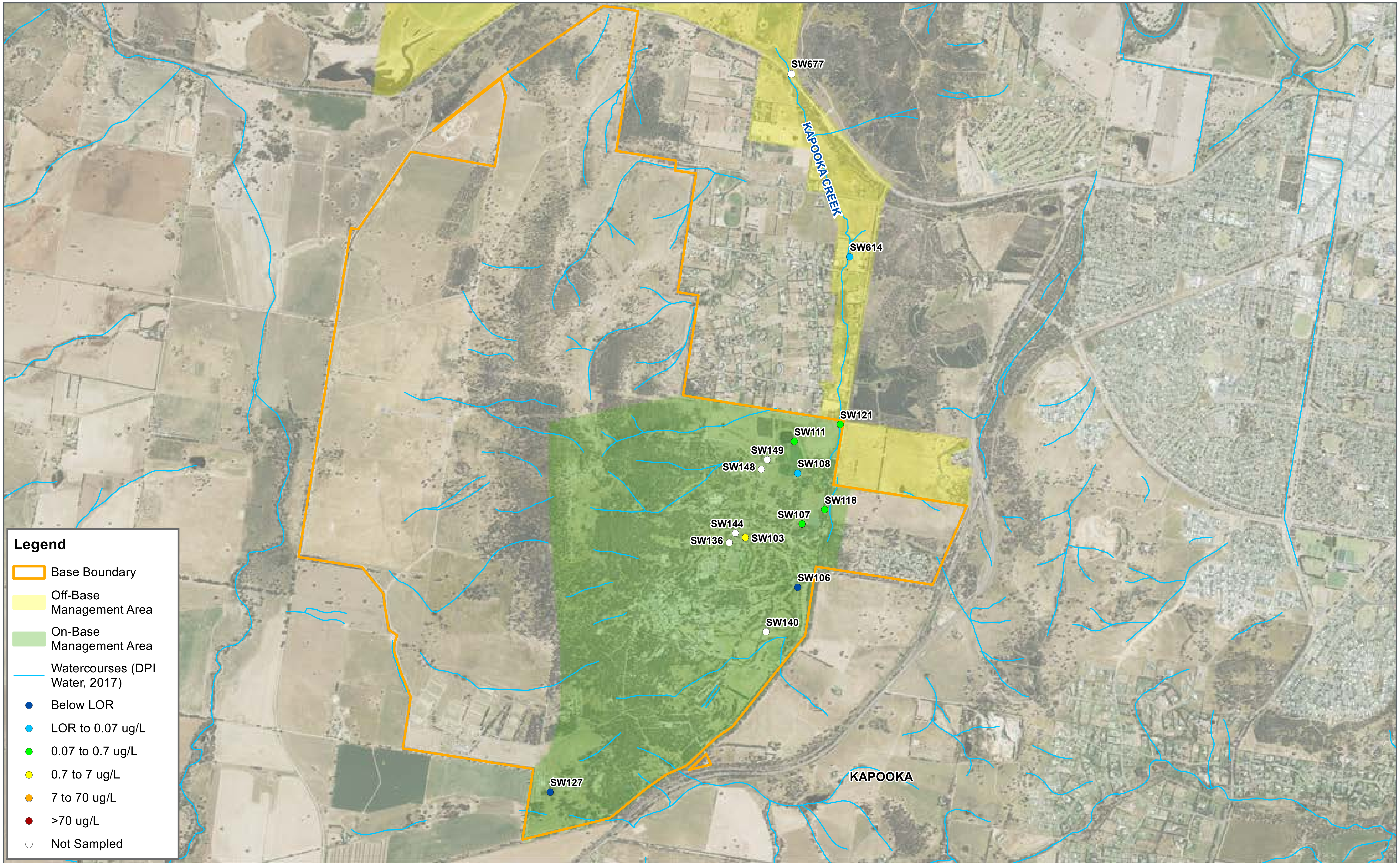

FIGURE 6A

1:30,000 Scale at A3

Metres

0 500 1,000

Surface Water PFAS Extent - 2018

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-03-17 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0291-SW_PFAS_Extent_2018_K.mxd 01
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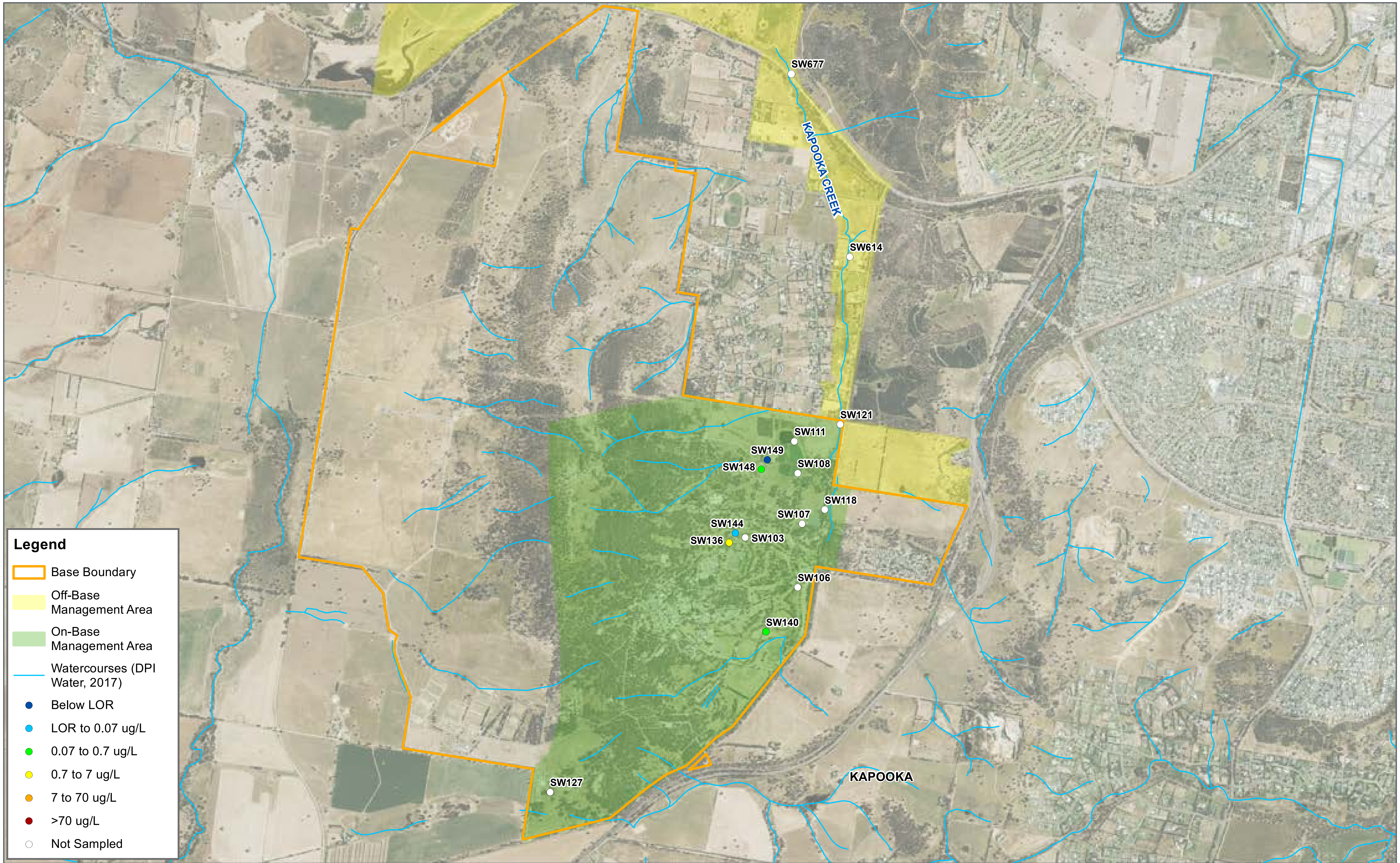

FIGURE 6B

1:30,000 Scale at A3

Metres 0 500 1,000

Surface Water PFAS Extent - 2019

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-03-17 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0292-SW_PFAS_Extent_2019_K.mxd 01
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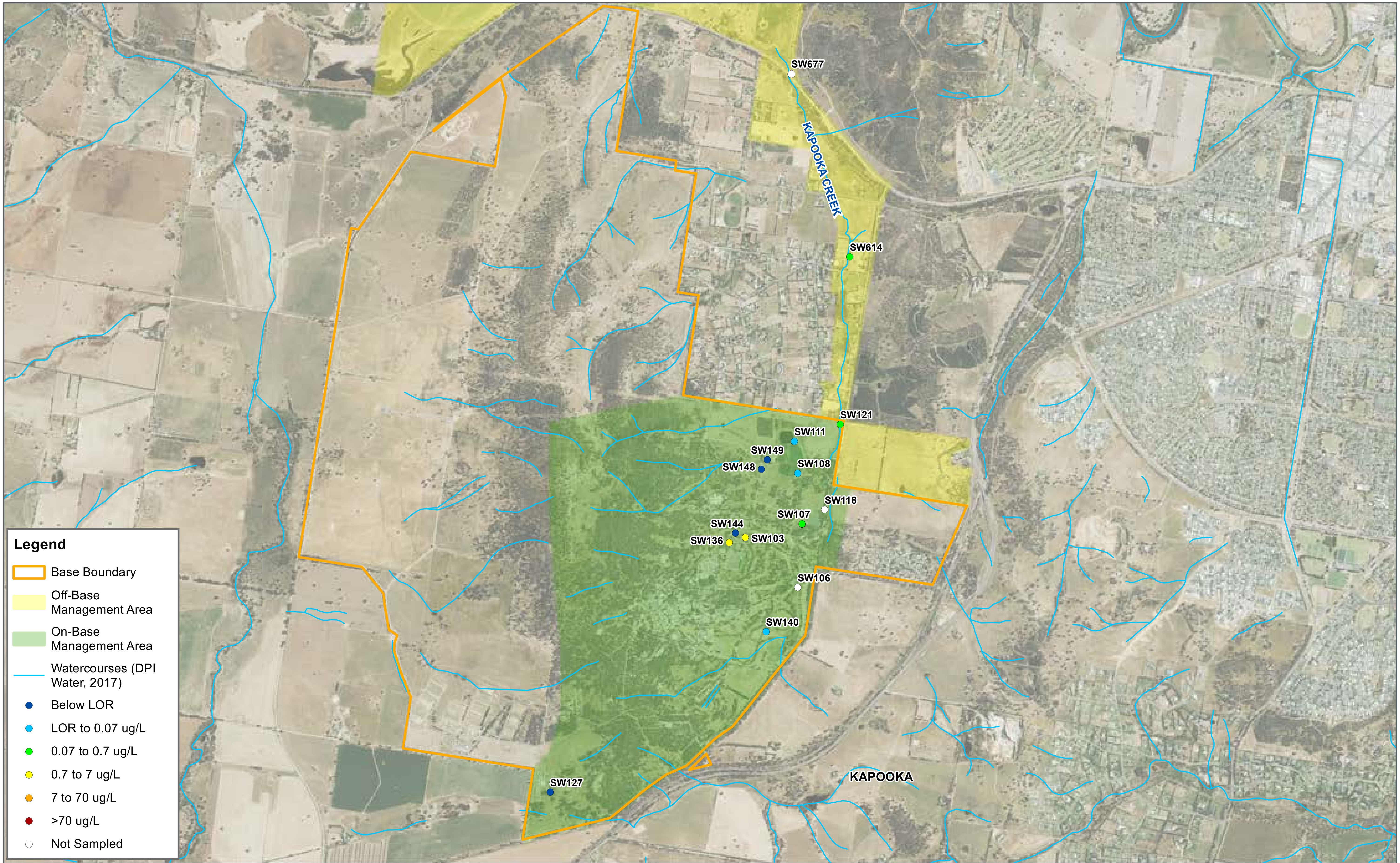

FIGURE 6C

1:30,000 Scale at A3

Metres

0 500 1,000

Surface Water PFAS Extent - 2021 (E1)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-03-17 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0293-SW_PFAS_Extent_2021_K.mxd 01
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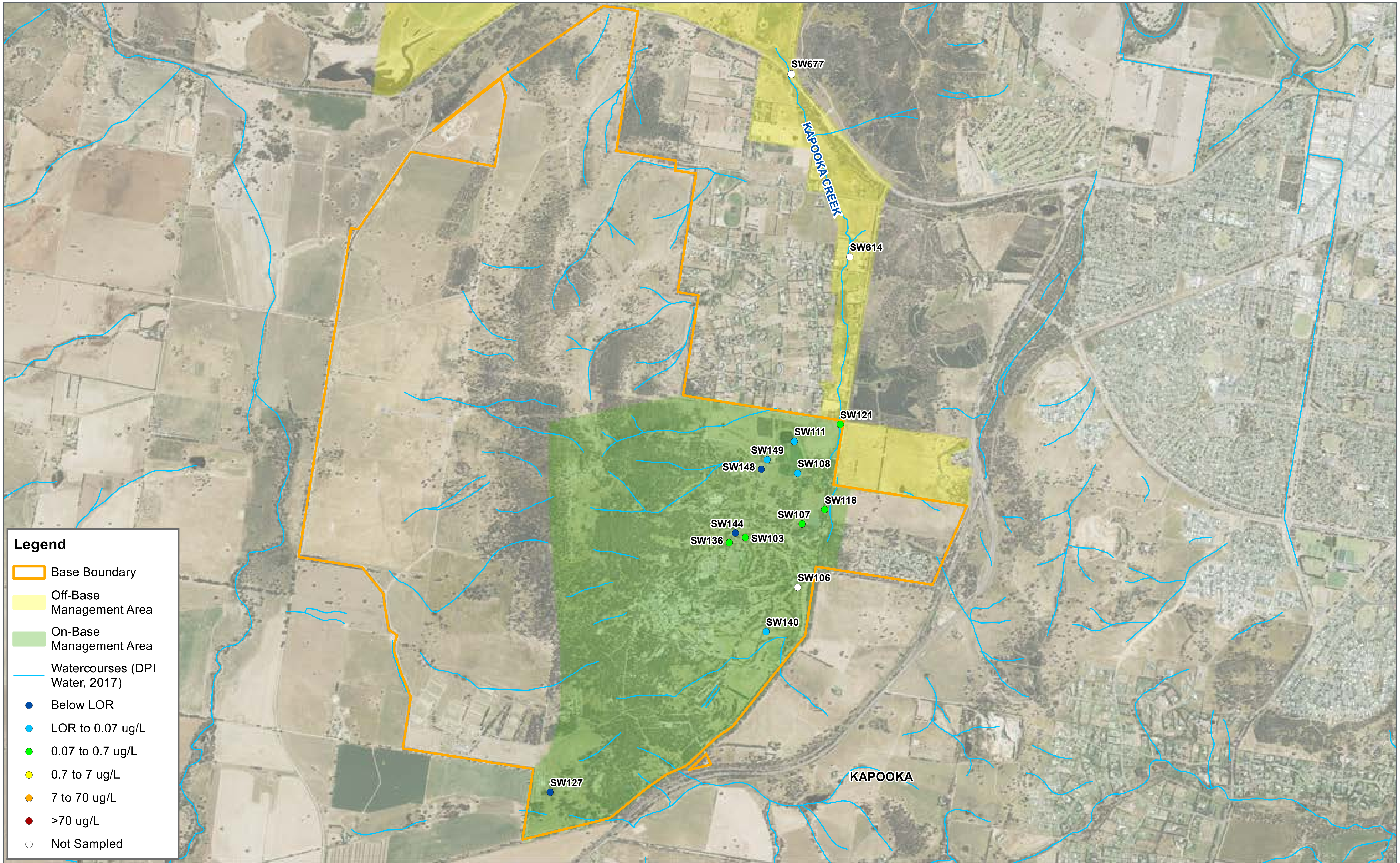

FIGURE 6D

1:30,000 Scale at A3

Metres
0 500 1,000

Surface Water PFAS Extent - 2022 (E2)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-03-17 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0294-SW_PFAS_Extent_2022_K.mxd 01
Aerial Imagery Supplied by Metromap (February 2022)

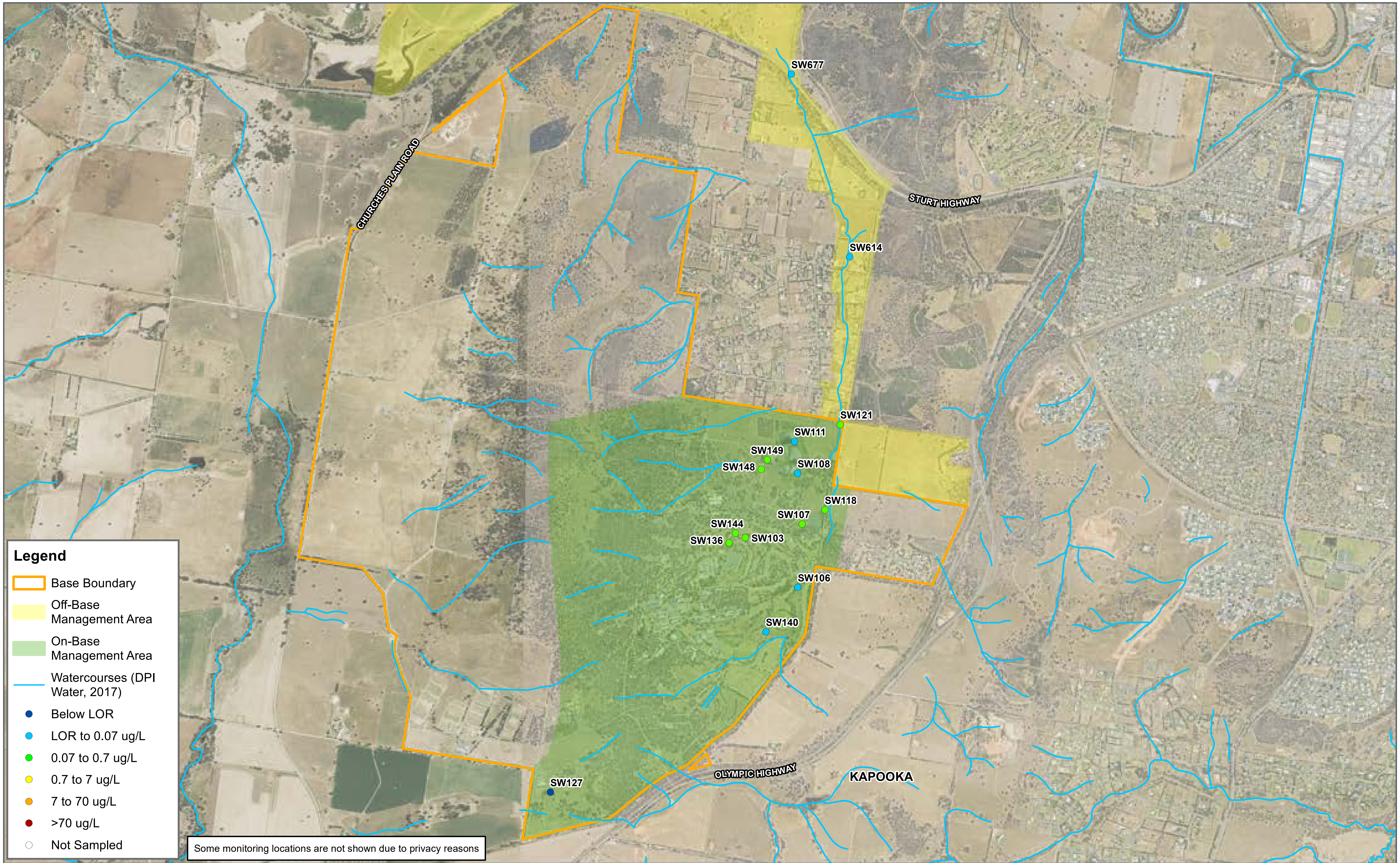

FIGURE 6E

1:30,000 Scale at A3

Metres
0 500 1,000

Surface Water PFAS Extent (November, 2022)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno Stantec

Map Produced by Cardno now Stantec
Date: 2024-02-05 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0415-SW_PFAS_Extent_Nov2022_K.mxd 01
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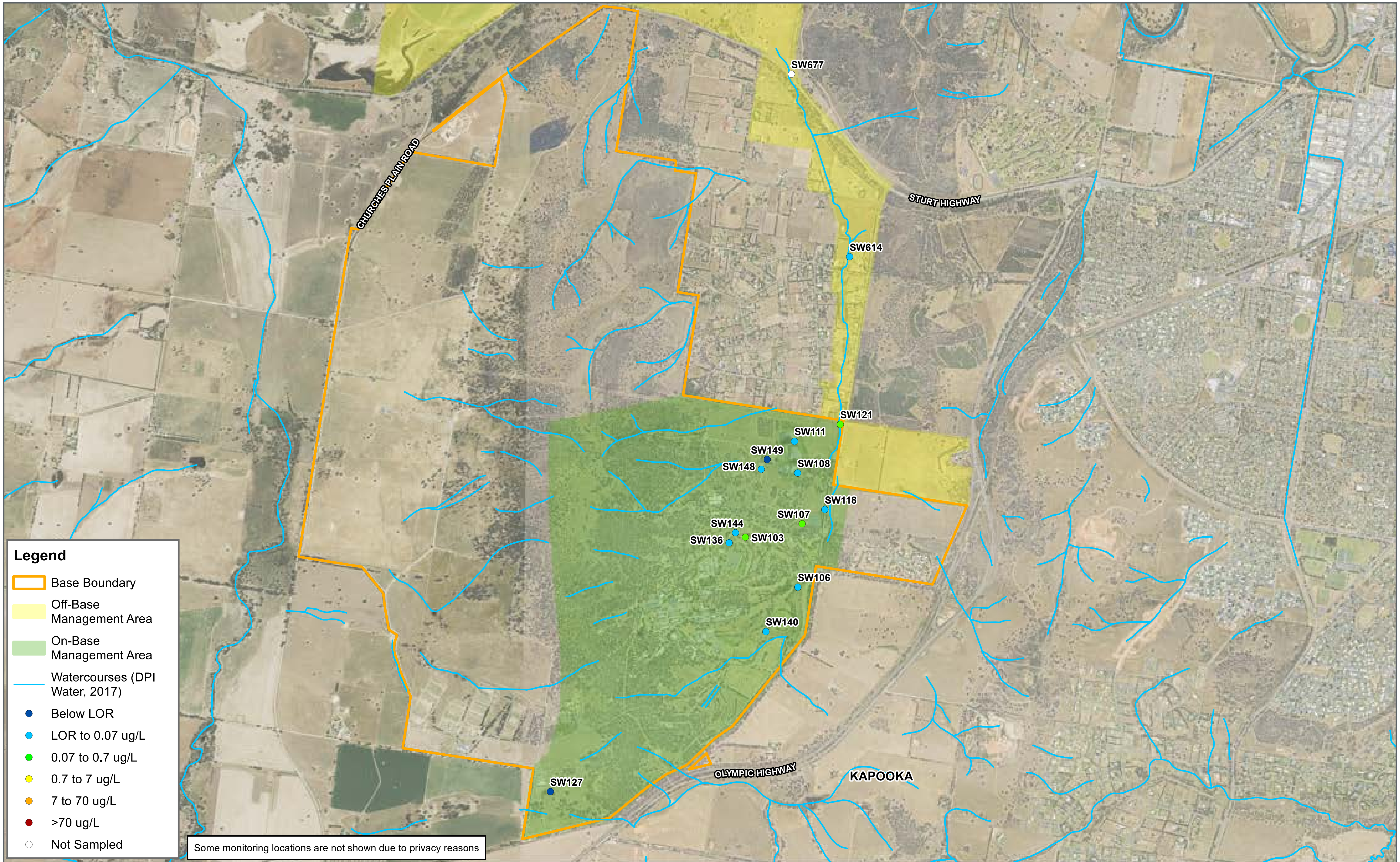

FIGURE 6F

1:30,000 Scale at A3

Metres
0 500 1,000

Surface Water PFAS Extent (April, 2023)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2024-02-05 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0416-SW_PFAS_Extent_Apr2023_K.mxd 01
Aerial Imagery Supplied by Metromap

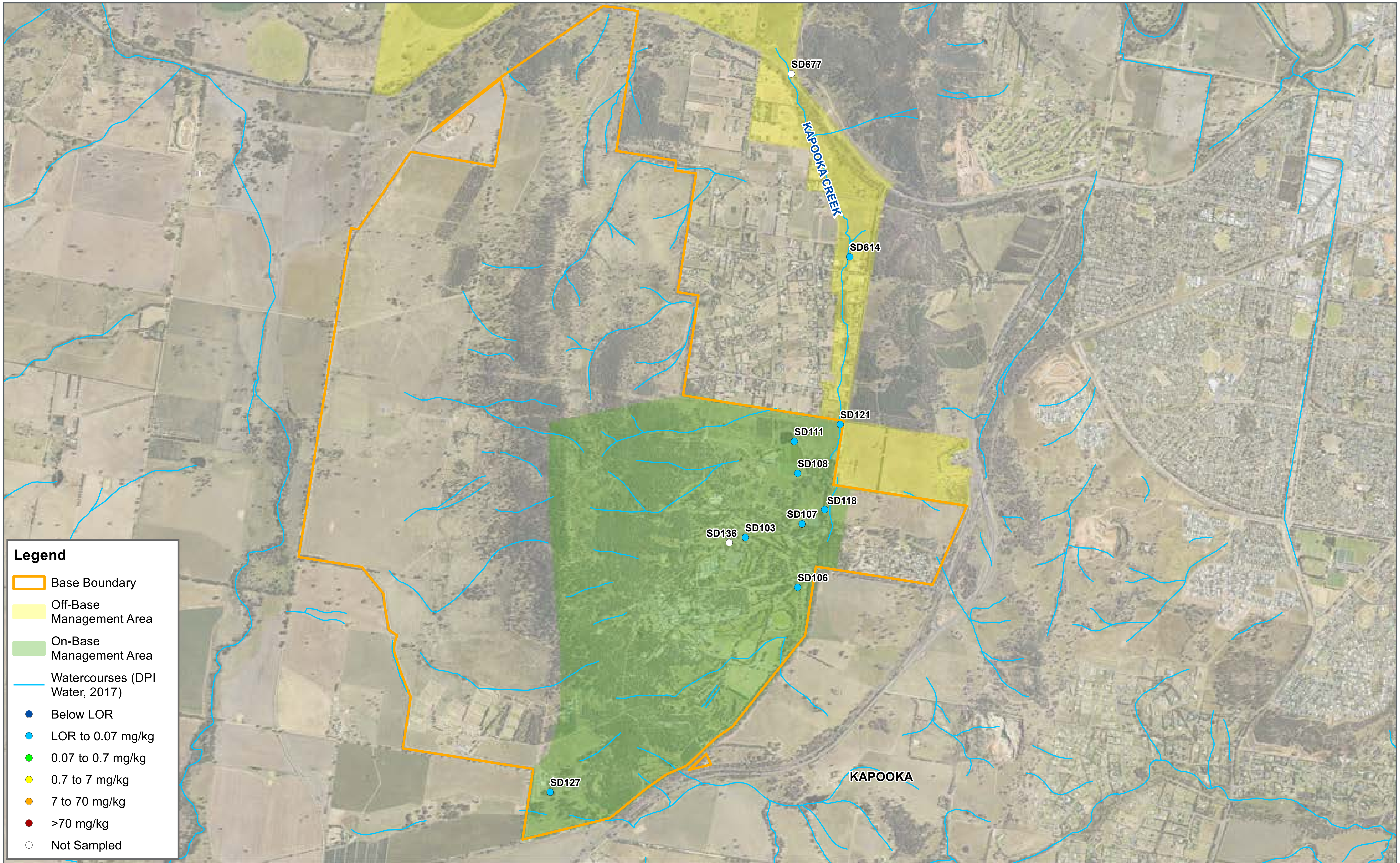

FIGURE 7A

1:30,000 Scale at A3

Metres 0 500 1,000

Sediment PFAS Extent - 2018

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-02-06 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0295-SED_PFAS_Extent_2018_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

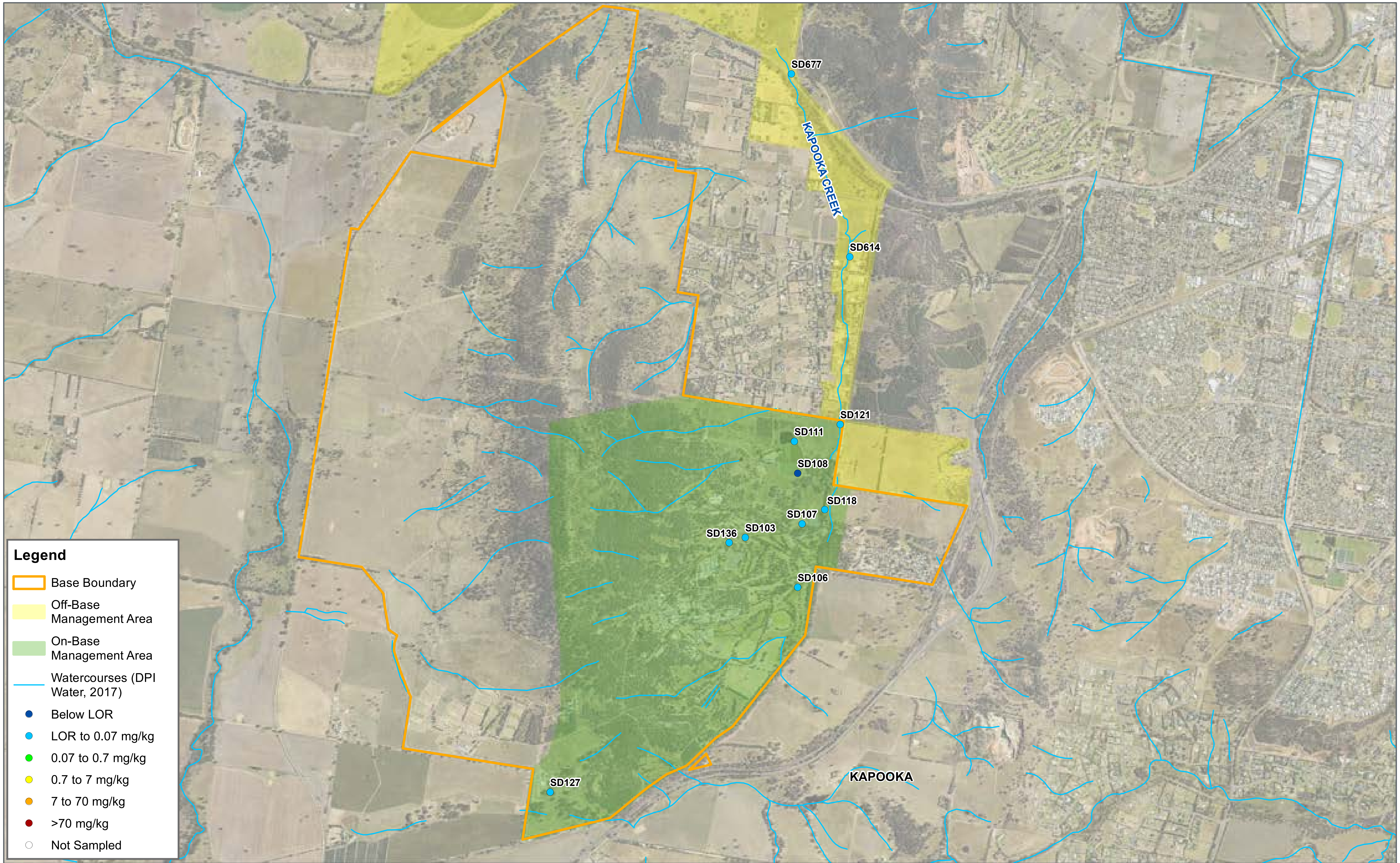

FIGURE 7B

1:30,000 Scale at A3

Metres
0 500 1,000

Sediment PFAS Extent - 2021 (E1)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Map Produced by Cardno now Stantec
Date: 2023-02-06 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0296-SED_PFAS_Extent_2021_K.mxd 01
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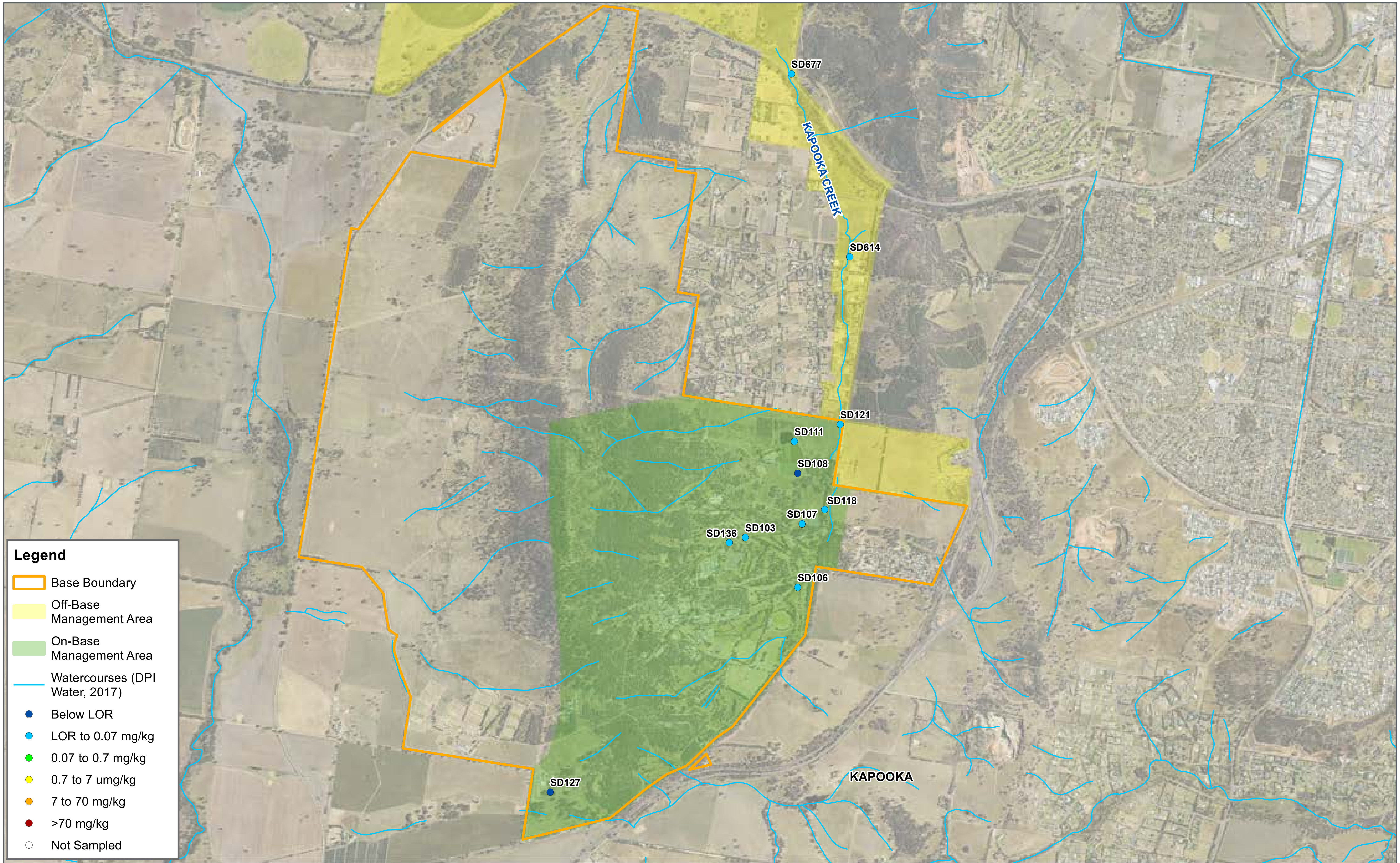


FIGURE 7C

1:30,000 Scale at A3

Sediment PFAS Extent - 2022 (E2)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-02-06 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0297-SED_PFAS_Extent_2022_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

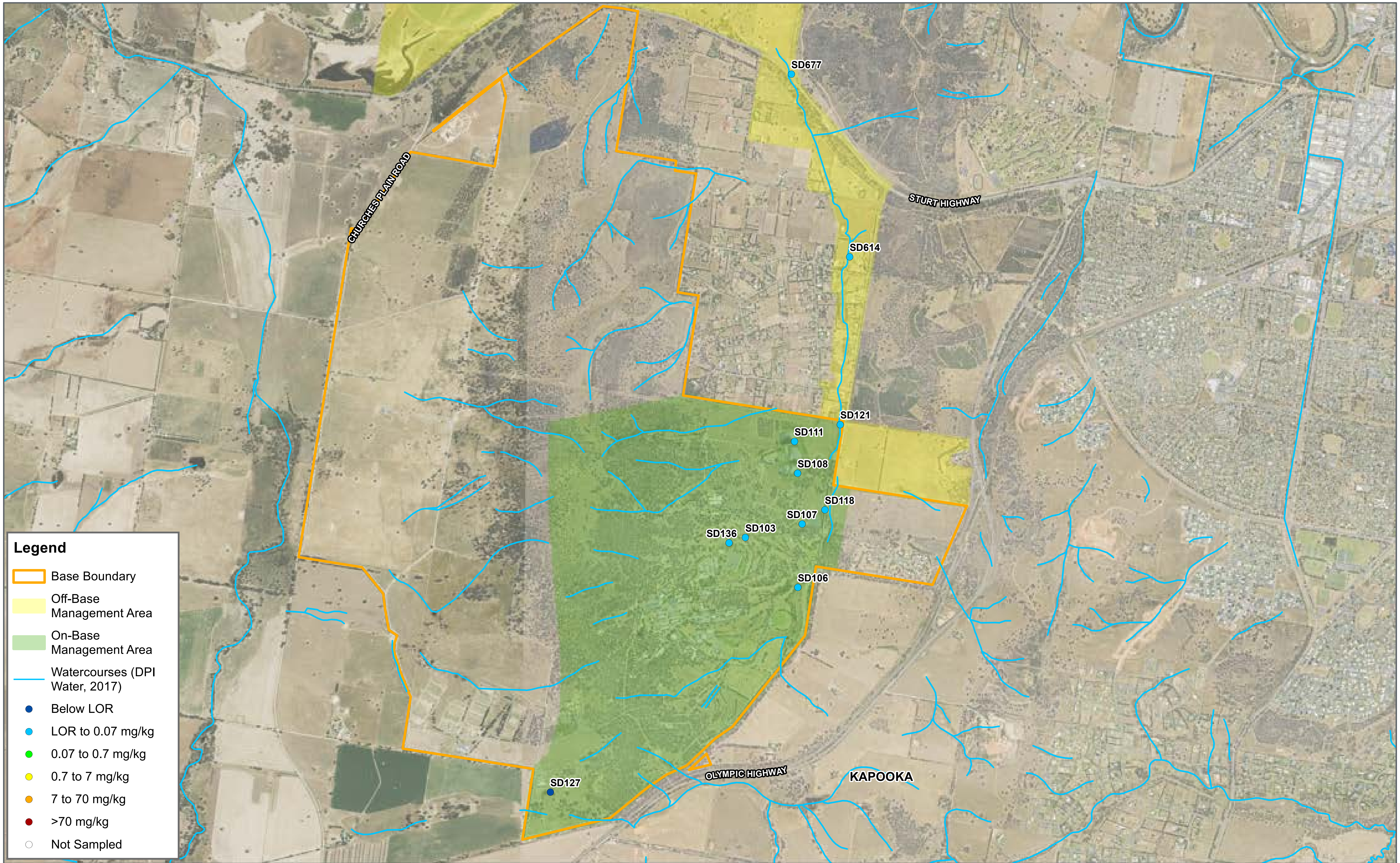


FIGURE 7D

1:30,000 Scale at A3

Metres 0 500 1,000

Sediment PFAS Extent (November, 2022)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno — Stantec

Map Produced by Cardno now Stantec
Date: 2024-02-05 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0417-SED_PFAS_Extent_Nov2022_K.mxd 01
Aerial Imagery Supplied by Metromap

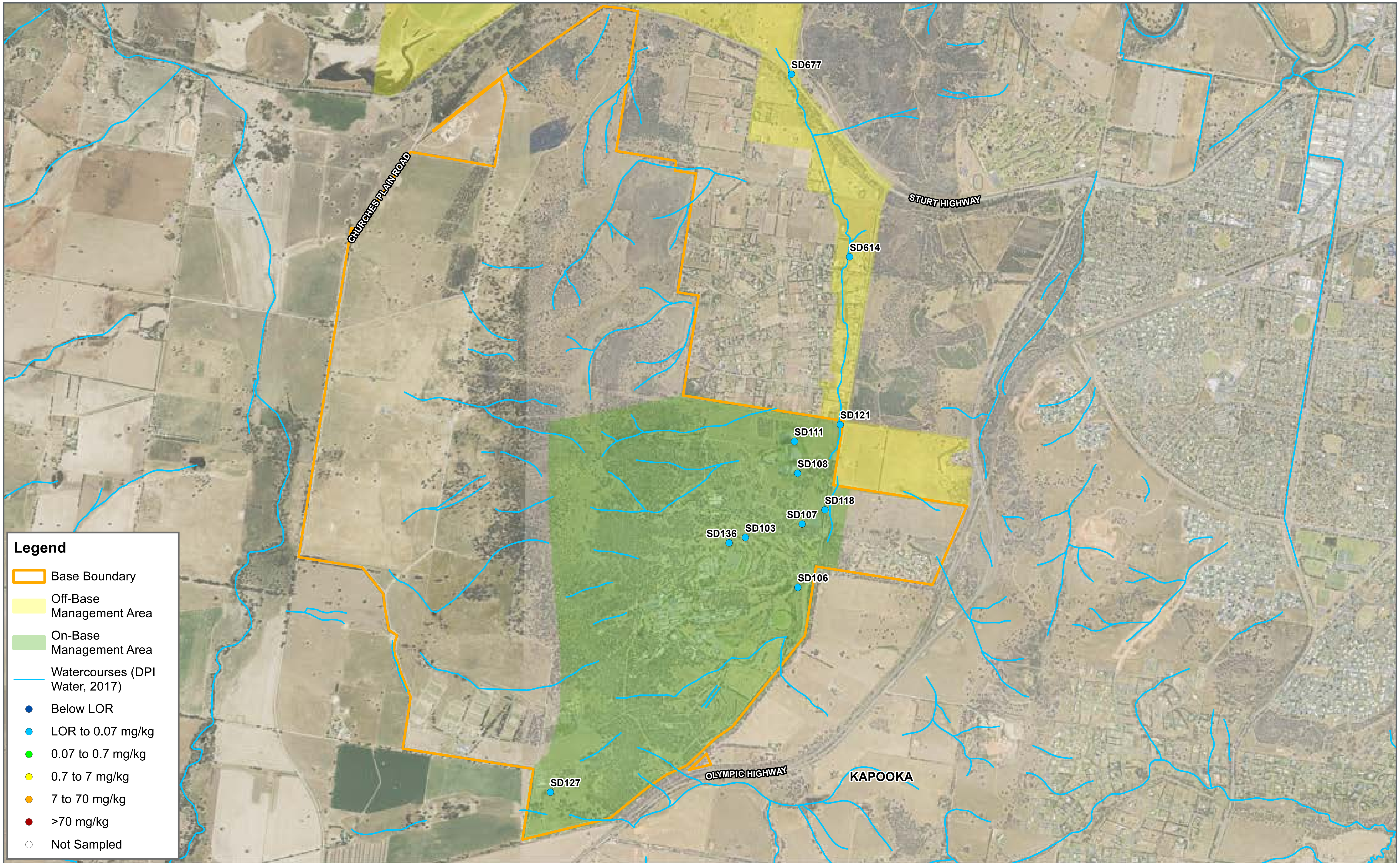


FIGURE 7E

1:30,000 Scale at A3

Metres

0 500 1,000

Sediment PFAS Extent (April, 2023)

ONGOING MONITORING REPORT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2024-02-05 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0418-SED_PFAS_Extent_Apr2023_K.mxd 01
Aerial Imagery Supplied by Metromap

APPENDIX

B

TABLES

Event	Bore ID	Property	Easting	Northing	Monitoring Date	Bore Depth (m)	Top of casing (mAHD)	Top of Screen (mBTOC)	Bottom of Screen (mBTOC)	SWL (mbTOC)	RL (mAHD)	Water Colour	Turbidity	Other Observations on Bore/Site	Hydrasleeve Deployment Depth (mBTOC)[1]	Duplicate Samples	Temp (C^0)	DO (mg/L)	EC (Specific) (US/Cm)	TDS (mg/L)	pH	Eh (mV)
E3	MW008	On-site	524926.6	6114754.4	03-11-2022	12.56	-	-	-	5.84	-	Clear	Low	Sampled using Low Flow	N/A	-	18.1	3.01	1212	787.8	6.79	110.6
E4	MW008	On-site	524926.6	6114754.4	12-04-2023	12.56	-	-	-	5.228	-	Clear	Low	Sampled using low flow.	N/A	-	16.8	1.74	1508	980.2	7.09	116.3
E3	MW103	On-site	526845.6	6110958.8	03-11-2022	53.50	225.8	49	52	23.525	202.28	Clear	Low	-	50.5	-	18.4	1.34	2012	1307.8	6.36	-28.1
E4	MW103	On-site	526845.6	6110958.8	13-04-2023	53.35	225.8	49	52	23.067	202.73	Clear	Low	No odour.	50.5	0315_QC105_20230413 & 0315_QC205_20230413	18.2	1.49	2451	1593.2	6.44	99.8
E3	MW104	On-site	526597.8	6111277.7	03-11-2022	54.44	231.87	38	53	34.310	197.56	Brown	High	Grey-brown sediment in sleeve	45.6	-	18.0	2.58	-	-	6.22	191.5
E4	MW104	On-site	526597.8	6111277.7	15-04-2023	53.90	231.87	38	53	33.756	198.11	Clear	High	Considerable volume of reddish brown suspended solids within bottom half of hydrasleeve, excluded as much as practicable from sampling matrix. No odour.	45.6	-	17.3	2.50	5586	3630.9	6.44	147.3
E3	MW107	On-site	526628.4	6111282.8	03-11-2022	14.4	230.54	12.5	15.5	11.645	-	Cloudy	Medium	-	14.5	-	17.1	0.79	1718	1116.7	6.81	-20.3
E4	MW107	On-site	526628.4	6111282.8	13-04-2023	15.3	230.54	12.5	15.5	10.836	-	Clear	Low	No odour.	14.5	Internal Lab QC Taken	17.1	2.55	2053	1334.5	7.18	-31.6
E3	MW109	On-site	525096.0	6114455.5	03-11-2022	35.27	193.62	24.4	33.4	22.454	171.17	Cloudy	Low	-	28.2	0315_QC101_20221103 & 0315_QC201_20221103	19.9	0.52	1138	739.7	6.72	14.0
E4	MW109	On-site	525096.0	6114455.5	13-04-2023	35.41	193.62	24.4	33.4	21.738	171.88	Clear	Low	Minor brown suspended solids at bottom tenth of hydrasleeve, no odour or colouration.	28.2	-	20.1	7.39	16	10.7	7.04	178.9
E3	MW110	On-site	525327.6	6114785.0	03-11-2022	22.30	180.29	17.4	20.9	8.936	171.35	Clear	Low	Brown sediment in sleeve	17.1	Internal Lab QC Taken	19.7	2.16	2138	1389.7	6.64	90.4
E4	MW110	On-site	525327.6	6114785.0	13-04-2023	22.33	180.29	17.4	20.9	8.385	171.91	Clear	Low	Very minor brown suspended solids present within hydrasleeve, exluded as much as practicable from sampling matrix.	17.1	-	18.0	2.63	1375	893.8	6.77	92.8
E3	MW601	Off-site	527164.1	6112666.0	03-11-2022	17.230	205.3	10	16	5.241	200.06	Cloudy	Moderate	-	12.1	-	20.0	2.51	645	419.3	6.9	118.4
E4	MW601	Off-site	527164.1	6112666.0	13-04-2023	17.07	205.3	10	16	5.140	200.16	Cloudy	Low	No odour.	12.1	-	18.1	2.95	757	492.1	7.28	85.7
E3	MW624	Off-site	527138.1	6112814.3	03-11-2022	53.89	205.92	29	51	8.640	197.28	Clear	Low	Slight organic odour	45.2	-	16.7	0.55	3957	2572.1	6.79	-204.5
E4	MW624	Off-site	527138.1	6112814.3	13-04-2023	54.25	205.92	29	51	8.231	197.69	Clear	Low	Strong sulphur odour, ants in well.	45.2	-	18.1	0.94	5101	3315.7	6.92	-68.6
E3	MW625	Off-site	[redacted]	[redacted]	03-11-2022	22.17	174.572	15.5	21.5	6.226	168.35	Cloudy	Low	-	17.7	-	18.6	2.9	1511	982.2	6.34	4
E4	MW625	Off-site	[redacted]	[redacted]	13-04-2023	22.33	174.572	15.5	21.5	3.789	170.78	Brown	Medium	Considerable volume of reddish brown suspended solids within bottom half of hydrasleeve, excluded as much as practicable from sampling matrix. No odour. Ants down well.	17.7	-	19.4	1.4	1836	1193.4	6.40	-63.8

1. As measured from the top of the Hydrasleeve.

Event	Location ID	Property	Easting	Northing	Monitoring Date	Sample Depth (m)	Water Body Depth	Flow Rate (Qualitative)	Flow Rate (m/s)	Water Colour	Turbidity	Channel Width (m)	Water Body Condition	Other Observations	Duplicate Samples	Temp (C^0)	DO (mg/L)	EC (Specific) (US/Cm)	TDS (mg/L)	pH	Eh (mV)
E3	SW103	On-Base	526271.4	6110348.6	03-11-2022	0.1	0.2	Slow	-	Clear	Low	-	Overland stormwater channel	High water level	-	16.3	5.13	227.6	147.9	7.1	145.3
E4	SW103	On-Base	526271.4	6110348.6	15-04-2023	0.2	0.3	Low	0.05	Brown	Medium	0.3	Overland stormwater channel	No sheen, no odour, high volume of grasses within waterway, tadpoles observed swimming.	0315_QC104_20230412 & 0315_QC204_20230412	14.6	6.52	89.60	46.7	7.1	-12
E3	SW106	On-Base	526717.6	6109926.1	03-11-2022	0.1	0.15	Slow	-	Clear	Low	-	Creek bed	-	Internal Lab QC Taken	13.7	5.67	147.3	95.7	6.69	174.5
E4	SW106	On-Base	526717.6	6109926.1	12-04-2023	0.1	0.2	Stagnant	-	Cloudy	Medium	Overgrown with reeds. Unable to assess channel width.	Creek bed	Stagnant water, no flow, high amount of vegetation (reeds).		12.8	3.97	459.80	229.2	6.7	130.5
E3	SW107	On-Base	526752.7	6110464.8	03-11-2022	0.1	0.2	Slow	-	Clear	Low	-	Overland stormwater channel - concrete overflow	Higher water level	-	13.2	4.95	149.6	97.2	6.65	162.6
E4	SW107	On-Base	526752.7	6110464.8	12-04-2023	0.2	0.5	Low	0.05	Cloudy	Medium	NA	Overland stormwater channel - concrete overflow	No odour.	-	14.3	4.49	99.00	51.2	6.97	73.8
E3	SW108	On-Base	526719.2	6110895.1	03-11-2022	0.1	5	Slow	-	Clear	Low	-	Wastewater Treatment Pland Pond	High water level	-	16.7	5.27	675	438.8	8.15	147.6
E4	SW108	On-Base	526719.2	6110895.1	13-04-2023	0.2	3	Stagnant	-	Clear	Low	NA	Wastewater Treatment Pland Pond	Stagnant water, no flow, slight green algae tinge, slight sewage odour.	-	16.4	5.26	893.00	485.1	9.00	48.4
E3	SW111	On-Base	526686.5	6111169.2	03-11-2022	0.2	5	Slow	-	Clear	Low	-	Wastewater Treatment Pland Pond	Stagnant organic matter on surface.	-	17.8	6.76	354.9	230.7	8.75	103.4
E4	SW111	On-Base	526686.5	6111169.2	13-04-2023	0.2	3	Stagnant	-	Clear	Low	NA	Wastewater Treatment Pland Pond	Stagnant water, no flow, slight sewage odour, algae on surface, no sheen.	-	15.8	5.47	478.50	256.4	7.74	79
E3	SW118	On-Base	526946.5	6110587.0	03-11-2022	0.1	0.5	Slow	-	Clear	Low	-	Overland drainage channel	-	-	13.4	6.11	140.4	91.3	6.9	158.9
E4	SW118	On-Base	526946.5	6110587.0	12-04-2023	0.2	0.3	Stagnant	-	Cloudy	Low	1	Overland drainage channel	Stagnant water, no flow, no odour.	-	15.8	4.76	33.90	18.2	6.72	93.7
E3	SW121	On-Base	527077.5	6111316.7	03-11-2022	0.1	0.5	Slow	-	Cloudy	Low	-	Overland drainage channel	-	-	12	5.13	156.6	101.8	6.53	76.8
E4	SW121	On-Base	527077.5	6111316.7	11-04-2023	0.2	3	Low	0.05	Brown	High	1	Overland drainage channel	No sheen, no odour, minimal water bugs, high amount of vegetation.	0315_QC102_20230411 & 0315_QC202_20230411	15.1	5.36	76.50	40.3	6.71	161.9
E3	SW127	On-Base	524610.6	6108182.2	03-11-2022	0.2	1	Slow	-	Cloudy	Medium	-	Pond	High water level and suspended sediment	0315_QC101_20221103 & 0315_QC201_20221103	13.6	4	69.6	45.2	5.2	216.2
E4	SW127	On-Base	524610.6	6108182.2	15-04-2023	0.3	0.7	Stagnant	-	Brown	Medium	NA	Pond	Stagnant water, no flow, no sheen, no odour, no nuisance organisms, no vegetation.	Internal Lab QC Taken	13.4	4.14	76.20	38.6	7.45	58.1
E3	SW136	On-Base	526132.2	6110304.8	03-11-2022	0.1	0.3	Slow	-	Clear	Low	-	Overland stormwater channel	-	-	17.3	3.65	241.8	157.2	6.82	139
E4	SW136	On-Base	526132.2	6110304.8	15-04-2023	0.15	0.2	Medium	0.5	Cloudy	Medium	1	Overland stormwater channel	No odour, no sheen, sampled in fast flowing section, slows considerably 5m downstream, high volume of vegetation (grass), no microorganisms observed.	Internal Lab QC Taken	14.7	7.09	95.90	50.1	6.94	-9.4

Event	Location ID	Property	Easting	Northing	Monitoring Date	Sample Depth (m)	Water Body Depth	Flow Rate (Qualitative)	Flow Rate (m/s)	Water Colour	Turbidity	Channel Width (m)	Water Body Condition	Other Observations	Duplicate Samples	Temp (C^0)	DO (mg/L)	EC (Specific) (US/Cm)	TDS (mg/L)	pH	Eh (mV)
E3	SW140	On-Base	526449.8	6109549.2	03-11-2022	0.2	2	Slow	-	Clear	Low	-	Sewage channel	High water level	0315_QC102_20221103 & 0315_QC202_20221103	14.9	2.71	476.5	309.7	6.33	173.5
E4	SW140	On-Base	526449.8	6109549.2	12-04-2023	0.2	0.8	Stagnant	-	Clear	Low	NA	Sewage channel	Reeds in drain, water still, no odour.	-	18	3.29	617.00	347.4	7.58	53.4
E3	SW144	On-Base	526185.0	6110390.0	03-11-2022	0.1	0.1	Fast	-	Clear	Low	-	Sewage channel	Slight sewage odour	Internal Lab QC Taken	16.8	2.54	836	543.4	8.14	16
E4	SW144	On-Base	526185.0	6110390.0	12-04-2023	0.1	0.1	High	0.5	Cloudy	Medium	NA	Sewage channel	Sewage odour.	-	18.9	1.21	991.00	569.1	8.29	-129.5
E3	SW148	On-Base	526404.5	6110931.5	03-11-2022	0.1	0.1	Fast	-	Brown	High	-	Sewage channel	Strong sewage odour	-	18.4	0.94	841	546.7	7.75	62.9
E4	SW148	On-Base	526404.5	6110931.5	12-04-2023	0.1	0.1	High	1	Cloudy	Medium	NA	Sewage channel	Sewage odour, toilet paper, other floating organic items.	-	19.8	1.04	1396.00	817.3	8.84	-169.6
E3	SW149	On-Base	526455.0	6111012.0	03-11-2022	0.05	0.05	Slow	-	Cloudy	Medium	-	Sewage channel	Minimal water in sewer	-	14.5	5.41	389.1	252.9	7.73	87.4
E4	SW149	On-Base	526455.0	6111012.0	12-04-2023	0.1	0.1	Low	0.1	Cloudy	Turbidity	NA	Sewage channel	Slow drip from sewer pipe, sewage odour.	-	16.7	8.51	436.90	239.0	8.1	54
E3	SW614	Off-Base	527151.5	6112749.5	04-11-2022	0.1	0.2	Medium	-	Clear	Low	-	Overland drainage channel	-	-	11.9	5.75	113	73.5	6.75	28.4
E4	SW614	Off-Base	527151.5	6112749.5	17-04-2023	0.1	0.2	Stagnant	-	Brown	Medium	Minimal water present, ponding only.	Overland drainage channel	Stagnant water, no flow, sampled during rainfall event.	-	15.3	5.43	95.20	50.4	7.57	110.6
E3	SW677	Off-Base	526647.3	6114308.7	04-11-2022	0.1	0.2	Medium	-	Cloudy	Low	-	-	-	-	15	6.11	115.6	75.1	7.34	-33.2
E4	SW677	Off-Base	526647.3	6114308.7	Dry																
E3	SW680	Off-Base	[redacted]	[redacted]	04-11-2022	0.1	2	Slow	-	Cloudy	Low	-	-	-	-	15	5.13	124.3	80.8	7.48	-27.8
E4	SW680	Off-Base	[redacted]	[redacted]	13-04-2023	0.2	2	Stagnant	-	Cloudy	Low	NA	Pond	Stagnant water, no flow, no odour, no foam, no sheen, no organisms.	-	15.1	2.64	198.50	104.6	7.2	77.8

Event	Location ID	Property	Easting	Northing	Monitoring Date	Observations	Duplicate Samples
E3	SD103	On-base	526271.4	6110348.6	03-11-2022	Sandy gravelly clay, brown, wet, low plasticity, organic matter, gravels, no odour no staining, taken at 0.1m.	-
E4	SD103	On-base	526271.4	6110348.6	12-04-2023	Dark brown gravelly sandy Clay, moist, moderate plasticity, no odour, no staining, sampled at 0.3m using core sampler.	0315_QC103_20230412 & 0315_QC203_20230412
E3	SD106	On-base	526717.6	6109926.1	03-11-2022	Silty clay, grey brown, wet, low to moderate plasticity, trace sand and rootlets, no odour no staining, taken at 0.1m.	Internal Lab QC Taken
E4	SD106	On-base	526717.6	6109926.1	12-04-2023	Brown silty Clay, wet, low to moderate plasticity, rootlets, no odour, no staining, sampled at 0.3m using core sampler.	-
E3	SD107	On-base	526752.7	6110464.8	03-11-2022	Silty clay, grey brown, wet, low to moderate plasticity, organic matter, trace sand, no odour no staining, taken at 0.1m.	-
E4	SD107	On-base	526752.7	6110464.8	12-04-2023	Dark brown silty Clay, medium to high plasticity, large gravels, no odour, soft, moist, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-
E3	SD108	On-base	526719.2	6110895.1	04-11-2022	Silty clay with sand and gravels, brown to orange mottled grey, low to medium plasticity, wet, tree rootlets, no odour, no staining.	Internal Lab QC Taken
E4	SD108	On-base	526719.2	6110895.1	13-04-2023	Brown black silty Clay, organic matter, roots, wet, medium to high plasticity, fine sand grains, no odour, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-
E3	SD111	On-base	526686.5	6111169.2	03-11-2022	Silty clay, brown, wet, low to moderate plasticity, trace sand and gravel, no odour no staining, taken at 0.2m.	-
E4	SD111	On-base	526686.5	6111169.2	13-04-2023	Brown silty Clay, mottled orange, low plasticity, minor gravels, no odour, wet, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-
E3	SD118	On-base	526946.5	6110587.0	03-11-2022	Silty clay, red brown, wet, low plasticity, organic matter, trace sand, no odour no staining, taken at 0.1m.	-
E4	SD118	On-base	526946.5	6110587.0	12-04-2023	Orange brown silty Clay, wet, medium to high plasticity. Large gravels, no odour, organic root matter, soft, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-
E3	SD121	On-base	527077.5	6111316.7	04-11-2022	Silty clay, grey brown, wet, low to moderate plasticity, organic matter, trace sand, no odour no staining, taken at 0.1m.	-
E4	SD121	On-base	527077.5	6111316.7	11-04-2023	Pale brown silty Clay, moderate to high plasticity, wet, no odour, no staining, sampled at 0.3m using core sampler.	0315_QC101_20230411 & 0315_QC201_20230411
E3	SD127	On-base	524610.6	6108182.2	03-11-2022	Sandy clay, brown, wet, low to moderate plasticity, no odour no staining, trace rootlets taken at 0.2m.	0315_QC103_20221103 & 0315_QC203_20221103
E4	SD127	On-base	524610.6	6108182.2	12-04-2023	Gray silty Clay, mottled brown, wet, moderate to high plasticity, no odour no staining, minor vegetation present (black plant roots), sampled at 0.3m using core sampler.	Internal Lab QC Taken
E3	SD136	On-base	526133.0	6110304.1	03-11-2022	Sandy silty clay, brown mottled with grey and orange, wet, low to moderate plasticity, minor organic matter, trace gravels, no odour no staining, taken at 0.1m.	0315_QC105_20221103 & 0315_QC205_20221103
E4	SD136	On-base	526133.0	6110304.1	12-04-2023	Gray silty Clay, mottled brown, wet, moderate to high plasticity, no odour no staining, minor vegetation present (black plant roots), sampled at 0.3m using core sampler.	Internal Lab QC Taken
E3	SD614	Off-base	527151.5	6112749.5	04-11-2022	Silty clay, grey brown, wet, low to moderate plasticity, organic matter, trace gravels, no odour no staining, roots and rootlets taken at 0.1m.	-
E4	SD614	Off-base	527151.5	6112749.5	12-04-2023	Brown silty Clay, mottled red, organic matter, moist, soft, medium plasticity, no odour, sampled at 0.3m using core sampler.	-
E3	SD677	Off-base	526647.3	6114308.7	04-11-2022	Silty clay, brown grey, wet, low to moderate plasticity, gravels, no odour no staining, roots and rootlets taken at 0.1m.	-
E4	SD677	Off-base	526647.3	6114308.7	12-04-2023	Brown silty Clay, small gravels, organic matter, medium to high plasticity, no odour, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-

					Perfluorocarbons														
					Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR					0.0003	0.0005	0.0003	0.0005	0.0005	0.0005	0.0005	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
PFAS NEMP 2.0 Table 1 Health Drinking Water						**0.56**	**0.07**												
PFAS NEMP 2.0 Table 1 Health Recreational Water						***10***	***2***												
PFAS NEMP 2.0 Table 5 Freshwater 95%					0.13	220													
Location Code	**Date**	**Field ID**	**Sample Type**	**Lab Report Number**															
MW008	16 Mar 2017	0315_MW008_170316	Normal	ES1706394	0.0252	<0.0005	**0.111**	0.0145	0.0088	0.0855	0.0034	<0.0005	0.023	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	18 Dec 2018	0315_MW008_S_181218	Normal	ES1838696	0.04	<0.01	**0.14**	<0.02	<0.02	0.10	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC102_181218	Field_D	ES1838696	0.04	<0.01	**0.14**	<0.02	<0.02	0.10	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC104_181218	Field_D	ES1838696	0.04	<0.01	**0.15**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC202_181218	Interlab_D	635075	0.09	<0.01	**0.23**	0.01	0.01	0.14	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	09 Mar 2020	0315_MW008_S_200309	Normal	ES2008982	0.06	<0.01	**0.23**	<0.02	<0.02	0.17	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC101_200309	Field_D	ES2008982	0.06	<0.01	**0.23**	<0.02	<0.02	0.17	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC201_200309	Interlab_D	239048	0.05	<0.01	**0.18**	0.01	<0.01	0.13	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02
	28 Oct 2021	0315_MW008_20211028	Normal	ES2139229	0.03	<0.01	**0.11**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_MW008_20220428	Normal	EM2208205	0.02	<0.01	**0.10**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_MW008_20221103	Normal	EM2222407	0.04	<0.01	**0.13**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_MW008_20230412	Normal	EM2306946	0.02	<0.01	**0.11**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW103	20 Feb 2019	0315_MW103_S_190220	Normal	ES1905450	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Oct 2021	0315_MW103_20211028	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	29 Apr 2022	0315_MW103_20220429	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_MW103_20221103	Normal	EM2222407	<0.01	0.02	0.06	<0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_MW103_20230413	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC105_20230413	Field_D	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC205_20230413	Interlab_D	982794	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW104	20 Feb 2019	0315_MW104_S_190220	Normal	ES1905450	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Oct 2021	0315_MW104_20211028	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_MW104_20220428	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_MW104_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	15 Apr 2023	0315_MW104_20230415	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW107	30 Jan 2019	0315_MW107_P_190130	Normal	ES1902996	<0.01	<0.01	**0.10**	<0.02	<0.02	0.10	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	07 Mar 2019	0315_MW107_P_190307	Normal	ES1907492	0.02	<0.01	0.07	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	29 Apr 2022	0315_MW107_20220429	Normal	EM2208205	0.02	0.02	**0.14**	0.02	0.02	0.12	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_MW107_20221103	Normal	EM2222407	0.01	<0.01	**0.09**	0.03	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_MW107_20230413	Normal	EM2306946	0.01	0.01	**0.09**	0.03	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW109	10 Mar 2020	0315_MW109_S_200310	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Oct 2021	0315_MW109_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC105_20211027	Field_D	ES2139230	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC205_20211027	Interlab_D	837707	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	27 Apr 2022	0315_MW109_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC101_20220427	Field_D	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC201_20220427	Interlab_D	889626	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	03 Nov 2022	0315_MW109_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC104_20221103	Field_D	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC204_20221103	Interlab_D	940511	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	13 Apr 2023	0315_MW109_20230413	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW110	10 Mar 2020	0315_MW110_S_200310	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Oct 2021	0315_MW110_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Apr 2022	0315_MW110_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_MW110_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_MW110_20230413	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW601	29 Jan 2019	0315_MW601_S_190129	Normal	ES1902996	0.01	<0.01	**0.15**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	<0.02	0.03	<0.02	<0.02	<0.02
		0315_QC101_190129	Field_D	ES1902996	0.01	<0.01	**0.15**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC201_190129	Interlab_D	638493	0.01	<0.01	**0.1**	0.01	0.01	0.09	<0.01	<0.01	<0.05	<0.01	0.01	0.01	<0.01	<0.01	<0.01
	18 Feb 2019	0315_MW601_S_190218	Normal	ES1905450	0.02	<0.01	**0.25**	<0.02	<0.02	0.23	<0.02	<0.02	<0.1	0.02	0.02	<0.02	<0.02	<0.02	<0.02
	12 Mar 2020	0315_MW601_P_200312	Normal	ES2008982	0.16	0.01	**0.89**	0.06	0.08	0.73	0.03	<0.02	<0.1	<0.02	0.04	<0.02	<0.02	<0.02	<0.02
	27 Oct 2021	0315_MW601_20211027	Normal	ES2139235	0.17	<0.01	**0.59**	0.03	0.03	0.42	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_MW601_20220428	Normal	EM2208229	0.20	0.01	**0.65**	0.03	0.04	0.45	0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
	04 Nov 2022	0315_MW601_20221104	Normal	EM2222368	0.34	<0.01	**0.77**	0.04	0.03	0.43	0.03	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_MW601_ 20230413	Normal	EM2306926	0.21	<0.01	**0.57**	0.02	0.04	0.36	0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
MW624	11 Mar 2020	0315_MW624_S_200311	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Oct 2021	0315_MW624_20211027	Normal	ES2139235	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	20 Dec 2021	MW624	Normal	EM2125953	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_MW624_20220428	Normal	EM2208229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	04 Nov 2022	0315_MW624_20221104	Normal	EM2222368	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_MW624_20230413	Normal	EM2306926	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW625	21 May 2020	0315_MW625_S_200521	Normal	ES2017986	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	26 Oct 2021	0315_MW625_20211026	Normal	ES2139232	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Apr 2022	0315_MW625_20220427	Normal	EM2208223	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_MW625_20221103	Normal	EM2222366	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_MW625_ 20230413	Normal	EM2306925	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

					Perfluorocarbons														
					Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS
					µg/L	µg/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR					0.0005	0.0005	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0003
PFAS NEMP 2.0 Table 1 Health Drinking Water																			
PFAS NEMP 2.0 Table 1 Health Recreational Water																			
PFAS NEMP 2.0 Table 5 Freshwater 95%																			
Location Code	**Date**	**Field ID**	**Sample Type**	**Lab Report Number**															
MW008	16 Mar 2017	0315_MW008_170316	Normal	ES1706394	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.16
	18 Dec 2018	0315_MW008_S_181218	Normal	ES1838696	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.14
		0315_QC102_181218	Field_D	ES1838696	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.14
		0315_QC104_181218	Field_D	ES1838696	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.15
		0315_QC202_181218	Interlab_D	635075	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.25
	09 Mar 2020	0315_MW008_S_200309	Normal	ES2008982	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23
		0315_QC101_200309	Field_D	ES2008982	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23
		0315_QC201_200309	Interlab_D	239048	<0.05	<0.1	<0.5	<0.1	<0.05	<0.05	<0.1	<0.5	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.19
	28 Oct 2021	0315_MW008_20211028	Normal	ES2139229	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11
	28 Apr 2022	0315_MW008_20220428	Normal	EM2208205	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.10
	03 Nov 2022	0315_MW008_20221103	Normal	EM2222407	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13
	12 Apr 2023	0315_MW008_20230412	Normal	EM2306946	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11
MW103	20 Feb 2019	0315_MW103_S_190220	Normal	ES1905450	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	28 Oct 2021	0315_MW103_20211028	Normal	ES2139229	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	29 Apr 2022	0315_MW103_20220429	Normal	EM2208205	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	03 Nov 2022	0315_MW103_20221103	Normal	EM2222407	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11
	13 Apr 2023	0315_MW103_20230413	Normal	EM2306946	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
		0315_QC105_20230413	Field_D	EM2306946	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
		0315_QC205_20230413	Interlab_D	982794	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1
MW104	20 Feb 2019	0315_MW104_S_190220	Normal	ES1905450	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	28 Oct 2021	0315_MW104_20211028	Normal	ES2139229	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	28 Apr 2022	0315_MW104_20220428	Normal	EM2208205	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.18	<0.05	<0.05	0.18
	03 Nov 2022	0315_MW104_20221103	Normal	EM2222407	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	15 Apr 2023	0315_MW104_20230415	Normal	EM2306946	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW107	30 Jan 2019	0315_MW107_P_190130	Normal	ES1902996	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.10
	07 Mar 2019	0315_MW107_P_190307	Normal	ES1907492	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07
	29 Apr 2022	0315_MW107_20220429	Normal	EM2208205	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.07	<0.05	<0.05	0.27
	03 Nov 2022	0315_MW107_20221103	Normal	EM2222407	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.12
	13 Apr 2023	0315_MW107_20230413	Normal	EM2306946	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13
MW109	10 Mar 2020	0315_MW109_S_200310	Normal	ES2008982	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	27 Oct 2021	0315_MW109_20211027	Normal	ES2139229	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
		0315_QC105_20211027	Field_D	ES2139230	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
		0315_QC205_20211027	Interlab_D	837707	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1
	27 Apr 2022	0315_MW109_20220427	Normal	EM2208205	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
		0315_QC101_20220427	Field_D	EM2208205	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
		0315_QC201_20220427	Interlab_D	889626	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1
	03 Nov 2022	0315_MW109_20221103	Normal	EM2222407	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
		0315_QC104_20221103	Field_D	EM2222407	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
		0315_QC204_20221103	Interlab_D	940511	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1
	13 Apr 2023	0315_MW109_20230413	Normal	EM2306946	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW110	10 Mar 2020	0315_MW110_S_200310	Normal	ES2008982	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	28 Oct 2021	0315_MW110_20211027	Normal	ES2139229	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	27 Apr 2022	0315_MW110_20220427	Normal	EM2208205	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	03 Nov 2022	0315_MW110_20221103	Normal	EM2222407	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	13 Apr 2023	0315_MW110_20230413	Normal	EM2306946	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
MW601	29 Jan 2019	0315_MW601_S_190129	Normal	ES1902996	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.18
		0315_QC101_190129	Field_D	ES1902996	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.15
		0315_QC201_190129	Interlab_D	638493	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.14
	18 Feb 2019	0315_MW601_S_190218	Normal	ES1905450	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.29
	12 Mar 2020	0315_MW601_P_200312	Normal	ES2008982	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.11
	27 Oct 2021	0315_MW601_20211027	Normal	ES2139235	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.68
	28 Apr 2022	0315_MW601_20220428	Normal	EM2208229	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.78
	04 Nov 2022	0315_MW601_20221104	Normal	EM2222368	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.89
	13 Apr 2023	0315_MW601_ 20230413	Normal	EM2306926	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.68
MW624	11 Mar 2020	0315_MW624_S_200311	Normal	ES2008982	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	27 Oct 2021	0315_MW624_20211027	Normal	ES2139235	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.05	<0.05	<0.05	0.05
	20 Dec 2021	MW624	Normal	EM2125953	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	28 Apr 2022	0315_MW624_20220428	Normal	EM2208229	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	04 Nov 2022	0315_MW624_20221104	Normal	EM2222368	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	13 Apr 2023	0315_MW624_20230413	Normal	EM2306926	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.23	<0.05	<0.05	0.23
MW625	21 May 2020	0315_MW625_S_200521	Normal	ES2017986	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	26 Oct 2021	0315_MW625_20211026	Normal	ES2139232	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	27 Apr 2022	0315_MW625_20220427	Normal	EM2208223	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	03 Nov 2022	0315_MW625_20221103	Normal	EM2222366	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01
	13 Apr 2023	0315_MW625_ 20230413	Normal	EM2306925	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01

					Perfluorocarbons															
					Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR					0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PFAS NEMP 2.0 Table 1 Health Drinking Water						**0.56**	**0.07**													
PFAS NEMP 2.0 Table 1 Health Recreational Water						***10***	***2***													
PFAS NEMP 2.0 Table 5 Freshwater 95%					0.13	220														
Location Code	**Date**	**Field ID**	**Sample Type**	**Lab Report Number**																
SW103	10 Dec 2018	0315_SW103_181210	Normal	ES1837611	0.67	0.05	**1.31**	0.10	0.06	0.64	0.02	<0.02	<0.1	0.13	0.18	0.04	<0.02	<0.02	<0.02	<0.02
	26 Oct 2021	0315_QC103_20211026	Field_D	ES2139230	0.74	0.03	**0.99**	0.02	<0.02	0.25	<0.02	<0.02	<0.1	0.06	0.07	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC203_20211026	Interlab_D	837707	1.0	0.03	**1.31**	0.02	0.02	0.31	0.02	<0.01	<0.05	0.06	0.07	0.02	<0.01	<0.01	<0.01	<0.01
		0315_SW103_20211026	Normal	ES2139229	0.60	0.02	**0.82**	<0.02	<0.02	0.22	<0.02	<0.02	<0.1	0.06	0.06	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_SW103_20220428	Normal	EM2208205	0.19	<0.01	**0.28**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW103_20221103	Normal	EM2222407	0.22	0.02	**0.36**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_QC104_20230412	Field_D	EM2306946	0.16	<0.01	**0.24**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC204_20230412	Interlab_D	982794	0.23	<0.01	**0.32**	<0.01	<0.01	0.09	<0.01	<0.01	<0.05	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
		0315_SW103_20230412	Normal	EM2306946	0.16	<0.01	**0.24**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW106	16 Dec 2018	0315_SW106_181216	Normal	ES1838218	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW106_20221103	Normal	EM2222407	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW106_20230412	Normal	EM2306946	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW107	10 Dec 2018	0315_SW107_181210	Normal	ES1837611	0.43	0.03	**0.65**	0.02	<0.02	0.22	<0.02	<0.02	<0.1	0.03	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
	26 Oct 2021	0315_SW107_20211026	Normal	ES2139229	0.18	0.01	**0.25**	<0.02	<0.02	0.07	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	02 May 2022	0315_SW107_20220502	Normal	EM2208205	0.15	<0.01	**0.20**	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW107_20221103	Normal	EM2222407	0.14	<0.01	**0.25**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW107_20230412	Normal	EM2306946	0.13	<0.01	**0.20**	<0.02	<0.02	0.07	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW108	15 Dec 2018	0315_SW108_181215	Normal	ES1838218	0.02	0.02	0.06	0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	26 Oct 2021	0315_SW108_20211026	Normal	ES2139229	0.01	<0.01	0.02	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	02 May 2022	0315_SW108_20220502	Normal	EM2208205	0.02	0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW108_20221103	Normal	EM2222407	0.01	<0.01	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_SW108_ 20230413	Normal	EM2306946	0.01	<0.01	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW111	15 Dec 2018	0315_SW111_181215	Normal	ES1838218	0.03	0.02	**0.11**	0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
	26 Oct 2021	0315_SW111_20211026	Normal	ES2139229	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Apr 2022	0315_SW111_20220427	Normal	EM2208205	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW111_20221103	Normal	EM2222407	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_SW111_ 20230413	Normal	EM2306946	0.01	<0.01	0.04	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW118	30 Nov 2018	0315_SW118_181130	Normal	ES1836659	0.52	0.02	**0.67**	<0.02	<0.02	0.15	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
	13 Dec 2018	0315_SW118_181213	Normal	ES1837950	0.07	<0.01	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_SW118_20220428	Normal	EM2208205	0.18	<0.01	**0.24**	<0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW118_20221103	Normal	EM2222407	0.13	<0.01	**0.23**	<0.02	<0.02	0.10	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW118_20230412	Normal	EM2306946	0.02	<0.01	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW121	30 Nov 2018	0315_SW121_181130	Normal	ES1836659	0.28	0.02	**0.39**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
	26 Oct 2021	0315_SW121_20211026	Normal	ES2139229	0.22	0.01	**0.31**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_SW121_20220428	Normal	EM2208205	0.16	<0.01	**0.21**	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	04 Nov 2022	0315_SW121_20221104	Normal	EM2222407	0.09	<0.01	**0.13**	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	11 Apr 2023	0315_QC102_20230411	Field_D	EM2306946	0.16	<0.01	**0.22**	<0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC202_20230411	Interlab_D	982794	0.22	<0.01	**0.28**	<0.01	<0.01	0.06	<0.01	<0.01	<0.05	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		0315_SW121_20230411	Normal	EM2306946	0.17	<0.01	**0.23**	0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

					Perfluorocarbons															
					Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR					0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PFAS NEMP 2.0 Table 1 Health Drinking Water						**0.56**	**0.07**													
PFAS NEMP 2.0 Table 1 Health Recreational Water						***10***	***2***													
PFAS NEMP 2.0 Table 5 Freshwater 95%					0.13	220														
Location Code	**Date**	**Field ID**	**Sample Type**	**Lab Report Number**																
SW127	14 Dec 2018	0315_SW127_181214	Normal	ES1838218	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	25 Oct 2021	0315_QC101_20211025	Field_D	ES2139230	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC201_20211025	Interlab_D	837707	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		0315_SW127_20211025	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Apr 2022	0315_SW127_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_QC101_20221103	Field_D	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC201_20221103	Interlab_D	940511	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		0315_SW127_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW127_20230412	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW136	29 Jan 2019	0315_SW136_190129	Normal	ES1902996	1.48	0.11	***4.15***	0.26	0.24	2.67	0.04	<0.02	<0.1	0.17	0.44	0.16	<0.02	<0.02	<0.02	<0.02
	26 Oct 2021	0315_SW136_20211026	Normal	ES2139229	1.20	0.04	**1.93**	0.06	0.06	0.73	0.03	<0.02	<0.1	0.11	0.19	0.03	<0.02	<0.02	<0.02	<0.02
	27 Apr 2022	0315_QC102_20220427	Field_D	EM2208205	0.05	<0.01	0.07	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC202_20220427	Interlab_D	889626	0.06	<0.01	**0.08**	<0.01	<0.01	0.02	<0.01	<0.01	<0.05	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		0315_SW136_20220427	Normal	EM2208205	0.04	<0.01	0.05	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW136_20221103	Normal	EM2222407	0.17	0.02	**0.30**	0.03	<0.02	0.13	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW136_20230412	Normal	EM2306946	0.04	<0.01	0.06	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW140	29 Jan 2019	0315_SW140_190129	Normal	ES1902996	0.03	<0.01	**0.25**	0.04	0.03	0.22	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	26 Oct 2021	0315_SW140_20211026	Normal	ES2139229	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_QC103_20220428	Field_D	EM2208205	<0.01	<0.01	0.01	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC203_20220428	Interlab_D	889626	<0.01	<0.01	0.02	<0.01	<0.01	0.02	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		0315_SW140_20220428	Normal	EM2208205	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_QC102_20221103	Field_D	EM2222407	0.01	<0.01	0.05	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		0315_QC202_20221103	Interlab_D	940511	0.01	<0.01	0.04	<0.01	<0.01	0.03	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		0315_SW140_20221103	Normal	EM2222407	<0.01	<0.01	0.03	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW140_20230412	Normal	EM2306946	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW144	29 Jan 2019	0315_SW144_190129	Normal	ES1902996	0.01	<0.01	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Oct 2021	0315_SW144_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	29 Apr 2022	0315_SW144_20220429	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW144_20221103	Normal	EM2222407	0.12	<0.01	**0.17**	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW144_20230412	Normal	EM2306946	0.02	<0.01	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW148	29 Jan 2019	0315_SW148_190129	Normal	ES1902996	0.47	0.01	**0.61**	0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Oct 2021	0315_SW148_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	28 Apr 2022	0315_SW148_20220428	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW148_20221103	Normal	EM2222407	0.16	<0.01	**0.16**	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW148_20230412	Normal	EM2306946	0.01	<0.01	0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW149	29 Jan 2019	0315_SW149_190129	Normal	ES1902996	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Oct 2021	0315_SW149_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	29 Apr 2022	0315_SW149_20220429	Normal	EM2208205	0.02	<0.01	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	03 Nov 2022	0315_SW149_20221103	Normal	EM2222407	0.16	0.01	**0.16**	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	12 Apr 2023	0315_SW149_20230412	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW614	13 Dec 2018	0315_SW614_181213	Normal	ES1837950	0.03	<0.01	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	27 Oct 2021	0315_SW614_20211027	Normal	ES2139235	0.27	<0.01	**0.35**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	04 Nov 2022	0315_SW614_20221104	Normal	EM2222368	0.05	<0.01	0.07	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	16 Apr 2023	0315_SW614_20230416	Normal	EM2306926	0.07	<0.01	0.07	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW677	04 Nov 2022	0315_SW677_20221104	Normal	EM2222368	0.04	<0.01	0.06	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW680	10 Dec 2019	0315_SW680_191210	Normal	ES1941493	0.08	<0.01	**0.12**	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	04 Nov 2022	0315_SW680_20221104	Normal	EM2222365	0.04	<0.01	0.07	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	13 Apr 2023	0315_SW680_ 20230413	Normal	EM2306924	0.10	<0.01	**0.13**	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

					Perfluorocarbons															
					Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
					µg/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	UG/L	ug/L
LOR					0.01	0.01	0.02	0.05	0.05	0.05	0.05	0.02	0.02	0.01	0.05	0.01	0.01	0.01	0.01	0.01
PFAS NEMP 2.0 Table 1 Health Drinking Water																				
PFAS NEMP 2.0 Table 1 Health Recreational Water																				
PFAS NEMP 2.0 Table 5 Freshwater 95%																				
Location Code	**Date**	**Field ID**	**Sample Type**	**Lab Report Number**																
SW103	10 Dec 2018	0315_SW103_181210	Normal	ES1837611	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.89		
	26 Oct 2021	0315_QC103_20211026	Field_D	ES2139230	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.17		
		0315_QC203_20211026	Interlab_D	837707	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	1.55	1.03	1.34
		0315_SW103_20211026	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.96		
	28 Apr 2022	0315_SW103_20220428	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.28		
	03 Nov 2022	0315_SW103_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.41		
	12 Apr 2023	0315_QC104_20230412	Field_D	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.24		
		0315_QC204_20230412	Interlab_D	982794	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.36	0.23	0.32
		0315_SW103_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.24		
SW106	16 Dec 2018	0315_SW106_181216	Normal	ES1838218	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	03 Nov 2022	0315_SW106_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02		
	12 Apr 2023	0315_SW106_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04		
SW107	10 Dec 2018	0315_SW107_181210	Normal	ES1837611	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.77		
	26 Oct 2021	0315_SW107_20211026	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.26		
	02 May 2022	0315_SW107_20220502	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.20		
	03 Nov 2022	0315_SW107_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.25		
	12 Apr 2023	0315_SW107_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.17	<0.05	<0.05	0.37		
SW108	15 Dec 2018	0315_SW108_181215	Normal	ES1838218	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.10		
	26 Oct 2021	0315_SW108_20211026	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02		
	02 May 2022	0315_SW108_20220502	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05		
	03 Nov 2022	0315_SW108_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03		
	13 Apr 2023	0315_SW108_ 20230413	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05		
SW111	15 Dec 2018	0315_SW111_181215	Normal	ES1838218	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.18		
	26 Oct 2021	0315_SW111_20211026	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04		
	27 Apr 2022	0315_SW111_20220427	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04		
	03 Nov 2022	0315_SW111_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04		
	13 Apr 2023	0315_SW111_ 20230413	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04		
SW118	30 Nov 2018	0315_SW118_181130	Normal	ES1836659	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.72		
	13 Dec 2018	0315_SW118_181213	Normal	ES1837950	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07		
	28 Apr 2022	0315_SW118_20220428	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.24		
	03 Nov 2022	0315_SW118_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23		
	12 Apr 2023	0315_SW118_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.09	<0.05	<0.05	0.11		
SW121	30 Nov 2018	0315_SW121_181130	Normal	ES1836659	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.44		
	26 Oct 2021	0315_SW121_20211026	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.32		
	28 Apr 2022	0315_SW121_20220428	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.21		
	04 Nov 2022	0315_SW121_20221104	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13		
	11 Apr 2023	0315_QC102_20230411	Field_D	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.22		
		0315_QC202_20230411	Interlab_D	982794	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.29	0.22	0.28
		0315_SW121_20230411	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.25		

					Perfluorocarbons															
Location Code	Date	Field ID	Sample Type	Lab Report Number	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
					µg/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	UG/L	ug/L
LOR					0.01	0.01	0.02	0.05	0.05	0.05	0.05	0.02	0.02	0.01	0.05	0.01	0.01	0.01	0.01	0.01
PFAS NEMP 2.0 Table 1 Health Drinking Water																				
PFAS NEMP 2.0 Table 1 Health Recreational Water																				
PFAS NEMP 2.0 Table 5 Freshwater 95%																				
SW127	14 Dec 2018	0315_SW127_181214	Normal	ES1838218	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	25 Oct 2021	0315_QC101_20211025	Field_D	ES2139230	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
		0315_QC201_20211025	Interlab_D	837707	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.01	<0.01
		0315_SW127_20211025	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	27 Apr 2022	0315_SW127_20220427	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	03 Nov 2022	0315_QC101_20221103	Field_D	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
		0315_QC201_20221103	Interlab_D	940511	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.01	<0.01
		0315_SW127_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	12 Apr 2023	0315_SW127_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
SW136	29 Jan 2019	0315_SW136_190129	Normal	ES1902996	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	5.57		
	26 Oct 2021	0315_SW136_20211026	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	2.45		
	27 Apr 2022	0315_QC102_20220427	Field_D	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07		
		0315_QC202_20220427	Interlab_D	889626	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.11	0.06	0.08
		0315_SW136_20220427	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05		
	03 Nov 2022	0315_SW136_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.38		
	12 Apr 2023	0315_SW136_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.06		
SW140	29 Jan 2019	0315_SW140_190129	Normal	ES1902996	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.32		
	26 Oct 2021	0315_SW140_20211026	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02		
	28 Apr 2022	0315_QC103_20220428	Field_D	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.01		
		0315_QC203_20220428	Interlab_D	889626	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.01	0.02
		0315_SW140_20220428	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02		
	03 Nov 2022	0315_QC102_20221103	Field_D	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05		
		0315_QC202_20221103	Interlab_D	940511	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	0.01	0.04
		0315_SW140_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03		
	12 Apr 2023	0315_SW140_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.05	<0.05	<0.05	0.07		
SW144	29 Jan 2019	0315_SW144_190129	Normal	ES1902996	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03		
	27 Oct 2021	0315_SW144_20211027	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	29 Apr 2022	0315_SW144_20220429	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	03 Nov 2022	0315_SW144_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.17		
	12 Apr 2023	0315_SW144_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.11	<0.05	<0.05	0.13		
SW148	29 Jan 2019	0315_SW148_190129	Normal	ES1902996	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.66		
	27 Oct 2021	0315_SW148_20211027	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	28 Apr 2022	0315_SW148_20220428	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.06	<0.05	<0.05	0.06		
	03 Nov 2022	0315_SW148_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.16		
	12 Apr 2023	0315_SW148_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.13	<0.05	<0.05	0.14		
SW149	29 Jan 2019	0315_SW149_190129	Normal	ES1902996	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	27 Oct 2021	0315_SW149_20211027	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
	29 Apr 2022	0315_SW149_20220429	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	0.07	<0.05	<0.05	0.09		
	03 Nov 2022	0315_SW149_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.19		
	12 Apr 2023	0315_SW149_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01		
SW614	13 Dec 2018	0315_SW614_181213	Normal	ES1837950	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03		
	27 Oct 2021	0315_SW614_20211027	Normal	ES2139235	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.35		
	04 Nov 2022	0315_SW614_20221104	Normal	EM2222368	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07		
	16 Apr 2023	0315_SW614_20230416	Normal	EM2306926	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07		
SW677	04 Nov 2022	0315_SW677_20221104	Normal	EM2222368	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.06		
SW680	10 Dec 2019	0315_SW680_191210	Normal	ES1941493	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.12		
	04 Nov 2022	0315_SW680_20221104	Normal	EM2222365	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07		
	13 Apr 2023	0315_SW680_ 20230413	Normal	EM2306924	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13		

Location Code	Date	Sample Type	Field ID	Lab Report No.	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)
					Perfluorocarbons															
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
SD103	10 Dec 2018	Normal	0315_SD103_181210	ES1837611	0.0086	<0.0002	0.0096	<0.0002	<0.0002	0.0010	<0.0002	0.0003	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	26 Oct 2021	Normal	0315_SD103_20211026	ES2139229	0.0140	<0.0002	0.0146	<0.0002	<0.0002	0.0006	<0.0002	0.0004	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003
		Field_D	0315_QC104_20211026	ES2139230	0.0126	<0.0002	0.0132	<0.0002	<0.0002	0.0006	<0.0002	0.0006	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	28 Apr 2022	Normal	0315_SD103_20220428	EM2208205	0.0163	<0.0002	0.0175	<0.0002	<0.0002	0.0012	<0.0002	0.0007	<0.001	<0.0002	0.0002	<0.0002	<0.0002	0.0003	0.0002	0.0002
		Field_D	0315_QC105_20220428	EM2208205	0.0163	<0.0002	0.0173	<0.0002	<0.0002	0.0010	<0.0002	0.0005	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	0.0002	0.0003
		Interlab_D	0315_QC205_20220428	889626	0.013	<0.005	0.013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	03 Nov 2022	Normal	0315_SD103_20221103	EM2222407	0.0063	<0.0002	0.0066	<0.0002	<0.0002	0.0003	<0.0002	0.0004	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	12 Apr 2023	Normal	0315_SD103_20230412	EM2306946	0.0130	0.0002	0.0137	<0.0002	<0.0002	0.0007	<0.0002	0.0006	<0.001	0.0003	0.0002	<0.0002	<0.0002	0.0003	0.0002	0.0004
		Field_D	0315_QC103_20230412	EM2306946	0.0089	0.0002	0.0093	<0.0002	<0.0002	0.0004	<0.0002	0.0005	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0003
		Interlab_D	0315_QC203_20230412	982794	0.014	<0.005	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SD106	16 Dec 2018	Normal	0315_SD106_181216	ES1838218	0.0076	<0.0002	0.0080	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	26 Oct 2021	Normal	0315_SD106_20211026	ES2139229	0.0042	<0.0002	0.0042	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	28 Apr 2022	Normal	0315_SD106_20220428	EM2208205	0.0042	0.0002	0.0042	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	0.0012	<0.0002	0.0004
	03 Nov 2022	Normal	0315_SD106_20221103	EM2222407	0.0040	<0.0002	0.0040	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	12 Apr 2023	Normal	0315_SD106_20230412	EM2306946	0.0053	<0.0002	0.0055	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD107	10 Dec 2018	Normal	0315_SD107_181210	ES1837611	0.0142	<0.0002	0.0149	<0.0002	<0.0002	0.0007	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	26 Oct 2021	Normal	0315_SD107_20211026	ES2139229	0.0051	<0.0002	0.0051	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	02 May 2022	Normal	0315_SD107_20220502	EM2208205	0.0037	<0.0002	0.0042	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	03 Nov 2022	Normal	0315_SD107_20221103	EM2222407	0.0027	<0.0002	0.0027	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	12 Apr 2023	Normal	0315_SD107_20230412	EM2306946	0.0033	<0.0002	0.0033	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD108	15 Dec 2018	Normal	0315_SD108_181215	ES1838218	0.0004	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	26 Oct 2021	Normal	0315_SD108_20211026	ES2139229	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	02 May 2022	Normal	0315_SD108_20220502	EM2208205	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	03 Nov 2022	Normal	0315_SD108_20221103	EM2222407	0.0006	<0.0002	0.0006	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	13 Apr 2023	Normal	0315_SD108_ 20230413	EM2306946	0.0005	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD111	15 Dec 2018	Normal	0315_SD111_181215	ES1838218	0.0041	<0.0002	0.0045	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
	26 Oct 2021	Normal	0315_SD111_20211026	ES2139229	0.0008	<0.0002	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	27 Apr 2022	Normal	0315_SD111_20220427	EM2208205	0.0005	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	03 Nov 2022	Normal	0315_SD111_20221103	EM2222407	0.0004	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	13 Apr 2023	Normal	0315_SD111_ 20230413	EM2306946	0.0008	<0.0002	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD118	30 Nov 2018	Normal	0315_SD118_181130	ES1836659	0.0037	<0.0002	0.0037	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	26 Oct 2021	Normal	0315_SD118_20211026	ES2139229	0.0045	<0.0002	0.0045	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	28 Apr 2022	Normal	0315_SD118_20220428	EM2208205	0.0077	<0.0002	0.0077	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	03 Nov 2022	Normal	0315_SD118_20221103	EM2222407	0.0025	<0.0002	0.0025	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	12 Apr 2023	Normal	0315_SD118_20230412	EM2306946	0.0058	<0.0002	0.0058	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD121	30 Nov 2018	Normal	0315_SD121_181130	ES1836659	0.0238	<0.0002	0.0246	<0.0002	<0.0002	0.0008	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	26 Oct 2021	Normal	0315_SD121_20211026	ES2139229	0.0016	<0.0002	0.0016	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	21 Dec 2021	Normal	SD121	EM2125953	0.0184	<0.0002	0.0188	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Field_D	QC101_211221	EM2125953	0.0194	<0.0002	0.0197	<0.0002	-	0.0003	-	-	<0.001	<0.0002	<0.0002	<0.0002	-	-	-	-
		Interlab_D	QC201_211221	853128	0.033	<0.005	0.033	-	-	<0.005	-	-	-	-	-	-	-	-	-	-
	28 Apr 2022	Normal	0315_SD121_20220428	EM2208205	0.0009	<0.0002	0.0009	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	04 Nov 2022	Normal	0315_SD121_20221104	EM2222407	0.0017	<0.0002	0.0017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	11 Apr 2023	Normal	0315_SD121_20230411	EM2306946	0.0017	<0.0002	0.0017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Field_D	0315_QC101_20230411	EM2306946	0.0039	<0.0002	0.0039	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Interlab_D	0315_QC201_20230411	982794	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SD127	14 Dec 2018	Normal	0315_SD127_181214	ES1838218	0.0007	<0.0002	0.0007	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	25 Oct 2021	Normal	0315_SD127_20211026	ES2139229	0.0005	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Field_D	0315_QC102_20211025	ES2139230	0.0003	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	27 Apr 2022	Normal	0315_SD127_20220427	EM2208205	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	03 Nov 2022	Normal	0315_SD127_20221103	EM2222407	0.0009	<0.0002	0.0009	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Field_D	0315_QC103_20221103	EM2222407	0.0014	<0.0002	0.0014	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Interlab_D	0315_QC203_20221103	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	12 Apr 2023	Normal	0315_SD127_20230412	EM2306946	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

					Perfluorocarbons															
					Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR					0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Location Code	**Date**	**Sample Type**	**Field ID**	**Lab Report No.**																
SD136	26 Oct 2021	Normal	0315_SD136_20211026	ES2139229	0.0046	<0.0002	0.0050	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	27 Apr 2022	Normal	0315_SD136_20220427	EM2208205	0.0393	<0.0002	0.0411	<0.0002	<0.0002	0.0018	<0.0002	0.0004	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Field_D	0315_QC104_20220427	EM2208205	0.0606	<0.0002	0.0631	<0.0002	<0.0002	0.0025	0.0002	0.0005	<0.001	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Interlab_D	0315_QC204_20220427	889626	0.052	<0.005	0.052	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	03 Nov 2022	Normal	0315_SD136_20221103	EM2222407	0.0030	<0.0002	0.0030	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Field_D	0315_QC105_20221103	EM2222407	0.0029	<0.0002	0.0029	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
		Interlab_D	0315_QC205_20221103	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	12 Apr 2023	Normal	0315_SD136_20230412	EM2306946	0.0246	0.0003	0.0282	<0.0002	<0.0002	0.0036	0.0003	0.0009	<0.001	0.0003	0.0008	0.0002	0.0002	0.0004	0.0005	0.0004
SD614	18 Dec 2018	Normal	0315_SD614_181218	ES1838696	0.0094	<0.0002	0.0097	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	27 Oct 2021	Normal	0315_SD614_20211027	ES2139235	0.0110	<0.0002	0.0114	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	20 Dec 2021	Normal	SD614	EM2125953	0.0093	<0.0002	0.0095	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	28 Apr 2022	Normal	0315_SD614_20220428	EM2208229	0.0075	<0.0002	0.0077	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	04 Nov 2022	Normal	0315_SD614_20221104	EM2222368	0.0073	<0.0002	0.0073	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	12 Apr 2023	Normal	0315_SD614_20230412	EM2306926	0.0090	<0.0002	0.0092	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD677	26 Oct 2021	Normal	0315_SD677_20211026	ES2139235	0.0052	<0.0002	0.0052	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	21 Dec 2021	Normal	SD677	EM2125953	0.0075	<0.0002	0.0075	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	28 Apr 2022	Normal	0315_SD677_20220428	EM2208229	0.0068	<0.0002	0.0068	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	04 Nov 2022	Normal	0315_SD677_20221104	EM2222368	0.0074	<0.0002	0.0074	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	12 Apr 2023	Normal	0315_SD677_20230412	EM2306926	0.0066	<0.0002	0.0066	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

					Perfluorocarbons															
					Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR					0.0002	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.005	0.005
Location Code	Date	Sample Type	Field ID	Lab Report No.																
SD103	10 Dec 2018	Normal	0315_SD103_181210	ES1837611	<0.0002	<0.0005	0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0102	-	-
	26 Oct 2021	Normal	0315_SD103_20211026	ES2139229	<0.0002	<0.0005	0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0156	-	-
		Field_D	0315_QC104_20211026	ES2139230	<0.0002	<0.0005	0.0004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0142	-	-
	28 Apr 2022	Normal	0315_SD103_20220428	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0191	-	-
		Field_D	0315_QC105_20220428	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0187	-	-
		Interlab_D	0315_QC205_20220428	889626	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	0.013	0.013
	03 Nov 2022	Normal	0315_SD103_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0070	-	-
	12 Apr 2023	Normal	0315_SD103_20230412	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0159	-	-
		Field_D	0315_QC103_20230412	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0105	-	-
		Interlab_D	0315_QC203_20230412	982794	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	0.014	0.014
SD106	16 Dec 2018	Normal	0315_SD106_181216	ES1838218	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0080	-	-
	26 Oct 2021	Normal	0315_SD106_20211026	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0042	-	-
	28 Apr 2022	Normal	0315_SD106_20220428	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	0.0004	<0.0005	<0.0005	<0.0005	<0.0005	0.0064	-	-
	03 Nov 2022	Normal	0315_SD106_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0040	-	-
	12 Apr 2023	Normal	0315_SD106_20230412	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0055	-	-
SD107	10 Dec 2018	Normal	0315_SD107_181210	ES1837611	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0149	-	-
	26 Oct 2021	Normal	0315_SD107_20211026	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0051	-	-
	02 May 2022	Normal	0315_SD107_20220502	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0042	-	-
	03 Nov 2022	Normal	0315_SD107_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0027	-	-
	12 Apr 2023	Normal	0315_SD107_20230412	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0033	-	-
SD108	15 Dec 2018	Normal	0315_SD108_181215	ES1838218	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	-	-
	26 Oct 2021	Normal	0315_SD108_20211026	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	-	-
	02 May 2022	Normal	0315_SD108_20220502	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	-	-
	03 Nov 2022	Normal	0315_SD108_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	-	-
	13 Apr 2023	Normal	0315_SD108_ 20230413	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	-	-
SD111	15 Dec 2018	Normal	0315_SD111_181215	ES1838218	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0048	-	-
	26 Oct 2021	Normal	0315_SD111_20211026	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	-	-
	27 Apr 2022	Normal	0315_SD111_20220427	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	-	-
	03 Nov 2022	Normal	0315_SD111_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	-	-
	13 Apr 2023	Normal	0315_SD111_ 20230413	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	-	-
SD118	30 Nov 2018	Normal	0315_SD118_181130	ES1836659	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0037	-	-
	26 Oct 2021	Normal	0315_SD118_20211026	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0045	-	-
	28 Apr 2022	Normal	0315_SD118_20220428	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0077	-	-
	03 Nov 2022	Normal	0315_SD118_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	-	-
	12 Apr 2023	Normal	0315_SD118_20230412	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0058	-	-
SD121	30 Nov 2018	Normal	0315_SD121_181130	ES1836659	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0246	-	-
	26 Oct 2021	Normal	0315_SD121_20211026	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	-	-
	21 Dec 2021	Normal	SD121	EM2125953	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0188	-	-
		Field_D	QC101_211221	EM2125953	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-
		Interlab_D	QC201_211221	853128	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	-	0.033	0.033
	28 Apr 2022	Normal	0315_SD121_20220428	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	-	-
	04 Nov 2022	Normal	0315_SD121_20221104	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0017	-	-
	11 Apr 2023	Normal	0315_SD121_20230411	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0017	-	-
		Field_D	0315_QC101_20230411	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0039	-	-
		Interlab_D	0315_QC201_20230411	982794	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	<0.005	<0.005
SD127	14 Dec 2018	Normal	0315_SD127_181214	ES1838218	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	-	-
	25 Oct 2021	Normal	0315_SD127_20211026	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	-	-
		Field_D	0315_QC102_20211025	ES2139230	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0003	-	-
	27 Apr 2022	Normal	0315_SD127_20220427	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	-	-
	03 Nov 2022	Normal	0315_SD127_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	-	-
		Field_D	0315_QC103_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	-	-
		Interlab_D	0315_QC203_20221103	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	<0.005	<0.005
	12 Apr 2023	Normal	0315_SD127_20230412	EM2306946	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	-	-

Location Code	Date	Sample Type	Field ID	Lab Report No.	Perfluorocarbons															
					Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
					mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR					0.0002	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.005	0.005
SD136	26 Oct 2021	Normal	0315_SD136_20211026	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0050	-	-
	27 Apr 2022	Normal	0315_SD136_20220427	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0418	-	-
		Field_D	0315_QC104_20220427	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0642	-	-
		Interlab_D	0315_QC204_20220427	889626	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	0.052	0.052	0.052
	03 Nov 2022	Normal	0315_SD136_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0030	-	-
		Field_D	0315_QC105_20221103	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0029	-	-
		Interlab_D	0315_QC205_20221103	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	<0.005	<0.005
	12 Apr 2023	Normal	0315_SD136_20230412	EM2306946	0.0003	<0.0005	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0330	-	-
SD614	18 Dec 2018	Normal	0315_SD614_181218	ES1838696	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0097	-	-
	27 Oct 2021	Normal	0315_SD614_20211027	ES2139235	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0114	-	-
	20 Dec 2021	Normal	SD614	EM2125953	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0095	-	-
	28 Apr 2022	Normal	0315_SD614_20220428	EM2208229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0077	-	-
	04 Nov 2022	Normal	0315_SD614_20221104	EM2222368	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0073	-	-
	12 Apr 2023	Normal	0315_SD614_20230412	EM2306926	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0092	-	-
SD677	26 Oct 2021	Normal	0315_SD677_20211026	ES2139235	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0052	-	-
	21 Dec 2021	Normal	SD677	EM2125953	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0075	-	-
	28 Apr 2022	Normal	0315_SD677_20220428	EM2208229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0068	-	-
	04 Nov 2022	Normal	0315_SD677_20221104	EM2222368	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0074	-	-
	12 Apr 2023	Normal	0315_SD677_20230412	EM2306926	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0066	-	-

APPENDIX

C

E3 FACTUAL REPORT

Cardno

now

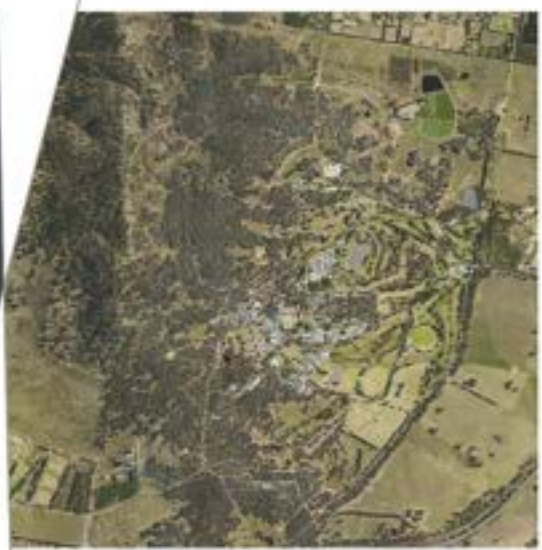
Stantec

PFAS OMP Factual Report

Biannual Sampling Event November 2022

Blamey Barracks Kapooka

DEF19008



Prepared for
Department of Defence

13 April 2023

Cardno

now

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Document Information

Prepared for	Department of Defence
Project Name	PFAS OMP Factual Report
File Reference	OMP002_Kapooka_E3 FactualReport_Rev2.docx
Job Reference	DEF19008
Date	13 April 2023
Version Number	2
Effective Date	13/04/2023

Author(s):

[redacted]

Approved By:

[redacted]

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
00	07/12/2022	Internal Draft	[redacted]	
0	14/12/2022	External Draft		
1	30/03/2023	Revised Draft		
2	13/04/2023	Final		

Table of Contents

Appendices

Tables

List of Abbreviations and Units

Chemical Names

DO	Dissolved Oxygen
PFAS	Per- and Poly-fluoroalkyl Substances
PFHxS	Perfluorohexane sulfonate, or perfluorohexane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate, or perfluorooctane sulfonic acid
TDS	Total Dissolved Solids (salinity of water)

Technical Terms

AFFF	Aqueous Film-Forming Foam
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AS	Australian Standard
BGL	Below Ground Level
COC	Chain of Custody
EC	Electrical Conductivity
EPA	Environment Protection Authority
HHERA	Human Health and Ecological Risk Assessment
HSL	Health Screening Level
LOR	Limit of Reporting
N/A	Not Applicable
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environmental Protection Measure
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan

Units

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

Site Specific

OMP	Ongoing Monitoring Plan
ESdat	Environmental data management software

1 Introduction

1.1 Background

Cardno, now Stantec (Cardno) was engaged by the Department of Defence (“Defence” or “the Client”) to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) at Blamey Barracks Kapooka (“the site”). The location of the site is displayed in Figure 1 of Appendix A.

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

> Cardno, 25 October 2022, Reference: DEF19008, *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP) Blamey Barracks Kapooka*.

For the purposes of this report:

> The “On-Base Management Area” is defined as a portion of the Blamey Barracks Kapooka (“the Base” or “the site”) including the eastern built up portion of the Base from the Former Quarry in the south to the Wastewater Treatment Plant (WWTP) in the north. It extends as far west as the natural ridgeline that runs north-south through the middle of the Base and to the east to include the Kapooka Creek flow pathway (Figure 1, Appendix A).

> The “Off-Base Management Area” includes the Kapooka Creek flow pathway on public land and all private properties which have some portion of the flow pathway passing through them. This area stretches from the Base, north all the way to the Murrumbidgee River (Figure 1, Appendix A).

> The “Management Area” is comprised of the “On-Base Management Area” and the “Off-Base Management Area” (Figure 1, Appendix A).

1.2 Purpose & Objectives

The objective of the OMP is to assess the changes in the nature and extent of PFAS in groundwater, surface water and sediment, 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 Aqueous Film Forming Foam (AFFF). The OMP will also provide confirmation of our current understanding of risk.

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 2022 sampling event and provision of analytical results with supporting tables and figures.

> To provide confirmation of the current understanding of risk.

> To provide supporting data for the assessment of management actions, where relevant.

1.3 Relevant Guidelines

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

> Australian and New Zealand Guidelines (ANZG; 2018), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

> National Environment Protection Council (2013), *National Environment Protection (Assessment of Site Contamination) Measure,* December 1999, Amended April 2013.

> Department of Defence (2019), *Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring.*

> Department of Defence (2021b), *Defence Contamination Management Manual (DCMM), Annex L – Data Management*, August 2018, Amended June 2021.

> Department of Defence, Department of Energy (2018), *Quality System Manual Schedule B15*.

> NSW EPA (2002), *The NSW State Groundwater Dependant Ecosystems Policy*, April 2002.

> NSW EPA (2004), *Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales*, Publication 1669.2, March 2004.

> NSW EPA (2016), *Designing Sampling Programs for Sites Potentially Contaminated by PFAS*.

> NSW EPA (2014), *Waste Classification Guidelines – Part 1: Classification of Waste*, November 2014.

> Heads of Environmental Protection Authority's Australia and New Zealand (HEPA; 2020), *PFAS National Environmental Management Plan (NEMP) Version 2.0*.

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

> National Health and Medical Research Council (NHMRC; 2019), *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*.

> Standards Australia (1998), AS/NZ 5667:1998, *Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*.

> U.S. Environmental Protection Agency (USEPA; 2006), '*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)'.*

2 Scope of Work

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

2.1 Review / Revision of the SAQP

Cardno undertook a review of the SAQP prior to commencement of sampling and updated the methodology for HydraSleeve® replacement following sampling and included new sample location SW680 in the scope. The SAQP will be reviewed and revised (as required) prior to the next monitoring event scheduled for April 2023.

2.2 Groundwater Monitoring

Sampling of selected groundwater monitoring wells was performed in accordance with the SAQP, applying methods set out in Section 3.1 of this report. The groundwater monitoring wells monitored as part of the OMP biannual event are presented in Table 2-1, and are shown in Figure 2, Appendix A.

Table 2-1 Groundwater Monitoring Locations

Monitoring Area	Location ID	Total
Wastewater Treatment Plant	On-Base: MW103, MW104, MW107	3 Location IDs
Former Commandants House	On-Base: MW008, MW109, MW110 Off-Base: MW625	4 Location IDs
Kapooka Creek flow pathway	Off-Base: MW601, MW624	2 Location IDs

2.3 Surface Water Monitoring

The surface water sampling locations monitored as part of the OMP are presented in Table 2-2, and are shown in Figure 2, Appendix A.

Table 2-2 Surface Water Monitoring Locations

Monitoring Area	Location ID	Total
Overland drainage pathways on-Base	On-Base: SW103, SW106, SW107, SW118, SW136	5 Location IDs
Kapooka Creek	On-Base: SW121 Off-Base: SW614, SW677	3 Location IDs
Kapooka Creek Flow Pathway	Off-Base: SW680	1 Location ID

Monitoring Area	Location ID	Total
Sewer	On-Base: SW140, SW144, SW148, SW149	4 Location IDs
Wastewater treatment plant ponds	On-Base: SW108, SW111	2 Location IDs
Overland drainage pathways – Former Quarry	On-Base: SW127	1 Location IDs

2.4 Sediment Monitoring

The sediment sampling locations monitored as part of the OMP are presented in Table 2-3, and are shown in Figure 2, Appendix A.

Table 2-3 Sediment Monitoring Locations

Monitoring Area	Location ID	Total
Overland drainage pathways on-Base	SD103, SD106, SD107, SD118, SD136	5 Location IDs
Kapooka Creek	On-Base: SD121 Off-Base: SD614, SD677	3 Location IDs
Wastewater treatment plant ponds	On-Base: SD108, SD111	2 Location IDs
Overland drainage pathways – Former Quarry	On-Base: SD127	1 Location ID

2.5 Data Management

All the data included in the report has been collected, uploaded to the ESdat database and reviewed according to the data management requirements of the DCMM Annex L (Defence, 2021b).

2.6 Deviations from the OMP SAQP

No deviations from the SAQP occurred during the November 2022 sampling event. On-site and off-site sampling and testing was undertaken at nine groundwater monitoring wells, 16 surface water monitoring locations and 11 sediment monitoring locations.

3 Methodology

3.1 Groundwater Sampling Methodology

Groundwater monitoring was undertaken as detailed in Table 3-1.

Table 3-1 Groundwater Sampling Method

Activity	Details
Dates of Field Activity	2 to 4 November 2022
Well Gauging	Standing Water Levels (SWL) were gauged using an interface probe. All wells were measured against a specified mark at the top of the well casing.

Activity	Details
Groundwater Field Parameters	Groundwater water quality parameter field measurements (field parameters) were recorded with a water quality meter after sample collection using extra sample water from within the HydraSleeve® decanted into a clean jar. With the exception of MW008, sampling was completed via HydraSleeve® technique. MW008 was sampled by low-flow micropurge as specified in the OMP (Jacobs, 2021b), which states that "MW008 is not suitable for sampling with HydraSleeve due to the approximate one-metre diameter of the well". Groundwater water quality field parameters were monitored and recorded during groundwater removal (purging), prior to collecting groundwater samples for laboratory analysis. The following field parameters were recorded using a water quality meter: ▪ pH. ▪ electrical conductivity (EC). ▪ oxidation reduction potential (ORP). ▪ Dissolved oxygen (DO). ▪ Temperature. Field parameters measured by the water quality meter were recorded on field data records. All field instruments (e.g. water quality meter) were calibrated to verify the accuracy of the measurements taken. Bump tests were also completed daily by field staff during the monitoring event. Calibration certificates and bump test records have been provided in Appendix D.
Deployment of HydraSleeve®	The HydraSleeves® were deployed with attached weights in order for sample collection to begin at the lowest point of the well screen. All existing HydraSleeves® were replaced during the initial gauging round on 2 November 2022. HydraSleeve® were left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment, before sampling.
Retrieval of HydraSleeves® (Sample Collection)	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 (to minimise changes in chemistry) via a discharge tube. All HydraSleeves® were replaced with new HydraSleeves® after sampling in preparation for the next sampling event.
Sample collection by low-flow Micropurge (MW008)	Groundwater sampling commenced once the water quality field parameters had stabilised, indicating that they represent natural groundwater in the aquifer. Samples were collected directly into appropriately preserved laboratory supplied bottles and packed in chilled containers for delivery to the laboratory under Chain of Custody (COC) documentation. Disposable High-Density Polyethylene (HDPE) tubing was utilised for sampling and was taken off-site for disposal following completion of sampling.
Sample collection by bailer	Where insufficient water was retrieved with the HydraSleeve®, samples were collected using disposable bailers. Wells were purged 3 bore volumes, or until dry, whichever is sooner, prior to sample collection.
Decontamination procedure	New HydraSleeves® were used at each groundwater monitoring well, thus removing the need for decontamination. Where HydraSleeves® could not be used, dedicated bailers were used instead which also did not require decontamination. All re-usable sampling equipment (e.g. interface probe) 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 was labelled with the sample location, date, project identification number and sampler's initials. 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).

Activity	Details
Laboratory Testing	All groundwater samples were analysed for the full PFAS analytical suite (see SAQP for full list of analytes). The primary laboratory was ALS Global Laboratories (Springvale), and the secondary laboratory (quality control) was Eurofins (Dandenong South). 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 quality control samples were collected as follows and analysed for the full PFAS analytical suite: ▪ Field duplicate (intra-laboratory) samples at one per 10 water samples (one sample). ▪ Field triplicate (inter-laboratory) samples at one per 10 water samples (one sample). ▪ Rinsate blank samples at one per day [collected off re-used sampling equipment (e.g. interface probe)] (two samples total). ▪ Trip blank samples of one per shipment included in the chilled sample containers upon transport to the laboratory (three samples total).

3.2 Surface Water Sampling Methodology

Surface water monitoring was undertaken using a grab method as detailed in Table 3-2.

Table 3-2 Surface Water Sampling Method

Item	Details
Dates of Field Activity	2 to 4 November 2022
Water Level Gauging	Water depths were measured where relevant with an interface probe, limiting water disturbance.
Field parameters	Surface water field parameters (i.e. pH, electrical conductivity (EC), oxidation reduction potential (ORP), dissolved oxygen (DO), and temperature) were recorded at the time of sampling using a pre-calibrated water quality meter. Field observations such colour, odours, flow direction and strength of flow, suspended solids and sheen presence were also recorded on field sampling sheets.
Sampling Method	Where possible, the samples were collected directly into sample containers. The sample bottles were positioned at least 10 cm below the surface water level and above the sediment bed and orientated with the opening facing downwards to avoid the collection of surface films. Where access to surface water samples was difficult, the samples were collected by attaching the sample bottles to a long-handled sampling device (telescopic pole) which was directly filled by lowering the sample bottle into the surface water body. The sample bottles were attached so that the telescopic pole was not in direct contact with the opening of the sample bottle. Samples were collected in accordance with Australian/New Zealand Standards (AS/NZS 5667.1:1998) '*Water quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*'.
Decontamination	All re-usable sampling equipment (e.g. telescopic pole) were thoroughly washed using phosphate-free detergent (Liquinox), and subsequently double rinsed with clean water before the sample collection.
Sample identification, preservation, transport and holding times.	Each sample was labelled with the sample location, date, project identification number and sampler's initials. Sample labelling and naming was in accordance with Annex L of the DCMM (Defence, 2021b). Samples were contained in 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).

Item	Details
Laboratory Testing	All surface water samples were analysed for the full PFAS analytical suite (see SAQP for full list of analytes). The primary laboratory was ALS Global Laboratories (Springvale), and the secondary laboratory (quality control) was Eurofins (Dandenong South). 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	Surface water quality control samples were collected as follows and analysed for the full PFAS analytical suite: ▪ Field duplicate (intra-laboratory) samples at one per 10 water samples (two samples). ▪ Field triplicate (inter-laboratory) samples at one per 10 water samples (two samples). ▪ Rinsate blank samples at one per day [collected off re-used sampling equipment (e.g. telescopic pole)] (two samples total). ▪ Trip blank samples of one per shipment included in the chilled sample containers upon transport to the laboratory (three samples total).

3.3 Sediment Sampling Methodology

Sediment monitoring was undertaken as detailed in Table 3-3.

Table 3-3 Sediment Sampling Method

Item	Details
Dates of Field Activity	2 to 4 November 2022
Sample Collection	Sediment samples were collected from the approximate midpoint of the flow pathway and collected from the top ten centimetres after removal of the immediate surface material using the required hand tools (e.g. trowel or hand auger), with samples placed directly into appropriately labelled, laboratory supplied sample containers and packed in chilled containers for delivery to the laboratory under CoC documentation. Sediment samples were collected after the co-located surface water sample was collected to prevent agitating sediments into the water body and surface water sample matrix. At each sampling location, the sediment sample was visually assessed and observations (physical description including makeup, colour, visible signs of contamination and moisture) recorded on field data sheets.
Decontamination	All re-usable sampling equipment (such as a trowel) were thoroughly washed using phosphate-free detergent (Liquinox), and subsequently double rinsed with clean water before the sample collection.
Sample identification, preservation, transport and holding times.	Each sample was labelled with the sample location, date, project identification number and sampler's initials. Sample labelling and naming was in accordance with Annex L of the DCMM (Defence, 2021b). Samples were contained in 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).
Laboratory Testing	All sediment samples were analysed for the full PFAS analytical suite (see SAQP for full list of analytes). The primary laboratory was ALS Global Laboratories (Springvale), and the secondary laboratory (quality control) was Eurofins (Dandenong South). Both laboratories are NATA-accredited for the parameters tested. Copies of the NATA stamped laboratory reports and CoC documentation are included in Appendix C.

Item	Details
Laboratory Testing – Quality Control	Sediment quality control samples were collected as follows and analysed for the full PFAS analytical suite: ▪ Field duplicate (intra-laboratory) samples at one per 10 sediment samples (two samples). ▪ Field triplicate (inter-laboratory) samples at one per 10 sediment samples (two samples). ▪ Rinsate blank samples at one per day [collected off re-used sampling equipment (e.g. trowel)] (two samples total). ▪ Trip blank samples of one per shipment included in the chilled sample containers upon transport to the laboratory (three samples total).

3.4 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.

> Data Comparability.

> Data Set Completeness.

A detailed review of these aspects has been undertaken, the results of which are presented in Appendix E. A summary of the data validation from the QA/QC review is included in Section 4.5 below.

3.5 Assessment Criteria

3.5.1 Groundwater and Surface Water

The adopted assessment criteria for groundwater and surface water are detailed in Table 3-4. The assessment levels adopted for groundwater and surface water are based upon the PFAS screening criteria specified in the OMP (Jacobs, 2021c), which were adopted based on the guidance in the PFAS NEMP (HEPA, 2020).

Table 3-4 Criteria for Groundwater and Surface Water

Exposure Scenario	Adopted Assessment Criteria		Guidance
	PFHxS / PFOS	PFOA	
	µg/L		
Human Health - Drinking Water Quality Guideline[1]	0.07[2]	0.56	HEPA 2020
Human Health - Surface Water Recreational	2[2]	10	HEPA 2020
Ecological (95% species protection)	0.13[3]	220	HEPA 2020

1. Drinking Water screening guidelines have been adopted for screening purposes for Industrial Water use, Stock Water use and Agriculture/Parks/Gardens Water use.
2. Combined PFOS and PFHxS.
3. PFOS only. 95% species protection guideline values adopted for screening of results, in accordance with the OMP (Jacobs, 2021c).

3.5.2 Sediment

There are currently no Australian regulatory endorsed assessment levels for risk posed to ecology or human health by PFAS in sediment.

4 Field Observations and Results

4.1 Conditions Impacting the Sampling Event

In the seven days prior to the sampling event, the regional area was experiencing a significant flooding event. 99.2 mm of rain was recorded at the nearest weather station (74272), located on the Kapooka Base. October 2022 rainfall was 158.4 mm, which is greater than three times the monthly October average between 2017 and 2021 of 41.12 mm.

The extensive flooding in the area prior to and during the event has the potential to impact on the results reported. No other on-site activities with the potential to impact sample collection or the results were noted.

4.2 Groundwater

4.2.1 Summary of Field Observations

4.2.1.1 Water quality parameter field measurements

Stabilised water quality parameter field measurements, water colour and turbidity observations recorded during the groundwater sampling program are presented in field sampling record sheets, included in Appendix D. Water quality parameter field measurements were generally consistent with April/May 2022. Groundwater varied from clear to brown with low to high turbidity and no notable changes were recorded relative to previous monitoring events.

4.2.1.2 Groundwater Elevation and Flow Direction

Groundwater elevation during this sampling event ranged from 168.35 mAHD (MW625) to 202.28 mAHD (MW103).

Regional groundwater flow is inferred to be in a north-westerly direction, towards the Murrumbidgee River, consistent with the previous monitoring event.

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

4.2.2 Groundwater Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria, and are presented in Table B1, Appendix B, and summarised in Table 4-1 below. Of the nine primary samples that were tested, PFOA was reported above the limit of reporting in one sample, and PFOS+PFHxS in four samples.

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 >LOR	No. Results Above Criteria	Significant Concentration Changes[3]
PFOS	MW601	0.13[2]	0.34	3	1	-
PFOA	NA	0.56[1]	0.02	1	0	-
PFOS+PFHxS	MW008, MW107, MW601	0.07[1]	0.77	4	3	-

1. Drinking water assessment criteria
2. Ecological assessment criteria
3. Significant concentration change defined as an order of magnitude increase or decrease

Results have also been compared against available historical data. No locations reported a significant change in concentration for this monitoring event.

A summary of locations where a first-time detection of PFOS, PFOS+PFHxS or PFOA or a new exceedance of guideline values were reported, is provided in 0 below. The laboratory reports are provided in Appendix C.

Summary of Groundwater Results with First-time Detections or New Exceedances

Deviation	Monitoring	PFOS+PFHxS	PFOA concentration	PFOS concentration

Type	Well	concentration (µg/L)		(µg/L)		(µg/L)	
		November 2022	Previous Maximum	November 2022	Previous Maximum	November 2022	Previous Maximum
First-time detections	MW103	0.06	<0.1	0.02	<0.01	<0.01	<0.01

Note:
Location with first-time detection of PFOS+PFHxS, PFOA or PFOS in latest monitoring round
Location with a new exceedance of lowest adopted guideline values in latest monitoring round
Bold: Exceedance of lowest adopted guideline values

Findings are summarised as follows:

> One groundwater sampling location (MW103) reported a first-time detection of PFOS+PFHxS and PFOA.

4.2.3 Summary of Monitoring Network Condition and Repairs

No changes to the monitoring network condition were noted.

4.3 Surface Water

4.3.1 Summary of Field Observations

4.3.1.1 Water quality parameter field measurements

Water quality parameter field measurements, water colour and turbidity observations recorded during the surface water sampling program are presented in field sampling record sheets, included in Appendix D. Field observations indicated that sampled locations had higher water level and faster flow rate compared with the previous monitoring event in April/May 2022 due to the recent heavy rainfall and flooding. Surface water varied from clear to brown with generally low turbidity.

4.3.2 Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria, presented in Table B2, Appendix B, and summarised in Table 4-2 below. Of the 16 primary samples that were tested, PFOA was reported above the limit of reporting in three samples, and PFOS+PFHxS in 15 samples.

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

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results >LOR	No. Results Above Criteria	Significant Concentration Changes[3]
PFOS	SW103, SW107, SW136, SW148, SW149	0.13[2]	0.22	14	5	SW144, SW148 (increase)
PFOA	NA	0.56[1]	0.02	3	-	-
PFOS+PFHxS	SW103, SW107, SW118, SW121, SW136, SW144, SW148, SW149	0.07[1]	0.36	15	8	SW144, SW148 (increase)

1. Drinking water assessment criteria
2. Ecological assessment criteria
3. Significant concentration change defined as an order of magnitude increase or decrease

Results have also been compared to available historical data. Two locations have reported a significant change in concentration for this monitoring event:

> SW144: PFOS+PFHxS has increased by one order of magnitude from a previous result of <0.01 µg/L in April/May 2022 to 0.17 µg/L in this event. PFOS has also increased by one order of magnitude from a previous result of <0.01 µg/L in April/May 2022 to 0.12 µg/L in this event.

> SW148: PFOS+PFHxS has increased by one order of magnitude from a previous result of <0.01 µg/L in April/May 2022 to 0.16 µg/L in this event. PFOS has also increased by one order of magnitude from a previous result of <0.01 µg/L in April/May 2022 to 0.16 µg/L in this event.

All other concentrations reported during this event were generally consistent with previous sampling events.

A summary of locations where a first-time detection of PFOS, PFOS+PFHxS or PFOA or a new exceedance of guideline values were reported is provided in 0 below. The laboratory reports are provided in Appendix C.

Table 4-3 Summary of Surface Water Results with First-time Detections or New Exceedances

Deviation Type	Surface Water Location	PFOS+PFHxS concentration (µg/L)		PFOA concentration (µg/L)		PFOS concentration (µg/L)	
		November 2022	Previous Maximum	November 2022	Previous Maximum	November 2022	Previous Maximum
First-time detections	SW106	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
	SW149	**0.16**	0.02	0.01	<0.01	**0.16**	0.0.2
	SW677	0.06	-	<0.01	-	0.04	-
New exceedance of lowest adopted guideline values	SW144	**0.17**	0.03	<0.01	<0.01	0.12	0.01
	SW149	**0.16**	0.02	0.01	<0.01	**0.16**	0.02

Note:
Location with first-time detection of PFOS+PFHxS, PFOA or PFOS in latest monitoring round
Location with a new exceedance of lowest adopted guideline values in latest monitoring round
Bold: Exceedance of lowest adopted guideline values

Findings are summarised as follows:

> Surface water monitoring location SW677 was able to be sampled for the first time as it has been dry previously.

> Two surface water monitoring locations (SW106 and SW677) reported a first-time detection of PFOS+PFHxS.

> One surface water monitoring location (SW149) reported a first-time detection of PFOA.

> One surface water monitoring location (SW677) reported a first-time detection of PFOS.

> Two surface water monitoring locations (SW144 and SW149) reported a new exceedance of the Drinking Water criterion for PFOS+PFHxS.

> One surface water monitoring location (SW144) reported a new exceedance of the Ecological criterion for PFOS.

4.4 Sediment

4.4.1 Summary of Field Observations

Odour, colour and other observations recorded during the sediment sampling program are presented in field sampling record sheets, included in Appendix D. Field observations were generally consistent with the previous monitoring event in April/May 2022.

4.4.2 Laboratory Results

National assessment criteria have not been established for PFAS in sediment. The results of laboratory analysis have been compared against historical results, presented in Table B3, Appendix B and summarised below.

Of the 11 primary samples analysed, no samples reported PFOA concentrations above the limit of reporting, and 11 samples reported PFOS+PFHxS concentrations above the limit of reporting.

Results have also been compared to available historical data. One location has reported a significant change in concentration for this monitoring event:

> SD136: PFOS+PFHxS has decreased by one order of magnitude from a previous result of 0.0631 mg/kg (highest value adopted from a quality control [duplicate or split] sample) in April/May 2022 to 0.003 mg/kg in this event. PFOS has also decreased by one order of magnitude from a previous result of 0.0606 mg/kg (highest value adopted from a quality control [duplicate or split] sample) in April/May 2022 to 0.003 mg/kg in this event.

No sediment locations reported a first-time detection of PFOS, PFOS+PFHxS or PFOA.

4.5 Data Validation

The data validation process has concluded that there are no significant systematic errors in the data collection process. Therefore, the data set used as the basis for the surface water, groundwater and sediment assessment is considered valid and complete. A detailed Data Quality Review is included in Appendix E.

5 Summary and Conclusions

Cardno conducted the November 2022 biannual groundwater, surface water and sediment monitoring event at Blamey Barracks Kapooka as part of the PFAS OMP. On-site and off-site sampling and testing was undertaken at nine groundwater monitoring wells, 16 surface water locations and 11 sediment locations.

Groundwater levels were gauged in all accessible wells before sampling. Regional groundwater flow is inferred to be in a north-westerly direction, towards the Murrumbidgee River, consistent with the previous monitoring event.

Table 5-1 Summary of Results

Activity	Details
Deviations from OMP SAQP	> No deviations from the OMP SAQP were reported.
Groundwater Analytical Results	> Nine groundwater samples were collected in total. > One groundwater location (MW103) reported a first-time detection for PFOS+PFHxS and PFOA. > No locations reported a new exceedance of the lowest adopted assessment criteria for PFOS, PFOA or PFOS+PFHxS. > No significant concentration changes were reported, and results were generally consistent with results reported in the previous event.
Surface Water Analytical Results	> 16 surface water samples were collected in total. > Two surface water monitoring locations (SW106 and SW677) reported a first-time detection of PFOS+PFHxS. > One surface water monitoring location (SW149) reported a first-time detection of PFOA. > One surface water monitoring location (SW677) reported a first-time detection of PFOS. > Two surface water monitoring locations (SW144 and SW149) reported a new exceedance of the Drinking Water criterion for PFOS+PFHxS. > One surface water monitoring location (SW144) reported a new exceedance of the Ecological criterion for PFOS. > Two surface water monitoring locations (SW144 and SW148) reported an order of magnitude increase in PFOS and PFOS+PFHxS results compared to the previous event. > All other results were generally consistent with results reported in the previous event.
Sediment Analytical Results	> 11 sediment samples were collected in total. > No sediment locations reported a first-time detection for PFOS, PFOA or PFOS+PFHxS. > One sediment location (SD136) reported an order of magnitude decrease in PFOS and PFOS+PFHxS concentrations compared to the previous event. > All other results were generally consistent with results reported in the previous event.
Next Scheduled Monitoring Event	> The next OMP monitoring event is scheduled for April 2023. > SAQP to be reviewed and updated as required prior to the next monitoring event. > No other actions which require completion prior to the next monitoring round have been identified.

6 References

General References

1. ANZECC and ARMCANZ (2000) *Australian Water Quality Guidelines for Fresh and Marine Water Quality.*
2. Department of Defence (2019), Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring.
3. Department of Defence, Department of Energy, 2018, *Quality System Manual Schedule B15*.
4. Department of Defence (2021a) *Defence OMP Factual Report Preparation Guidance*, Revised May 2021.
5. Department of Defence (2021b), *Defence Contamination Management Manual (DCMM), Annex L – Data Management*, August 2018, Amended June 2021.
6. National Environment Protection Council (2013), *National Environment Protection (Assessment of Site Contamination) Measure,* December 1999, Amended April 2013.
7. NSW EPA (2002), The NSW State Groundwater Dependant Ecosystems Policy, April 2002.
8. NSW EPA (2004), Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales, Publication 1669.2, March 2004.
9. NSW EPA (2016), Designing Sampling Programs for Sites Potentially Contaminated by PFAS.
10. NSW EPA (2014), Waste Classification Guidelines – Part 1: Classification of Waste, November 2014.
11. Environmental Protection Agency (United States EPA; 2002) EPA/240/R-02/004 *Guidance on Environmental Data Verification and Data Validation,* November 2002.
12. The Heads of EPAs Australia and New Zealand (HEPA; 2020) *PFAS National Environmental Management Plan (NEMP) Version 2.0*, January 2020.
13. National Environment Protection Council (NEPC; 1999 - amended 2013) *National Environmental Protection (Assessment of Site Contamination) Measure (as amended),* registered May 2013.
14. National Health and Medical Research Council (2011 – updated 2018) *National Water Quality Management Strategy Australian Drinking Water Guidelines*, 6 August 2018.
15. Nation Health and Medical Research Council (NHMRC; 2019) *Guidance on Per and Poly-fluoroalkyl Substances (PFAS) in Recreational Water,* August 2019.
16. 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*.
17. US EPA (2006) *Guidance for the Data Quality Objectives Process* (EPA QA/G-4), United States Environmental Protection Agency.
18. US EPA (2002) *Guidance on Environmental Data Verification and Data Validation,* Reference: EPA/240/R-02/004, United States Environmental Protection Agency, November 2002.

Site Specific References

19. Jacobs (2019) Blamey Barracks *Comprehensive PFAS Investigation. Detailed Site Investigation*, September 2019.
20. Jacobs (2021a) Blamey Barracks *Comprehensive PFAS Investigation. Human Health and Ecological Risk Assessment (HHERA)*, 23 June 2021.
21. Jacobs (2021b) *Blamey Barracks Kapooka; PFAS Management Area Plan (PMAP)*, June 2021.
22. Jacobs (2021c) *PFAS Ongoing Monitoring Plan*, June 2021.
23. Cardno (2022) *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP),* Blamey Barracks Kapooka. Prepared for Department of Defence, October 2022.

APPENDIX

A

FIGURES

Cardno

now

Stantec

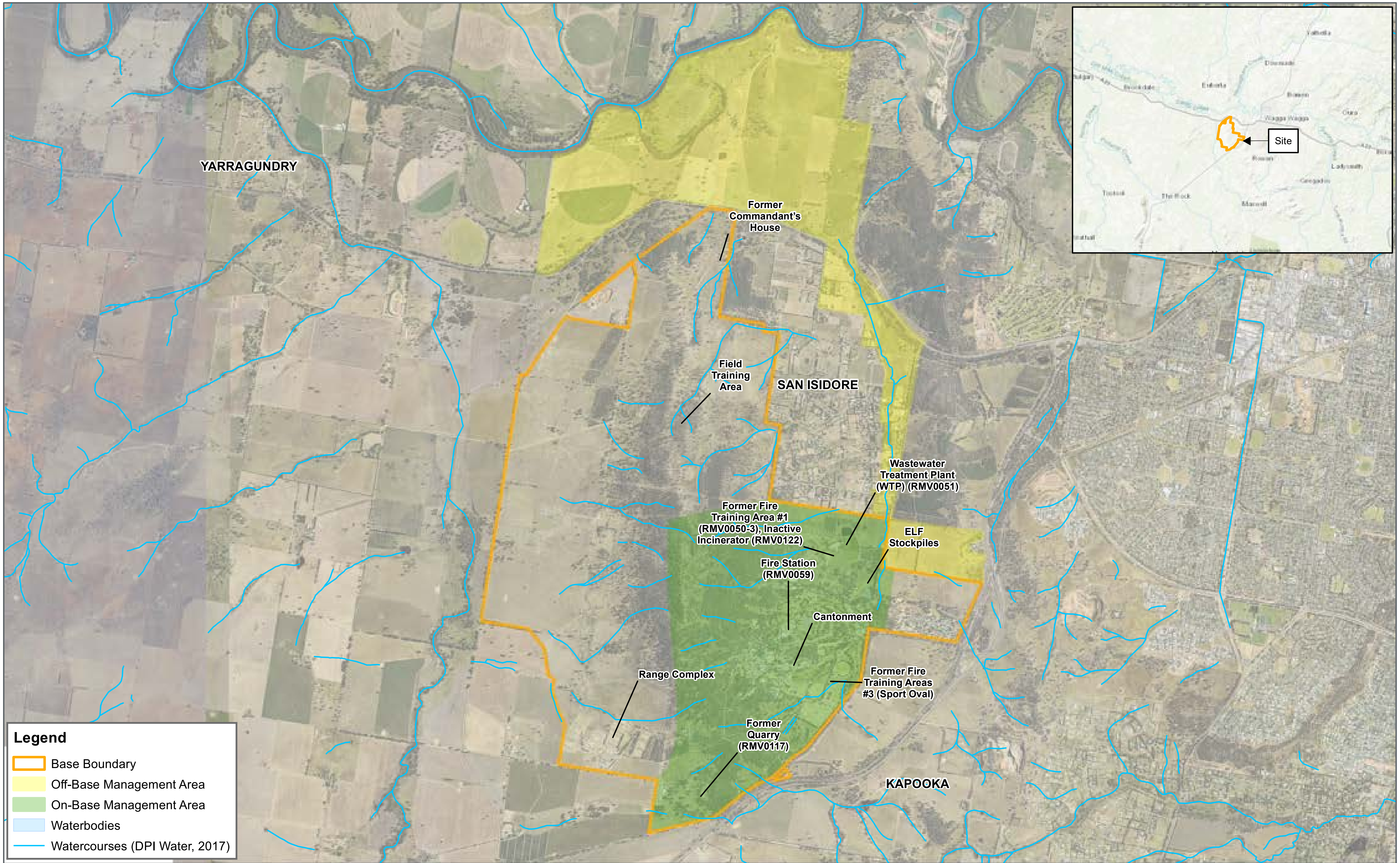

FIGURE 1

1:40,000 Scale at A3

Metres 0 1,000 2,000

Site Locality Plan & Management Areas

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2022-06-14 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0164-SiteLocalityPlan_K.mxd 02
Aerial Imagery Supplied by Metromap (February, 2022)

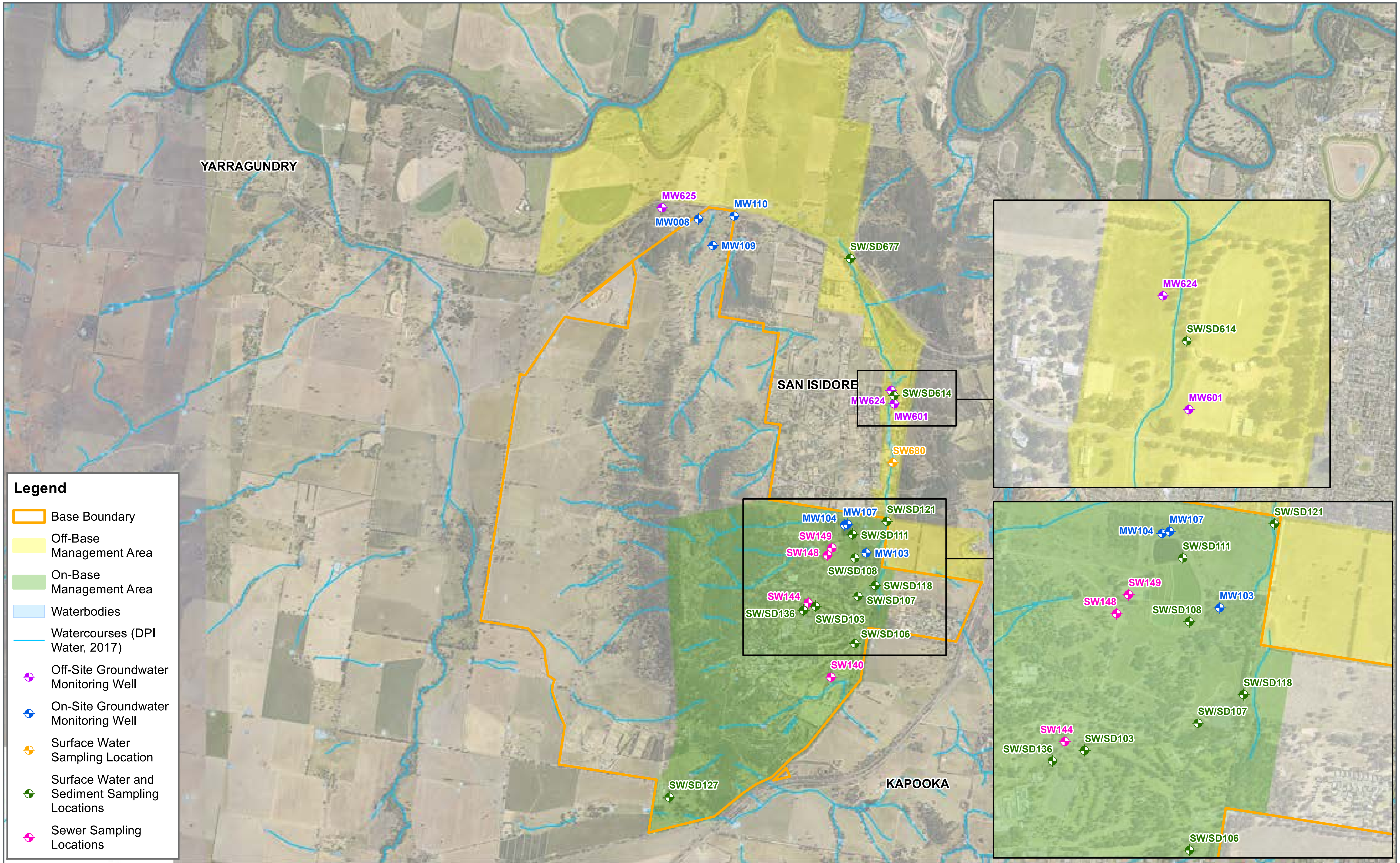

FIGURE 2

1:40,000 Scale at A3

Metres
0 1,000 2,000

Sampling Locations

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

N

Cardno — Stantec

Map Produced by Cardno now Stantec
Date: 2022-12-13 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0166-SampleLocationsN_K.mxd 02
Aerial Imagery Supplied by Metromap (February, 2022)

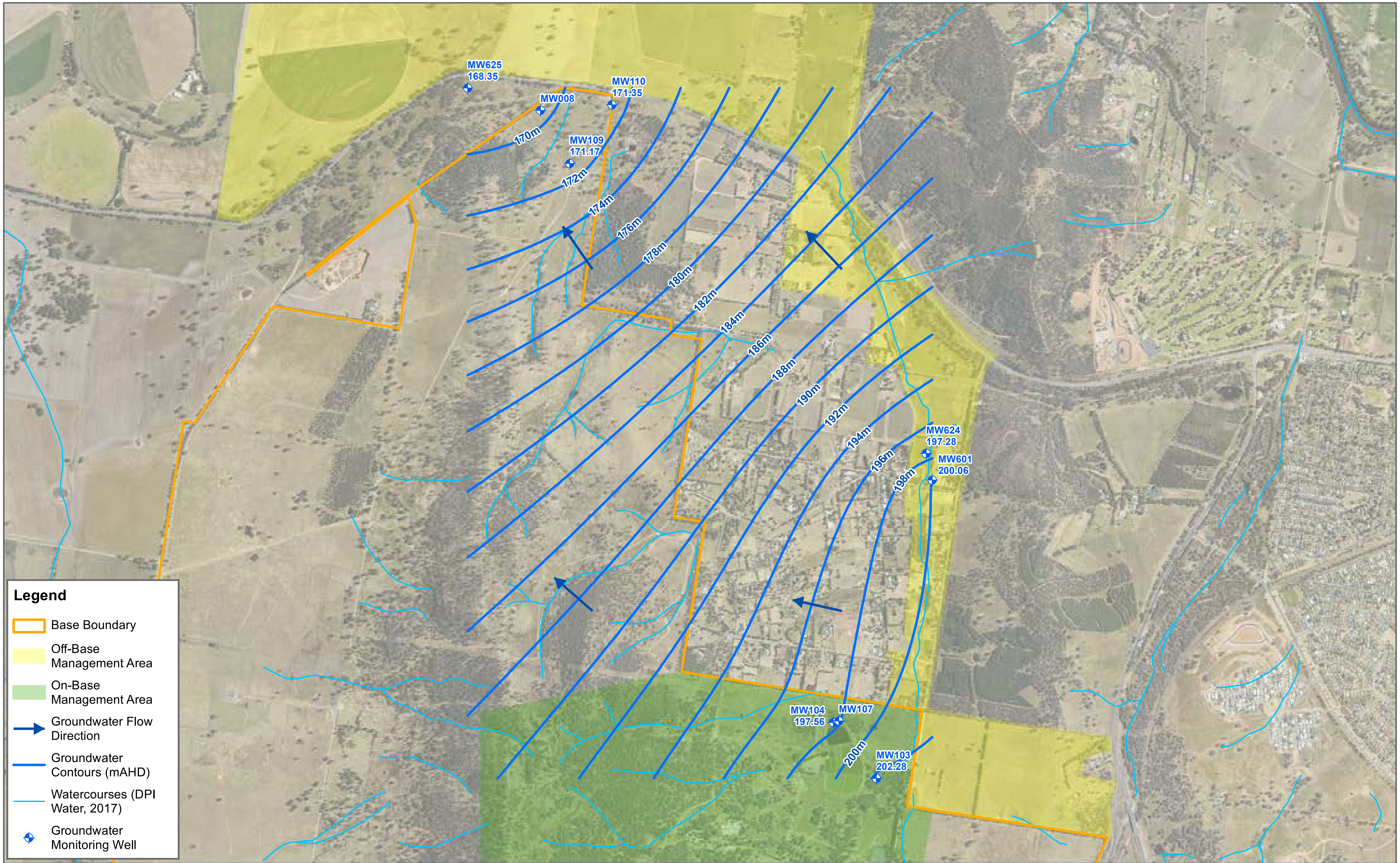

FIGURE 3

1:20,000 Scale at A3

Groundwater Elevation Contours (November, 2022)

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno — Stantec

Map Produced by Cardno now Stantec
Date: 2022-12-14 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0259-GW_Contours_E3_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

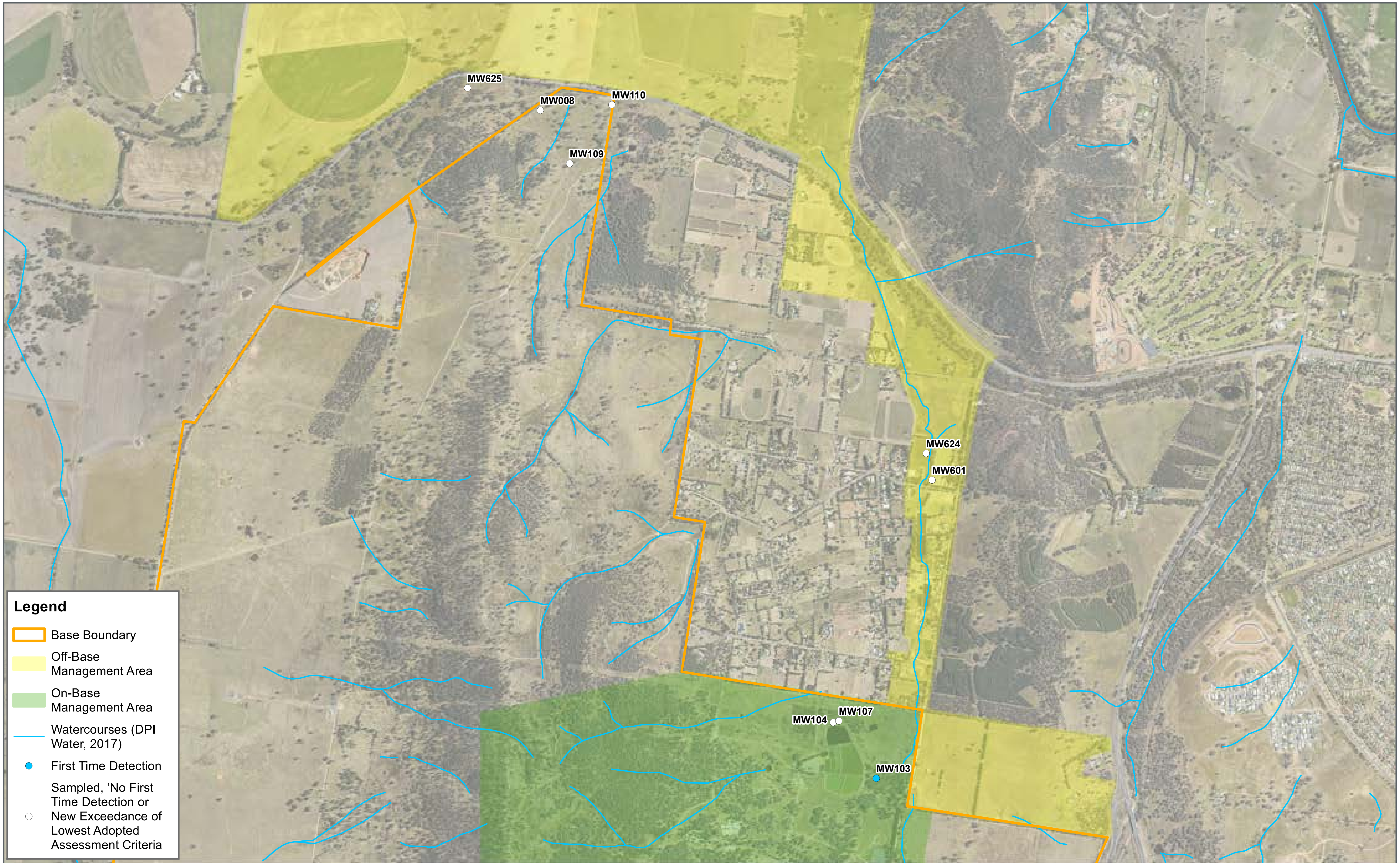

FIGURE 4

1:20,000 Scale at A3

Metres

0 500 1,000

PFAS Results Summary - Goundwater (November, 2022)

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Map Produced by Cardno now Stantec
Date: 2022-12-14 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0260-GW_PFAS_Summary_E3_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

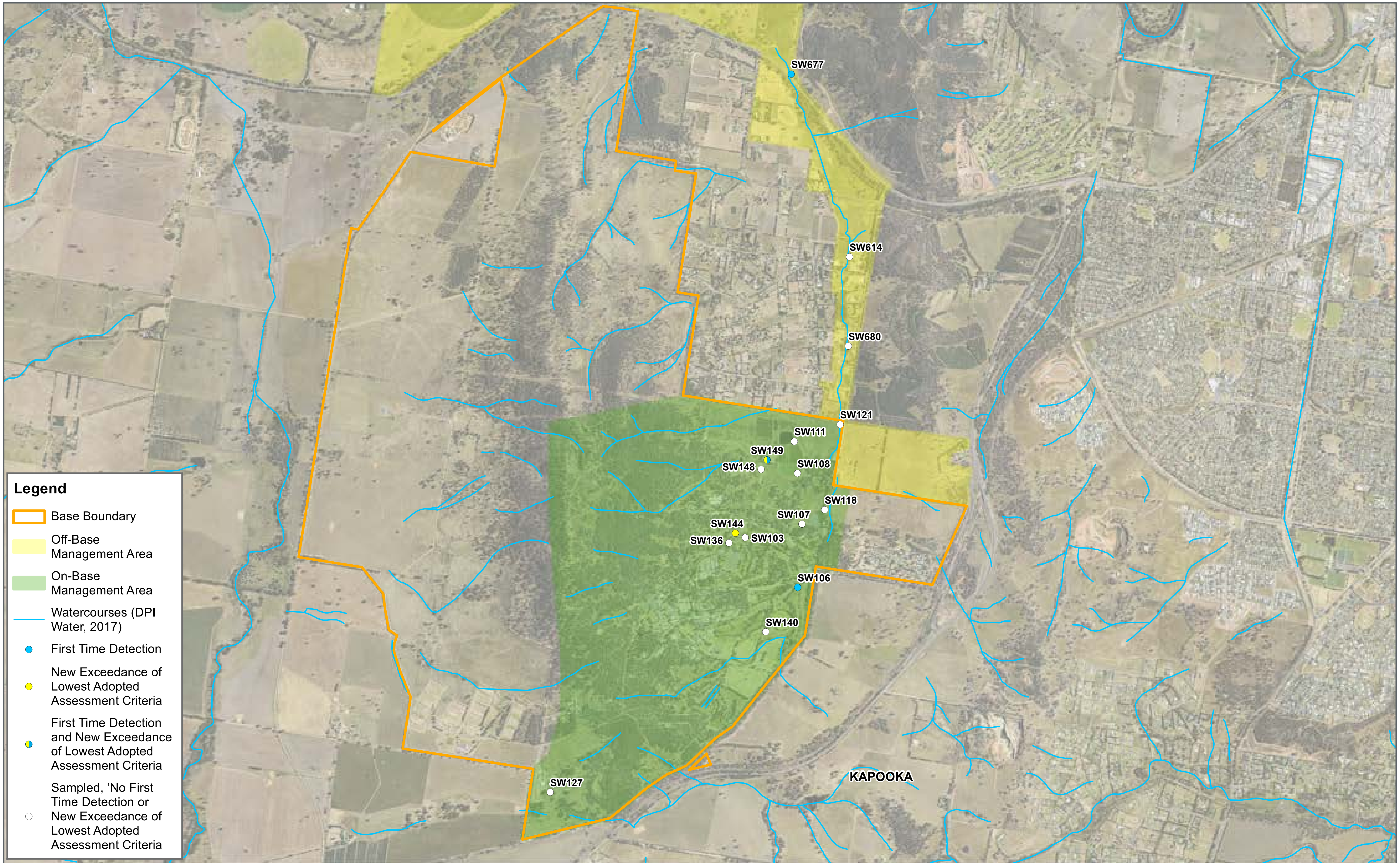

FIGURE 5

1:30,000 Scale at A3

Metres
0 500 1,000

PFAS Results Summary - Surface water (November, 2022)

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno — Stantec

Map Produced by Cardno now Stantec
Date: 2022-12-14 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0261-SW_PFAS_Summary_E3_K.mxd 01
Aerial Imagery Supplied by Metromap (February 2022)

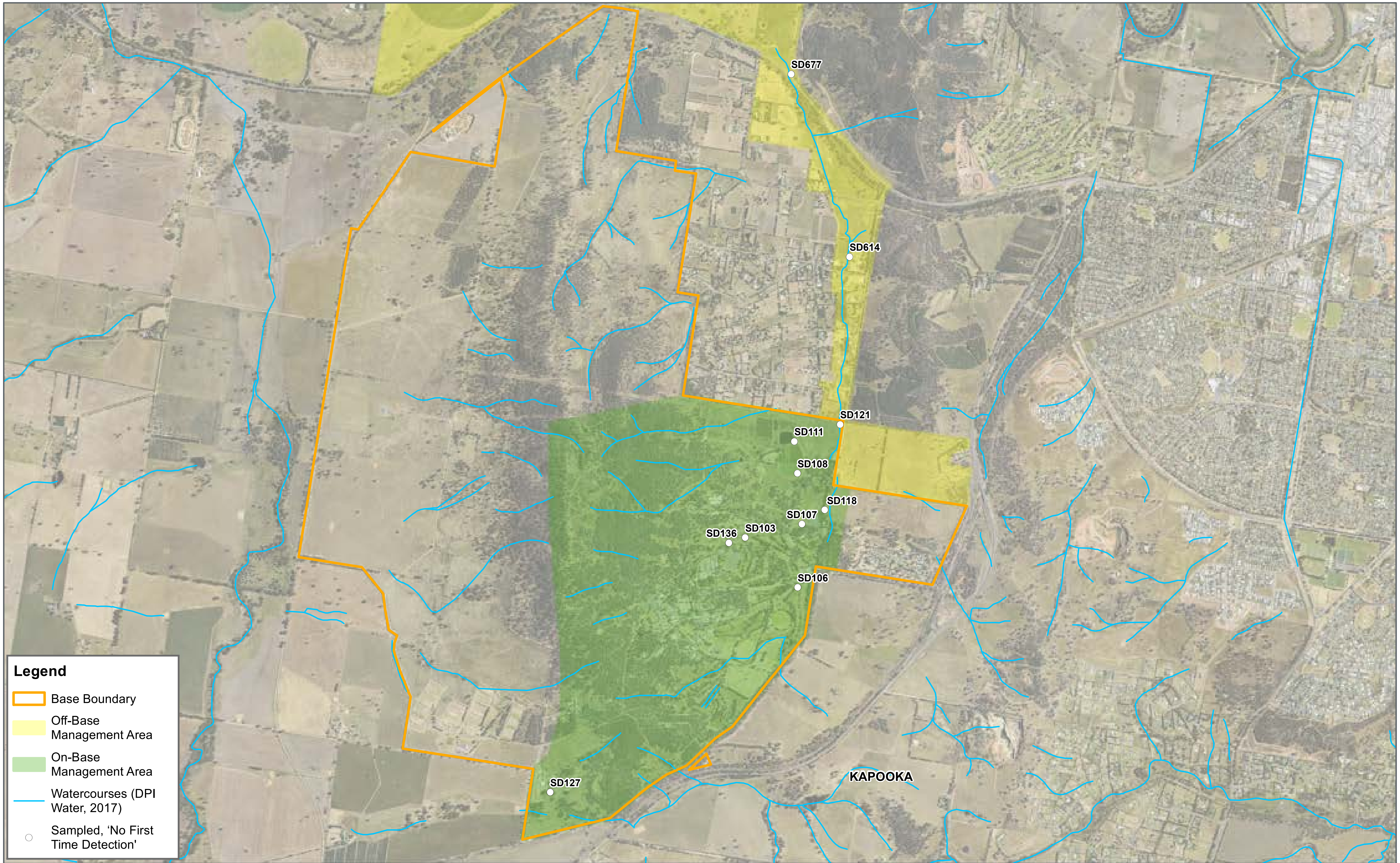

FIGURE 6

1:30,000 Scale at A3

Metres

0 500 1,000

PFAS Results Summary - Sediment (November, 2022)

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

N

Map Produced by Cardno now Stantec
Date: 2022-12-14 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0262-SED_PFAS_Summary_E3_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

APPENDIX

B

DATA ASSESSMENT TABLES

Cardno

now

Stantec

Location Code	Monitoring Zone	Sampled_Date_Time	Field ID	Sample_Type	Lab_Report_Number	Perfluorocarbons																
						Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR						0.0003	0.0005	0.0003	0.0005	0.0005	0.0005	0.0005	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
PFAS NEMP 2.0 Table 1 Health Drinking Water							**0.56**	**0.07**														
PFAS NEMP 2.0 Table 1 Health Recreational Water							*10*	*2*														
PFAS NEMP 2.0 Table 5 Freshwater 95%						0.13	220															
MW008	On-Base	16/03/2017	0315_MW008_170316	Normal	ES1706394	0.0252	<0.0005	**0.111**	0.0145	0.0088	0.0855	0.0034	<0.0005	0.023	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	On-Base	18/12/2018	0315_QC202_181218	Interlab_D	635075	0.09	<0.01	**0.23**	0.01	0.01	0.14	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base		0315_MW008_S_181218	Normal	ES1838696	0.04	<0.01	**0.14**	<0.02	<0.02	0.1	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_QC102_181218	Field_D	ES1838696	0.04	<0.01	**0.14**	<0.02	<0.02	0.1	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_QC104_181218	Field_D	ES1838696	0.04	<0.01	**0.15**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	9/03/2020	0315_QC201_200309	Interlab_D	239048	0.05	<0.01	**0.18**	0.01	<0.01	0.13	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.1
	On-Base		0315_MW008_S_200309	Normal	ES2008982	0.06	<0.01	**0.23**	<0.02	<0.02	0.17	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_OC101_200309	Field_D	ES2008982	0.06	<0.01	**0.23**	<0.02	<0.02	0.17	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/10/2021	0315_MW008_20211028	Normal	ES2139229	0.03	<0.01	**0.11**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/04/2022	0315_MW008_20220428	Normal	EM2208205	0.02	<0.01	**0.1**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_MW008_20221103	Normal	EM2222407	0.04	<0.01	**0.13**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW103	On-Base	20/02/2019	0315_MW103_S_190220	Normal	ES1905450	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/10/2021	0315_MW103_20211028	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	29/04/2022	0315_MW103_20220429	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_MW103_20221103	Normal	EM2222407	<0.01	0.02	0.06	<0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW104	On-Base	20/02/2019	0315_MW104_S_190220	Normal	ES1905450	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/10/2021	0315_MW104_20211028	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/04/2022	0315_MW104_20220428	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_MW104_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW107	On-Base	30/01/2019	0315_MW107_P_190130	Normal	ES1902996	<0.01	<0.01	**0.1**	<0.02	<0.02	0.1	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	7/03/2019	0315_MW107_P_190307	Normal	ES1907492	0.02	<0.01	0.07	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	29/04/2022	0315_MW107_20220429	Normal	EM2208205	0.02	0.02	**0.14**	0.02	0.02	0.12	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_MW107_20221103	Normal	EM2222407	0.01	<0.01	**0.09**	0.03	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW109	On-Base	10/03/2020	0315_MW109_S_200310	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/10/2021	0315_QC205_20211027	Interlab_D	837707	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base		0315_MW109_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_QC105_20211027	Field_D	ES2139230	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/04/2022	0315_MW109_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_OC101_20220427	Field_D	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_QC201_20220427	Interlab_D	889626	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base	3/11/2022	0315_QC204_20221103	Interlab_D	940511	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base		0315_MW109_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_OC104_20221103	Field_D	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW110	On-Base	10/03/2020	0315_MW110_S_200310	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/10/2021	0315_MW110_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/04/2022	0315_MW110_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_MW110_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW601	Off-Base	29/01/2019	0315_OC201_190129	Interlab_D	638493	0.01	<0.01	**0.1**	0.01	0.01	0.09	<0.01	<0.01	<0.05	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Off-Base		0315_MW601_S_190129	Normal	ES1902996	0.01	<0.01	**0.15**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base		0315_QC101_190129	Field_D	ES1902996	0.01	<0.01	**0.15**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	18/02/2019	0315_MW601_S_190218	Normal	ES1905450	0.02	<0.01	**0.25**	<0.02	<0.02	0.23	<0.02	<0.02	<0.1	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	12/03/2020	0315_MW601_P_200312	Normal	ES2008982	0.16	0.01	**0.89**	0.06	0.08	0.73	0.03	<0.02	<0.1	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	27/10/2021	0315_MW601_20211027	Normal	ES2139235	0.17	<0.01	**0.59**	0.03	0.03	0.42	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	28/04/2022	0315_MW601_20220428	Normal	EM2208229	0.2	0.01	**0.65**	0.03	0.04	0.45	0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	4/11/2022	0315_MW601_20221104	Normal	EM2222368	0.34	<0.01	**0.77**	0.04	0.03	0.43	0.03	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW624	Off-Base	11/03/2020	0315_MW624_S_200311	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	27/10/2021	0315_MW624_20211027	Normal	ES2139235	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	20/12/2021	MW624	Normal	EM2125953	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	28/04/2022	0315_MW624_20220428	Normal	EM2208229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	4/11/2022	0315_MW624_20221104	Normal	EM2222368	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW625	Off-Base	21/05/2020	0315_MW625_S_200521	Normal	ES2017986	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	26/10/2021	0315_MW625_20211026	Normal	ES2139232	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	27/04/2022	0315_MW625_20220427	Normal	EM2208223	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	3/11/2022	0315_MW625_20221103	Normal	EM2222366	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

Location Code	Monitoring Zone	Sampled_Date_Time	Field ID	Sample_Type	Lab_Report_Number	Perfluorocarbons													
						Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
						µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L
LOR						0.0005	0.0005	0.001	0.000001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0003	0.00001
PFAS NEMP 2.0 Table 1 Health Drinking Water																			
PFAS NEMP 2.0 Table 1 Health Recreational Water																			
PFAS NEMP 2.0 Table 5 Freshwater 95%																			
MW008	On-Base	16/03/2017	0315_MW008_170316	Normal	ES1706394	<0.0005	<0.0005	<0.001	<0.000001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.16	-
	On-Base	18/12/2018	0315_QC202_181218	Interlab_D	635075	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.25	0.00023
	On-Base		0315_MW008_S_181218	Normal	ES1838696	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.14	-
	On-Base		0315_QC102_181218	Field_D	ES1838696	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.14	-
	On-Base		0315_QC104_181218	Field_D	ES1838696	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.15	-
	On-Base	9/03/2020	0315_QC201_200309	Interlab_D	239048	<0.5	<0.1	<0.05	<0.00005	<0.1	<0.5	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.19	-
	On-Base		0315_MW008_S_200309	Normal	ES2008982	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23	-
	On-Base		0315_QC101_200309	Field_D	ES2008982	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23	-
	On-Base	28/10/2021	0315_MW008_20211028	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11	-
	On-Base	28/04/2022	0315_MW008_20220428	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.1	-
	On-Base	3/11/2022	0315_MW008_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13	-
MW103	On-Base	20/02/2019	0315_MW103_S_190220	Normal	ES1905450	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	28/10/2021	0315_MW103_20211028	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	29/04/2022	0315_MW103_20220429	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	3/11/2022	0315_MW103_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11	-
MW104	On-Base	20/02/2019	0315_MW104_S_190220	Normal	ES1905450	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	28/10/2021	0315_MW104_20211028	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	28/04/2022	0315_MW104_20220428	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.18	<0.05	<0.05	0.18	-
	On-Base	3/11/2022	0315_MW104_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
MW107	On-Base	30/01/2019	0315_MW107_P_190130	Normal	ES1902996	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.1	-
	On-Base	7/03/2019	0315_MW107_P_190307	Normal	ES1907492	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
	On-Base	29/04/2022	0315_MW107_20220429	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.07	<0.05	<0.05	0.27	-
	On-Base	3/11/2022	0315_MW107_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.12	-
MW109	On-Base	10/03/2020	0315_MW109_S_200310	Normal	ES2008982	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	27/10/2021	0315_QC205_20211027	Interlab_D	837707	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.00001
	On-Base		0315_MW109_20211027	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base		0315_QC105_20211027	Field_D	ES2139230	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	27/04/2022	0315_MW109_20220427	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base		0315_QC101_20220427	Field_D	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base		0315_QC201_20220427	Interlab_D	889626	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.00001
	On-Base	3/11/2022	0315_QC204_20221103	Interlab_D	940511	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.00001
	On-Base		0315_MW109_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base		0315_QC104_20221103	Field_D	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
MW110	On-Base	10/03/2020	0315_MW110_S_200310	Normal	ES2008982	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	28/10/2021	0315_MW110_20211027	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	27/04/2022	0315_MW110_20220427	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	3/11/2022	0315_MW110_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
MW601	Off-Base	29/01/2019	0315_QC201_190129	Interlab_D	638493	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.14	0.0001
	Off-Base		0315_MW601_S_190129	Normal	ES1902996	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.18	-
	Off-Base		0315_QC101_190129	Field_D	ES1902996	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.15	-
	Off-Base	18/02/2019	0315_MW601_S_190218	Normal	ES1905450	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.29	-
	Off-Base	12/03/2020	0315_MW601_P_200312	Normal	ES2008982	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.11	-
	Off-Base	27/10/2021	0315_MW601_20211027	Normal	ES2139235	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.68	-
	Off-Base	28/04/2022	0315_MW601_20220428	Normal	EM2208229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.78	-
	Off-Base	4/11/2022	0315_MW601_20221104	Normal	EM2222368	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.89	-
MW624	Off-Base	11/03/2020	0315_MW624_S_200311	Normal	ES2008982	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	Off-Base	27/10/2021	0315_MW624_20211027	Normal	ES2139235	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.05	<0.05	<0.05	0.05	-
	Off-Base	20/12/2021	MW624	Normal	EM2125953	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	Off-Base	28/04/2022	0315_MW624_20220428	Normal	EM2208229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	Off-Base	4/11/2022	0315_MW624_20221104	Normal	EM2222368	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
MW625	Off-Base	21/05/2020	0315_MW625_S_200521	Normal	ES2017986	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	Off-Base	26/10/2021	0315_MW625_20211026	Normal	ES2139232	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	Off-Base	27/04/2022	0315_MW625_20220427	Normal	EM2208223	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	Off-Base	3/11/2022	0315_MW625_20221103	Normal	EM2222366	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

Location Code	Monitoring Zone	Sampled_Date_Time	Field ID	Sample_Type	Lab_Report_Number	Perfluorocarbons																
						Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)
						ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
LOR						0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PFAS NEMP 2.0 Table 1 Health Drinking Water							**0.56**	**0.07**														
PFAS NEMP 2.0 Table 1 Health Recreational Water							*10*	*2*														
PFAS NEMP 2.0 Table 5 Freshwater 95%						0.13	220															
SW103	On-Base	10/12/2018	0315_SW103_181210	Normal	ES1837611	0.67	0.05	**1.31**	0.1	0.06	0.64	0.02	<0.02	<0.1	0.13	0.18	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	26/10/2021	0315_QC203_20211026	Interlab_D	837707	1	0.03	**1.31**	0.02	0.02	0.31	0.02	<0.01	<0.05	0.06	0.07	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base		0315_QC103_20211026	Field_D	ES2139230	0.74	0.03	**0.99**	0.02	<0.02	0.25	<0.02	<0.02	<0.1	0.06	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_SW103_20211026	Normal	ES2139229	0.6	0.02	**0.82**	<0.02	<0.02	0.22	<0.02	<0.02	<0.1	0.06	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/04/2022	0315_SW103_20220428	Normal	EM2208205	0.19	<0.01	**0.28**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW103_20221103	Normal	EM2222407	0.22	0.02	**0.36**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW106	On-Base	16/12/2018	0315_SW106_181216	Normal	ES1838218	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW106_20221103	Normal	EM2222407	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW107	On-Base	10/12/2018	0315_SW107_181210	Normal	ES1837611	0.43	0.03	**0.65**	0.02	<0.02	0.22	<0.02	<0.02	<0.1	0.03	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	26/10/2021	0315_SW107_20211026	Normal	ES2139229	0.18	0.01	**0.25**	<0.02	<0.02	0.07	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	2/05/2022	0315_SW107_20220502	Normal	EM2208205	0.15	<0.01	**0.2**	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW107_20221103	Normal	EM2222407	0.14	<0.01	**0.25**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW108	On-Base	15/12/2018	0315_SW108_181215	Normal	ES1838218	0.02	0.02	0.06	0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	26/10/2021	0315_SW108_20211026	Normal	ES2139229	0.01	<0.01	0.02	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	2/05/2022	0315_SW108_20220502	Normal	EM2208205	0.02	0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW108_20221103	Normal	EM2222407	0.01	<0.01	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW111	On-Base	15/12/2018	0315_SW111_181215	Normal	ES1838218	0.03	0.02	**0.11**	0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	26/10/2021	0315_SW111_20211026	Normal	ES2139229	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/04/2022	0315_SW111_20220427	Normal	EM2208205	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW111_20221103	Normal	EM2222407	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW118	On-Base	30/11/2018	0315_SW118_181130	Normal	ES1836659	0.52	0.02	**0.67**	<0.02	<0.02	0.15	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	13/12/2018	0315_SW118_181213	Normal	ES1837950	0.07	<0.01	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/04/2022	0315_SW118_20220428	Normal	EM2208205	0.18	<0.01	**0.24**	<0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW118_20221103	Normal	EM2222407	0.13	<0.01	**0.23**	<0.02	<0.02	0.1	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW121	On-Base	30/11/2018	0315_SW121_181130	Normal	ES1836659	0.28	0.02	**0.39**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	26/10/2021	0315_SW121_20211026	Normal	ES2139229	0.22	0.01	**0.31**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/04/2022	0315_SW121_20220428	Normal	EM2208205	0.16	<0.01	**0.21**	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	4/11/2022	0315_SW121_20221104	Normal	EM2222407	0.09	<0.01	**0.13**	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW127	On-Base	14/12/2018	0315_SW127_181214	Normal	ES1838218	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	25/10/2021	0315_QC201_20211025	Interlab_D	837707	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base		0315_QC101_20211025	Field_D	ES2139230	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_SW127_20211025	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/04/2022	0315_SW127_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_QC201_20221103	Normal	940511	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base	3/11/2022	0315_QC101_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW127_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW136	On-Base	29/01/2019	0315_SW136_190129	Normal	ES1902996	1.48	0.11	***4.15***	0.26	0.24	2.67	0.04	<0.02	<0.1	0.17	0.44	0.16	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	26/10/2021	0315_SW136_20211026	Normal	ES2139229	1.2	0.04	**1.93**	0.06	0.06	0.73	0.03	<0.02	<0.1	0.11	0.19	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/04/2022	0315_QC102_20220427	Field_D	EM2208205	0.05	<0.01	0.07	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_QC202_20220427	Interlab_D	889626	0.06	<0.01	**0.08**	<0.01	<0.01	0.02	<0.01	<0.01	<0.05	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base		0315_SW136_20220427	Normal	EM2208205	0.04	<0.01	0.05	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW136_20221103	Normal	EM2222407	0.17	0.02	**0.3**	0.03	<0.02	0.13	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW140	On-Base	29/01/2019	0315_SW140_190129	Normal	ES1902996	0.03	<0.01	**0.25**	0.04	0.03	0.22	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	26/10/2021	0315_SW140_20211026	Normal	ES2139229	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/04/2022	0315_QC103_20220428	Field_D	EM2208205	<0.01	<0.01	0.01	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base		0315_QC203_20220428	Interlab_D	889626	<0.01	<0.01	0.02	<0.01	<0.01	0.02	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base		0315_SW140_20220428	Normal	EM2208205	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_QC202_20221103	Normal	940511	0.01	<0.01	0.04	<0.01	<0.01	0.03	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	On-Base	3/11/2022	0315_QC102_20221103	Normal	EM2222407	0.01	<0.01	0.05	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW140_20221103	Normal	EM2222407	<0.01	<0.01	0.03	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW144	On-Base	29/01/2019	0315_SW144_190129	Normal	ES1902996	0.01	<0.01	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/10/2021	0315_SW144_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	29/04/2022	0315_SW144_20220429	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW144_20221103	Normal	EM2222407	0.12	<0.01	**0.17**	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW148	On-Base	29/01/2019	0315_SW148_190129	Normal	ES1902996	0.47	0.01	**0.61**	0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/10/2021	0315_SW148_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	28/04/2022	0315_SW148_20220428	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW148_20221103	Normal	EM2222407	0.16	<0.01	**0.16**	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW149	On-Base	29/01/2019	0315_SW149_190129	Normal	ES1902996	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	27/10/2021	0315_SW149_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	29/04/2022	0315_SW149_20220429	Normal	EM2208205	0.02	<0.01	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	On-Base	3/11/2022	0315_SW149_20221103	Normal	EM2222407	0.16	0.01	**0.16**	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW614	Off-Base	13/12/2018	0315_SW614_181213	Normal	ES1837950	0.03	<0.01	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	27/10/2021	0315_SW614_20211027	Normal	ES2139235	0.27	<0.01	**0.35**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	4/11/2022	0315_SW614_20221104	Normal	EM2222368	0.05	<0.01	0.07	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW677	Off-Base	4/11/2022	0315_SW677_20221104	Normal	EM2222368	0.04	<0.01	0.06	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
SW680	Off-Base	10/12/2019	0315_SW680_191210	Normal	ES1941493	0.08	<0.01	**0.12**	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Off-Base	4/11/2022	0315_SW680_20221104	Normal	EM2222365	0.04	<0.01	0.07	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

						Perfluorocarbons													
						Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
						ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
LOR						0.01	0.02	0.05	0.00005	0.05	0.05	0.02	0.02	0.01	0.05	0.01	0.01	0.01	0.00001
PFAS NEMP 2.0 Table 1 Health Drinking Water																			
PFAS NEMP 2.0 Table 1 Health Recreational Water																			
PFAS NEMP 2.0 Table 5 Freshwater 95%																			
Location Code	**Monitoring Zone**	**Sampled_Date_Time**	**Field ID**	**Sample_Type**	**Lab_Report_Number**														
SW103	On-Base	10/12/2018	0315_SW103_181210	Normal	ES1837611	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.89	-
	On-Base	26/10/2021	0315_QC203_20211026	Interlab_D	837707	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	1.55	0.00134
	On-Base		0315_QC103_20211026	Field_D	ES2139230	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.17	-
	On-Base		0315_SW103_20211026	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.96	-
	On-Base	28/04/2022	0315_SW103_20220428	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.28	-
	On-Base	3/11/2022	0315_SW103_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.41	-
SW106	On-Base	16/12/2018	0315_SW106_181216	Normal	ES1838218	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	3/11/2022	0315_SW106_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02	-
SW107	On-Base	10/12/2018	0315_SW107_181210	Normal	ES1837611	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.77	-
	On-Base	26/10/2021	0315_SW107_20211026	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.26	-
	On-Base	2/05/2022	0315_SW107_20220502	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.2	-
	On-Base	3/11/2022	0315_SW107_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.25	-
SW108	On-Base	15/12/2018	0315_SW108_181215	Normal	ES1838218	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.1	-
	On-Base	26/10/2021	0315_SW108_20211026	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02	-
	On-Base	2/05/2022	0315_SW108_20220502	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05	-
	On-Base	3/11/2022	0315_SW108_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03	-
SW111	On-Base	15/12/2018	0315_SW111_181215	Normal	ES1838218	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.18	-
	On-Base	26/10/2021	0315_SW111_20211026	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04	-
	On-Base	27/04/2022	0315_SW111_20220427	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04	-
	On-Base	3/11/2022	0315_SW111_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04	-
SW118	On-Base	30/11/2018	0315_SW118_181130	Normal	ES1836659	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.72	-
	On-Base	13/12/2018	0315_SW118_181213	Normal	ES1837950	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
	On-Base	28/04/2022	0315_SW118_20220428	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.24	-
	On-Base	3/11/2022	0315_SW118_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23	-
SW121	On-Base	30/11/2018	0315_SW121_181130	Normal	ES1836659	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.44	-
	On-Base	26/10/2021	0315_SW121_20211026	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.32	-
	On-Base	28/04/2022	0315_SW121_20220428	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.21	-
	On-Base	4/11/2022	0315_SW121_20221104	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13	-
SW127	On-Base	14/12/2018	0315_SW127_181214	Normal	ES1838218	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	25/10/2021	0315_QC201_20211025	Interlab_D	837707	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.00001
	On-Base		0315_QC101_20211025	Field_D	ES2139230	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base		0315_SW127_20211025	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	27/04/2022	0315_SW127_20220427	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	3/11/2022	0315_QC201_20221103	Normal	940511	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.00001
	On-Base	3/11/2022	0315_QC101_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	3/11/2022	0315_SW127_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
SW136	On-Base	29/01/2019	0315_SW136_190129	Normal	ES1902996	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	5.57	-
	On-Base	26/10/2021	0315_SW136_20211026	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	2.45	-
	On-Base	27/04/2022	0315_QC102_20220427	Field_D	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
	On-Base		0315_QC202_20220427	Interlab_D	889626	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.11	0.00008
	On-Base		0315_SW136_20220427	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05	-
	On-Base	3/11/2022	0315_SW136_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.38	-
SW140	On-Base	29/01/2019	0315_SW140_190129	Normal	ES1902996	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.32	-
	On-Base	26/10/2021	0315_SW140_20211026	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02	-
	On-Base	28/04/2022	0315_QC103_20220428	Field_D	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.01	-
	On-Base		0315_QC203_20220428	Interlab_D	889626	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	0.00002
	On-Base		0315_SW140_20220428	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02	-
	On-Base	3/11/2022	0315_QC202_20221103	Normal	940511	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	0.00004
	On-Base	3/11/2022	0315_QC102_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05	-
	On-Base	3/11/2022	0315_SW140_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03	-
SW144	On-Base	29/01/2019	0315_SW144_190129	Normal	ES1902996	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03	-
	On-Base	27/10/2021	0315_SW144_20211027	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	29/04/2022	0315_SW144_20220429	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	3/11/2022	0315_SW144_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.17	-
SW148	On-Base	29/01/2019	0315_SW148_190129	Normal	ES1902996	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.66	-
	On-Base	27/10/2021	0315_SW148_20211027	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	28/04/2022	0315_SW148_20220428	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.06	<0.05	<0.05	0.06	-
	On-Base	3/11/2022	0315_SW148_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.16	-
SW149	On-Base	29/01/2019	0315_SW149_190129	Normal	ES1902996	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	27/10/2021	0315_SW149_20211027	Normal	ES2139229	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
	On-Base	29/04/2022	0315_SW149_20220429	Normal	EM2208205	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.07	<0.05	<0.05	0.09	-
	On-Base	3/11/2022	0315_SW149_20221103	Normal	EM2222407	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.19	-
SW614	Off-Base	13/12/2018	0315_SW614_181213	Normal	ES1837950	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03	-
	Off-Base	27/10/2021	0315_SW614_20211027	Normal	ES2139235	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.35	-
	Off-Base	4/11/2022	0315_SW614_20221104	Normal	EM2222368	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
SW677	Off-Base	4/11/2022	0315_SW677_20221104	Normal	EM2222368	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.06	-
SW680	Off-Base	10/12/2019	0315_SW680_191210	Normal	ES1941493	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.12	-
	Off-Base	4/11/2022	0315_SW680_20221104	Normal	EM2222365	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

						Perfluorocarbons																
						Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorononanesulfonic acid (PFNS)	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR						0.0002	0.0002	0.0002	0.005	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Location_Code	Monitoring_Zone	Sampled_Date_Time	Field_ID	Sample_Type	Lab_Report_Number																	
SD103	On-Base	10/12/2018	0315_SD103_181210	Normal	ES1837611	0.0086	<0.0002	0.0096	-	<0.0002	<0.0002	0.001	<0.0002	0.0003	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	26/10/2021	0315_OC104_20211026	Field_D	ES2139230	0.0126	<0.0002	0.0132	-	<0.0002	<0.0002	0.0006	<0.0002	0.0006	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	26/10/2021	0315_SD103_20211026	Normal	ES2139229	0.014	<0.0002	0.0146	-	<0.0002	<0.0002	0.0006	<0.0002	0.0004	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003
	On-Base	28/04/2022	0315_OC105_20220428	Field_D	EM2208205	0.0163	<0.0002	0.0173	-	<0.0002	<0.0002	0.001	<0.0002	0.0005	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	0.0002	0.0003
	On-Base		0315_OC205_20220428	Interlab_D	889626	0.013	<0.005	0.013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	On-Base		0315_SD103_20220428	Normal	EM2208205	0.0163	<0.0002	0.0175	-	<0.0002	<0.0002	0.0012	<0.0002	0.0007	<0.001	<0.0002	0.0002	<0.0002	<0.0002	0.0003	0.0002	0.0002
	On-Base	3/11/2022	0315_SD103_20221103	Normal	EM2222407	0.0063	<0.0002	0.0066	-	<0.0002	<0.0002	0.0003	<0.0002	0.0004	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD106	On-Base	16/12/2018	0315_SD106_181216	Normal	ES1838218	0.0076	<0.0002	0.008	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	26/10/2021	0315_SD106_20211026	Normal	ES2139229	0.0042	<0.0002	0.0042	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	28/04/2022	0315_SD106_20220428	Normal	EM2208205	0.0042	0.0002	0.0042	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	0.0012	<0.0002	0.0004
	On-Base	3/11/2022	0315_SD106_20221103	Normal	EM2222407	0.004	<0.0002	0.004	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD107	On-Base	10/12/2018	0315_SD107_181210	Normal	ES1837611	0.0142	<0.0002	0.0149	-	<0.0002	<0.0002	0.0007	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	26/10/2021	0315_SD107_20211026	Normal	ES2139229	0.0051	<0.0002	0.0051	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	2/05/2022	0315_SD107_20220502	Normal	EM2208205	0.0037	<0.0002	0.0042	-	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	3/11/2022	0315_SD107_20221103	Normal	EM2222407	0.0027	<0.0002	0.0027	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD108	On-Base	15/12/2018	0315_SD108_181215	Normal	ES1838218	0.0004	<0.0002	0.0004	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	26/10/2021	0315_SD108_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	2/05/2022	0315_SD108_20220502	Normal	EM2208205	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	3/11/2022	0315_SD108_20221103	Normal	EM2222407	0.0006	<0.0002	0.0006	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD111	On-Base	15/12/2018	0315_SD111_181215	Normal	ES1838218	0.0041	<0.0002	0.0045	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
	On-Base	26/10/2021	0315_SD111_20211026	Normal	ES2139229	0.0008	<0.0002	0.0008	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	27/04/2022	0315_SD111_20220427	Normal	EM2208205	0.0005	<0.0002	0.0005	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	3/11/2022	0315_SD111_20221103	Normal	EM2222407	0.0004	<0.0002	0.0004	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD118	On-Base	30/11/2018	0315_SD118_181130	Normal	ES1836659	0.0037	<0.0002	0.0037	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	26/10/2021	0315_SD118_20211026	Normal	ES2139229	0.0045	<0.0002	0.0045	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	28/04/2022	0315_SD118_20220428	Normal	EM2208205	0.0077	<0.0002	0.0077	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	3/11/2022	0315_SD118_20221103	Normal	EM2222407	0.0025	<0.0002	0.0025	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD121	On-Base	30/11/2018	0315_SD121_181130	Normal	ES1836659	0.0238	<0.0002	0.0246	-	<0.0002	<0.0002	0.0008	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	26/10/2021	0315_SD121_20211026	Normal	ES2139229	0.0016	<0.0002	0.0016	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	21/12/2021	OC101_211221	Field_D	EM2125953	0.0194	<0.0002	0.0197	-	<0.0002	-	0.0003	-	-	<0.001	<0.0002	<0.0002	<0.0002	-	-	-	-
	On-Base		OC201_211221	Interlab_D	853128	0.033	<0.005	0.033	-	-	-	<0.005	-	-	-	-	-	-	-	-	-	-
	On-Base		SD121	Normal	EM2125953	0.0184	<0.0002	0.0188	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	28/04/2022	0315_SD121_20220428	Normal	EM2208205	0.0009	<0.0002	0.0009	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	4/11/2022	0315_SD121_20221104	Normal	EM2222407	0.0017	<0.0002	0.0017	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD127	On-Base	14/12/2018	0315_SD127_181214	Normal	ES1838218	0.0007	<0.0002	0.0007	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	25/10/2021	0315_OC102_20211025	Field_D	ES2139230	0.0003	<0.0002	0.0003	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	25/10/2021	0315_SD127_20211026	Normal	ES2139229	0.0005	<0.0002	0.0005	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	27/04/2022	0315_SD127_20220427	Normal	EM2208205	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	3/11/2022	0315_OC203_20221103	Interlab_D	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	On-Base		0315_OC103_20221103	Field_D	EM2222407	0.0014	<0.0002	0.0014	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base		0315_SD127_20221103	Normal	EM2222407	0.0009	<0.0002	0.0009	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD136	On-Base	26/10/2021	0315_SD136_20211026	Normal	ES2139229	0.0046	<0.0002	0.005	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	27/04/2022	0315_OC104_20220427	Field_D	EM2208205	0.0606	<0.0002	0.0631	-	<0.0002	<0.0002	0.0025	0.0002	0.0005	<0.001	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base		0315_OC204_20220427	Interlab_D	889626	0.052	<0.005	0.052	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	On-Base		0315_SD136_20220427	Normal	EM2208205	0.0393	<0.0002	0.0411	-	<0.0002	<0.0002	0.0018	<0.0002	0.0004	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base	3/11/2022	0315_OC205_20221103	Interlab_D	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	On-Base		0315_OC105_20221103	Field_D	EM2222407	0.0029	<0.0002	0.0029	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	On-Base		0315_SD136_20221103	Normal	EM2222407	0.003	<0.0002	0.003	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD614	Off-Base	18/12/2018	0315_SD614_181218	Normal	ES1838696	0.0094	<0.0002	0.0097	-	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Off-Base	27/10/2021	0315_SD614_20211027	Normal	ES2139235	0.011	<0.0002	0.0114	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Off-Base	20/12/2021	SD614	Normal	EM2125953	0.0093	<0.0002	0.0095	-	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Off-Base	28/04/2022	0315_SD614_20220428	Normal	EM2208229	0.0075	<0.0002	0.0077	-	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Off-Base	4/11/2022	0315_SD614_20221104	Normal	EM2222368	0.0073	<0.0002	0.0073	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SD677	Off-Base	26/10/2021	0315_SD677_20211026	Normal	ES2139235	0.0052	<0.0002	0.0052	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Off-Base	21/12/2021	SD677	Normal	EM2125953	0.0075	<0.0002	0.0075	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Off-Base	28/04/2022	0315_SD677_20220428	Normal	EM2208229	0.0068	<0.0002	0.0068	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Off-Base	4/11/2022	0315_SD677_20221104	Normal	EM2222368	0.0074	<0.0002	0.0074	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

						Perfluorocarbons													
						Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSI	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR						0.0002	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002
Location_Code	Monitoring_Zone	Sampled_Date_Time	Field_ID	Sample_Type	Lab_Report_Number														
SD103	On-Base	10/12/2018	0315_SD103_181210	Normal	ES1837611	<0.0002	<0.0005	0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0102
	On-Base	26/10/2021	0315_OC104_20211026	Field_D	ES2139230	<0.0002	<0.0005	0.0004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0142
	On-Base	26/10/2021	0315_SD103_20211026	Normal	ES2139229	<0.0002	<0.0005	0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0156
	On-Base	28/04/2022	0315_OC105_20220428	Field_D	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0187
	On-Base		0315_OC205_20220428	Interlab_D	889626	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05
	On-Base		0315_SD103_20220428	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0191
	On-Base	3/11/2022	0315_SD103_20221103	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.007
SD106	On-Base	16/12/2018	0315_SD106_181216	Normal	ES1838218	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.008
	On-Base	26/10/2021	0315_SD106_20211026	Normal	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0042
	On-Base	28/04/2022	0315_SD106_20220428	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	0.0004	<0.0005	<0.0005	<0.0005	<0.0005	0.0064
	On-Base	3/11/2022	0315_SD106_20221103	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.004
SD107	On-Base	10/12/2018	0315_SD107_181210	Normal	ES1837611	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0149
	On-Base	26/10/2021	0315_SD107_20211026	Normal	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0051
	On-Base	2/05/2022	0315_SD107_20220502	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0042
	On-Base	3/11/2022	0315_SD107_20221103	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0027
SD108	On-Base	15/12/2018	0315_SD108_181215	Normal	ES1838218	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0004
	On-Base	26/10/2021	0315_SD108_20211026	Normal	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
	On-Base	2/05/2022	0315_SD108_20220502	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
	On-Base	3/11/2022	0315_SD108_20221103	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
SD111	On-Base	15/12/2018	0315_SD111_181215	Normal	ES1838218	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0048
	On-Base	26/10/2021	0315_SD111_20211026	Normal	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008
	On-Base	27/04/2022	0315_SD111_20220427	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
	On-Base	3/11/2022	0315_SD111_20221103	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0004
SD118	On-Base	30/11/2018	0315_SD118_181130	Normal	ES1836659	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0037
	On-Base	26/10/2021	0315_SD118_20211026	Normal	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0045
	On-Base	28/04/2022	0315_SD118_20220428	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0077
	On-Base	3/11/2022	0315_SD118_20221103	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0025
SD121	On-Base	30/11/2018	0315_SD121_181130	Normal	ES1836659	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0246
	On-Base	26/10/2021	0315_SD121_20211026	Normal	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0016
	On-Base	21/12/2021	OC101_211221	Field_D	EM2125953	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	-
	On-Base		OC201_211221	Interlab_D	853128	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	-
	On-Base		SD121	Normal	EM2125953	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0188
	On-Base	28/04/2022	0315_SD121_20220428	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0009
	On-Base	4/11/2022	0315_SD121_20221104	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0017
SD127	On-Base	14/12/2018	0315_SD127_181214	Normal	ES1838218	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0007
	On-Base	25/10/2021	0315_OC102_20211025	Field_D	ES2139230	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0003
	On-Base	25/10/2021	0315_SD127_20211026	Normal	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
	On-Base	27/04/2022	0315_SD127_20220427	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002
	On-Base	3/11/2022	0315_OC203_20221103	Interlab_D	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05
	On-Base		0315_OC103_20221103	Field_D	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0014
	On-Base		0315_SD127_20221103	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0009
SD136	On-Base	26/10/2021	0315_SD136_20211026	Normal	ES2139229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.005
	On-Base	27/04/2022	0315_OC104_20220427	Field_D	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0642
	On-Base		0315_OC204_20220427	Interlab_D	889626	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	0.052
	On-Base		0315_SD136_20220427	Normal	EM2208205	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0418
	On-Base	3/11/2022	0315_OC205_20221103	Interlab_D	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05
	On-Base		0315_OC105_20221103	Field_D	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0029
	On-Base		0315_SD136_20221103	Normal	EM2222407	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.003
SD614	Off-Base	18/12/2018	0315_SD614_181218	Normal	ES1838696	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0097
	Off-Base	27/10/2021	0315_SD614_20211027	Normal	ES2139235	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0114
	Off-Base	20/12/2021	SD614	Normal	EM2125953	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0095
	Off-Base	28/04/2022	0315_SD614_20220428	Normal	EM2208229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0077
	Off-Base	4/11/2022	0315_SD614_20221104	Normal	EM2222368	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0073
SD677	Off-Base	26/10/2021	0315_SD677_20211026	Normal	ES2139235	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0052
	Off-Base	21/12/2021	SD677	Normal	EM2125953	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0075
	Off-Base	28/04/2022	0315_SD677_20220428	Normal	EM2208229	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0068
	Off-Base	4/11/2022	0315_SD677_20221104	Normal	EM2222368	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0074

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

ChemName	Unit	Lab Report Number Field ID Date	EM2222407 0315_MW109_20221103 3/11/2022	EM2222407 0315_QC104_20221103 3/11/2022	RPD	EM2222407 0315_MW109_20221103 3/11/2022	940511 0315_QC204_20221103 3/11/2022	RPD	EM2222407 0315_SW127_20221103 3/11/2022	EM2222407 0315_QC101_20221103 3/11/2022	RPD
		LOR									
Sum of WA DWER PFAS (n=10)*	UG/L	0.01	<0.01	<0.01	0	<0.01	<0.05	0	<0.01	<0.01	0
Perfluorocarbons											
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluorooctanoate (PFOA)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Sum of PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluorononanesulfonic acid (PFNS)	UG/L						<0.01				
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorobutanoic acid (PFBA)	µg/L	0.05	<0.1	<0.1	0	<0.1	<0.05	0	<0.1	<0.1	0
Perfluoropentanoic acid (PFPeA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluoropropanesulfonic acid (PFPrS)	UG/L						<0.01				
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorononanoic acid (PFNA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorodecanoic acid (PFDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.01	<0.02	<0.02	0	<0.02	<0.01	0	<0.02	<0.02	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	mg/L	0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	0	<0.00005	<0.00005	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	0	<0.02	<0.05	0	<0.02	<0.02	0
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
8:2 Fluorotelomer sulfonate (8:2 FtS)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01	<0.05	<0.05	0	<0.05	<0.01	0	<0.05	<0.05	0
Sum of PFAS	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.1	0	<0.01	<0.01	0
Sum of US EPA PFAS (PFOS + PFOA)*	UG/L						<0.01				
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/L	0.00001					<0.00001				

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

ChemName	Unit	EM2222407 0315_SW127_20221103 3/11/2022	940511 0315_QC201_20221103 3/11/2022	**RPD**	EM2222407 0315_SW140_20221103 3/11/2022	EM2222407 0315_QC102_20221103 3/11/2022	**RPD**	EM2222407 0315_SW140_20221103 3/11/2022	940511 0315_QC202_20221103 3/11/2022	**RPD**
Sum of WA DWER PFAS (n=10)*	UG/L	<0.01	<0.05	0	0.03	0.05	**50**	0.03	<0.05	0
Perfluorocarbons										
Perfluorooctane sulfonic acid (PFOS)	µg/L	<0.01	<0.01	0	<0.01	0.01	0	<0.01	0.01	0
Perfluorooctanoate (PFOA)	µg/L	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Sum of PFHxS and PFOS	µg/L	<0.01	<0.01	0	0.03	0.05	**50**	0.03	0.04	29
Perfluorononanesulfonic acid (PFNS)	UG/L		<0.01						<0.01	
Perfluorobutane sulfonic acid (PFBS)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	<0.01	<0.01	0	0.03	0.04	29	0.03	0.03	0
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorodecanesulfonic acid (PFDS)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorobutanoic acid (PFBA)	µg/L	<0.1	<0.05	0	<0.1	<0.1	0	<0.1	<0.05	0
Perfluoropentanoic acid (PFPeA)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorohexanoic acid (PFHxA)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluoropropanesulfonic acid (PFPrS)	UG/L		<0.01						<0.01	
Perfluoroheptanoic acid (PFHpA)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorononanoic acid (PFNA)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorodecanoic acid (PFDA)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorododecanoic acid (PFDoDA)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorotridecanoic acid (PFTrDA)	µg/L	<0.02	<0.01	0	<0.02	<0.02	0	<0.02	<0.01	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
Perfluorooctane sulfonamide (FOSA)	µg/L	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	mg/L	<0.00005	<0.00005	0	<0.00005	<0.00005	0	<0.00005	<0.00005	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	<0.02	<0.05	0	<0.02	<0.02	0	<0.02	<0.05	0
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
8:2 Fluorotelomer sulfonate (8:2 FtS)	µg/L	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	<0.05	<0.01	0	<0.05	<0.05	0	<0.05	<0.01	0
Sum of PFAS	µg/L	<0.01	<0.1	0	0.03	0.05	**50**	0.03	<0.1	0
Sum of US EPA PFAS (PFOS + PFOA)*	UG/L		<0.01						0.01	
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/L		<0.00001						0.00004	

***RPDs have only been considered where a concentration is g**
****Elevated RPDs are highlighted as per QAQC Profile setting:**
*****Interlab Duplicates are matched on a per compound basi:**

		Lab Report Number	**EM2222407**	EM2222407		EM2222407	940511		EM2222407	EM2222407		EM2222407	940511	
		Field ID	**0315_SD127_20221103**	0315_QC103_20221103		0315_SD127_20221103	0315_QC203_20221103		0315_SD136_20221103	0315_QC105_20221103		0315_SD136_20221103	0315_QC205_20221103	
		Date	**3/11/2022**	3/11/2022	**RPD**	3/11/2022	3/11/2022	**RPD**	3/11/2022	3/11/2022	**RPD**	3/11/2022	3/11/2022	**RPD**
ChemName	**Unit**	**LOR**												
Moisture Content	%	0.1	23.1	22.1	4	23.1			30.7	28.6	7	30.7		
Perfluorocarbons														
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	0.0009	0.0014	**43**	0.0009	<0.005	0	0.0030	0.0029	3	0.0030	<0.005	0
Perfluorooctanoate (PFOA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Sum of PFHxS and PFOS	mg/kg	0.0002	0.0009	0.0014	**43**	0.0009	<0.005	0	0.0030	0.0029	3	0.0030	<0.005	0
Perfluorononanesulfonic acid (PFNS)	mg/kg	0.005					<0.005						<0.005	
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorobutanoic acid (PFBA)	mg/kg	0.001	<0.001	<0.001	0	<0.001	<0.005	0	<0.001	<0.001	0	<0.001	<0.005	0
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.005					<0.005						<0.005	
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorononanoic acid (PFNA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.0002	0	<0.0002	<0.01	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.0002	0	<0.0002	<0.01	0
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
6:2 Fluorotelomer Sulfonate (6:2 FtS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.01	0	<0.0005	<0.0005	0	<0.0005	<0.01	0
8:2 Fluorotelomer sulfonate (8:2 FtS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
Sum of PFAS	mg/kg	0.0002	0.0009	0.0014	**43**	0.0009	<0.05	0	0.0030	0.0029	3	0.0030	<0.05	0

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

		Lab Report Number	EM2222407	EM2222407	EM2222407	EM2222407	EM2222407
		Field ID	0315_QC301_20221103	0315_QC302_20221104	0315_QC501_20221102	0315_QC502_20221103	0315_QC503_20221104
		Date	3/11/2022	4/11/2022	2/11/2022	3/11/2022	4/11/2022
		Sample Type	Rinsate	Rinsate	Trip_B	Trip_B	Trip_B
ChemName	**Unit**	**LOR**					
Sum of WA DWER PFAS (n=10)*	UG/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorocarbons							
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanoate (PFOA)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonate (8:2 FtS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sum of PFAS	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

APPENDIX

C

LABORATORY CERTIFICATES

Cardno

now

Stantec

Cardno

Chain of Custody

Sheet 1 of 1

145

PM Name: [redacted]

Phone: [redacted] Fax: [redacted] Mobile: [redacted]

Address: Level 4, 501 Swanston Street, Melbourne, Vic 3000

PM Email: [redacted]

Results Email (please email results to all listed): [redacted]

Project Number: NSW_0315_PFASOMP

Laboratory (name, phone/fax no & contact person): Eurofins

Attn [redacted]

Sample ID	Laboratory ID	Container	Sampling Date	Sampling Time	Sample Matrix: Water	Soil				Sample preservation: Ice				Analysis: PFAS Standard Suite										HOLD
0315_QC201_20221103		2	3/11/2022		x					x				x										
0315_QC202_20221103		2	3/11/2022		x					x				x										
0315_QC203_20221103		1	3/11/2022			x				x				x										
0315_QC204_20221103		2	3/11/2022		x					x				x										
0315_QC205_20221103		1	3/11/2022			x				x				x										

Sampler: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: (print and signature) [redacted] Date

[redacted] (Sampler): (print and signature) [redacted] Date 11/11 Time Received by: [redacted] (print and signature) Date 11/11 Time 4pm

Relinquished by: (print and signature) [redacted] Date 11/11 Time Received by: (print and signature) Date Time

Relinquished by: (print and signature) Date Time Received by: (print and signature) Date Time

11/11
8.6° ice

Please supply results electronically in spreadsheet and ESDAT files.

Turn around time: (24 hour/48 hour/3 days/5 days) Please circle

940511

Revision 2
Approved 2 December 2016

Sample Receipt Advice

Company name:	Stantec Australia Pty Ltd (VIC)
Contact name:	[redacted]
Project name:	NSW_0315_PFASOMP
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Nov 11, 2022 4:00 PM
Eurofins reference	940511

Sample Information

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

Notes

Received extra sample 0445_QC210_221110.

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]

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

Global Leader - Results you can trust

eurofins

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

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521
[redacted]

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898
[redacted]

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954
[redacted]

Company Name: Stantec Australia Pty Ltd (VIC)
Address: [redacted]

Project Name: NSW_0315_PFASOMP

Order No.:
Report #: 940511
Phone:
Fax:

Received: Nov 11, 2022 4:00 PM
Due: Nov 18, 2022
Priority: 5 Day
Contact Name: [redacted]

Eurofins Analytical Services Manager : [redacted]

Sample Detail						HOLD	Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	0315_QC201_20221103	Nov 03, 2022		Water	M22-No0030229			X
2	0315_QC202_20221103	Nov 03, 2022		Water	M22-No0030230			X
3	0315_QC203_20221103	Nov 03, 2022		Soil	M22-No0030231		X	X
4	0315_QC204_20221103	Nov 03, 2022		Water	M22-No0030232			X
5	0315_QC205_20221103	Nov 03, 2022		Soil	M22-No0030233		X	X
6	0445_QC210_221110	Nov 10, 2022		Water	M22-No0030234	X		
Test Counts						1	2	5

eurofins | Environment Testing

Certificate of Analysis

Stantec Australia Pty Ltd
Level 22, 570 Bourke Street
Melbourne
VIC 3000

NATA Accredited
Accreditation Number 1261
Site Number 1254

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: [redacted])

Report **940511-S**
Project name NSW_0315_PFASOMP
Received Date Nov 11, 2022

Client Sample ID			**0315_QC203_20221103**	**0315_QC205_20221103**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**M22-No0030231**	**M22-No0030233**
Date Sampled			**Nov 03, 2022**	**Nov 03, 2022**
Test/Reference	LOR	Unit		
% Moisture	1	%	22	29
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA)[N11]	5	ug/kg	< 5	< 5
Perfluoropentanoic acid (PFPeA)[N11]	5	ug/kg	< 5	< 5
Perfluorohexanoic acid (PFHxA)[N11]	5	ug/kg	< 5	< 5
Perfluoroheptanoic acid (PFHpA)[N11]	5	ug/kg	< 5	< 5
Perfluorooctanoic acid (PFOA)[N11]	5	ug/kg	< 5	< 5
Perfluorononanoic acid (PFNA)[N11]	5	ug/kg	< 5	< 5
Perfluorodecanoic acid (PFDA)[N11]	5	ug/kg	< 5	< 5
Perfluoroundecanoic acid (PFUnDA)[N11]	5	ug/kg	< 5	< 5
Perfluorododecanoic acid (PFDoDA)[N11]	5	ug/kg	< 5	< 5
Perfluorotridecanoic acid (PFTrDA)[N15]	5	ug/kg	< 5	< 5
Perfluorotetradecanoic acid (PFTeDA)[N11]	5	ug/kg	< 5	< 5
13C4-PFBA (surr.)	1	%	75	73
13C5-PFPeA (surr.)	1	%	85	80
13C5-PFHxA (surr.)	1	%	76	80
13C4-PFHpA (surr.)	1	%	69	73
13C8-PFOA (surr.)	1	%	68	73
13C5-PFNA (surr.)	1	%	66	73
13C6-PFDA (surr.)	1	%	59	72
13C2-PFUnDA (surr.)	1	%	67	73
13C2-PFDoDA (surr.)	1	%	71	75
13C2-PFTeDA (surr.)	1	%	65	73
Perfluoroalkyl sulfonamido substances				
Perfluorooctane sulfonamide (FOSA)[N11]	5	ug/kg	< 5	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	5	ug/kg	< 5	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	5	ug/kg	< 5	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	5	ug/kg	< 5	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	5	ug/kg	< 5	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	10	ug/kg	< 10	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	10	ug/kg	< 10	< 10
13C8-FOSA (surr.)	1	%	78	87

Client Sample ID			0315_QC203_20221103	0315_QC205_20221103
Sample Matrix			Soil	Soil
Eurofins Sample No.			M22-No0030231	M22-No0030233
Date Sampled			Nov 03, 2022	Nov 03, 2022
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonamido substances				
D3-N-MeFOSA (surr.)	1	%	76	78
D5-N-EtFOSA (surr.)	1	%	70	78
D7-N-MeFOSE (surr.)	1	%	76	81
D9-N-EtFOSE (surr.)	1	%	76	81
D5-N-EtFOSAA (surr.)	1	%	106	75
D3-N-MeFOSAA (surr.)	1	%	87	77
Perfluoroalkyl sulfonic acids (PFSAs)				
Perfluorobutanesulfonic acid (PFBS)N11	5	ug/kg	< 5	< 5
Perfluorononanesulfonic acid (PFNS)N15	5	ug/kg	< 5	< 5
Perfluoropropanesulfonic acid (PFPrS)N15	5	ug/kg	< 5	< 5
Perfluoropentanesulfonic acid (PFPeS)N15	5	ug/kg	< 5	< 5
Perfluorohexanesulfonic acid (PFHxS)N11	5	ug/kg	< 5	< 5
Perfluoroheptanesulfonic acid (PFHpS)N15	5	ug/kg	< 5	< 5
Perfluorooctanesulfonic acid (PFOS)N11	5	ug/kg	< 5	< 5
Perfluorodecanesulfonic acid (PFDS)N15	5	ug/kg	< 5	< 5
13C3-PFBS (surr.)	1	%	64	71
18O2-PFHxS (surr.)	1	%	78	91
13C8-PFOS (surr.)	1	%	66	84
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)N11	5	ug/kg	< 5	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)N11	10	ug/kg	< 10	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)N11	5	ug/kg	< 5	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)N11	5	ug/kg	< 5	< 5
13C2-4:2 FTSA (surr.)	1	%	79	80
13C2-6:2 FTSA (surr.)	1	%	76	77
13C2-8:2 FTSA (surr.)	1	%	66	88
13C2-10:2 FTSA (surr.)	1	%	85	80
PFASs Summations				
Sum (PFHxS + PFOS)*	5	ug/kg	< 5	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5	< 5
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10	< 10
Sum of PFASs (n=30)*	50	ug/kg	< 50	< 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	Melbourne	Nov 12, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Nov 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Nov 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Nov 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Nov 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Nov 12, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name:	Stantec Australia Pty Ltd (VIC)	**Order No.:**		**Received:**	Nov 11, 2022 4:00 PM
Address:	[redacted]	**Report #:**	940511	**Due:**	Nov 18, 2022
		Phone:		**Priority:**	5 Day
		Fax:		**Contact Name:**	[redacted]
Project Name:	NSW_0315_PFASOMP				

Eurofins Analytical Services Manager : [redacted]

Sample Detail						HOLD	Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	0315_QC201_20221103	Nov 03, 2022		Water	M22-No0030229			X
2	0315_QC202_20221103	Nov 03, 2022		Water	M22-No0030230			X
3	0315_QC203_20221103	Nov 03, 2022		Soil	M22-No0030231		X	X
4	0315_QC204_20221103	Nov 03, 2022		Water	M22-No0030232			X
5	0315_QC205_20221103	Nov 03, 2022		Soil	M22-No0030233		X	X
6	0445_QC210_221110	Nov 10, 2022		Water	M22-No0030234	X		
Test Counts						1	2	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term " NT" 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 (PFTrDA)	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 (PFSAs)							
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 FTSAs)							
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)	%	102			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	90			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	112			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	121			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	117			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	120			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	130			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	110			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	113			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	105			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	111			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	125			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	120			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	110			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	117			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	117			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	113			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	122			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	120			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	133			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	116			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	124			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	123			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	112			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	115			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	106			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	97			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	126			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)	%	113			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M22-No0030187	NCP	%	107			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M22-No0030187	NCP	%	90			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M22-No0030187	NCP	%	115			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-No0030187	NCP	%	112			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M22-No0030187	NCP	%	119			50-150	Pass	
Perfluorononanoic acid (PFNA)	M22-No0030187	NCP	%	119			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M22-No0030187	NCP	%	123			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-No0030187	NCP	%	104			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-No0030187	NCP	%	117			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-No0030187	NCP	%	122			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-No0030187	NCP	%	119			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M22-No0030187	NCP	%	121			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-No0030187	NCP	%	122			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-No0030187	NCP	%	106			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-No0030187	NCP	%	117			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-No0030187	NCP	%	115			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-No0030187	NCP	%	112			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-No0030187	NCP	%	109			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M22-No0030187	NCP	%	123			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-No0030187	NCP	%	138			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-No0030187	NCP	%	114			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-No0030187	NCP	%	126			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-No0030187	NCP	%	125			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-No0030187	NCP	%	104			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-No0030187	NCP	%	120			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-No0030187	NCP	%	147			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-No0030187	NCP	%	109			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-No0030187	NCP	%	119			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-No0030187	NCP	%	107			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-No0030187	NCP	%	119			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-No0029916	NCP	ug/kg	< 10	< 10	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-No0029916	NCP	ug/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-No0029916	NCP	ug/kg	< 10	< 10	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-No0029916	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	M22-No0030233	CP	%	29	30	1.8	30%	Pass	

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Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
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]	Senior Analyst-Sample Properties

[redacted]

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 or please click here.

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Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

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.

[redacted]
VIC 3000

Attention: [redacted])

Report **940511-W**
Project name NSW_0315_PFASOMP
Received Date Nov 11, 2022

Client Sample ID			**0315_QC201_20221103**	**0315_QC202_20221103**	**0315_QC204_20221103**
Sample Matrix			**Water**	**Water**	**Water**
Eurofins Sample No.			**M22-No0030229**	**M22-No0030230**	**M22-No0030232**
Date Sampled			**Nov 03, 2022**	**Nov 03, 2022**	**Nov 03, 2022**
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	94	98	108
13C5-PFPeA (surr.)	1	%	102	115	120
13C5-PFHxA (surr.)	1	%	106	113	119
13C4-PFHpA (surr.)	1	%	118	118	114
13C8-PFOA (surr.)	1	%	117	116	116
13C5-PFNA (surr.)	1	%	116	110	111
13C6-PFDA (surr.)	1	%	107	103	90
13C2-PFUnDA (surr.)	1	%	90	84	69
13C2-PFDoDA (surr.)	1	%	79	78	59
13C2-PFTeDA (surr.)	1	%	72	85	58
Perfluoroalkyl sulfonamido substances					
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	102	111	111
D3-N-MeFOSA (surr.)	1	%	65	89	104
D5-N-EtFOSA (surr.)	1	%	55	75	120

Client Sample ID			0315_QC201_20221103	0315_QC202_20221103	0315_QC204_20221103
Sample Matrix			Water	Water	Water
Eurofins Sample No.			M22-No0030229	M22-No0030230	M22-No0030232
Date Sampled			Nov 03, 2022	Nov 03, 2022	Nov 03, 2022
Test/Reference	LOR	Unit			
Perfluoroalkyl sulfonamido substances					
D7-N-MeFOSE (surr.)	1	%	60	65	67
D9-N-EtFOSE (surr.)	1	%	63	72	62
D5-N-EtFOSAA (surr.)	1	%	84	83	75
D3-N-MeFOSAA (surr.)	1	%	90	83	77
Perfluoroalkyl sulfonic acids (PFSAs)					
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	< 0.01	[N09]0.03	< 0.01
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	< 0.01	[N09]0.01	< 0.01
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	105	109	117
18O2-PFHxS (surr.)	1	%	104	103	103
13C8-PFOS (surr.)	1	%	103	104	105
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	100	135	106
13C2-6:2 FTSA (surr.)	1	%	109	124	98
13C2-8:2 FTSA (surr.)	1	%	119	136	133
13C2-10:2 FTSA (surr.)	1	%	98	92	65
PFASs Summations					
Sum (PFHxS + PFOS)*	0.01	ug/L	< 0.01	0.04	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	< 0.01	0.01	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	< 0.01	0.04	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	< 0.05	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	< 0.1	< 0.1

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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 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Nov 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Nov 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Nov 14, 2022	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Nov 12, 2022	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Company Name:	Stantec Australia Pty Ltd (VIC)	**Order No.:**		**Received:**	Nov 11, 2022 4:00 PM
Address:	[redacted]	**Report #:**	940511	**Due:**	Nov 18, 2022
		Phone:		**Priority:**	5 Day
		Fax:		**Contact Name:**	[redacted]
Project Name:	NSW_0315_PFASOMP				

Eurofins Analytical Services Manager : [redacted]

Sample Detail						HOLD	Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	0315_QC201_20221103	Nov 03, 2022		Water	M22-No0030229			X
2	0315_QC202_20221103	Nov 03, 2022		Water	M22-No0030230			X
3	0315_QC203_20221103	Nov 03, 2022		Soil	M22-No0030231		X	X
4	0315_QC204_20221103	Nov 03, 2022		Water	M22-No0030232			X
5	0315_QC205_20221103	Nov 03, 2022		Soil	M22-No0030233		X	X
6	0445_QC210_221110	Nov 10, 2022		Water	M22-No0030234	X		
Test Counts						1	2	5

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	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 (PFSAs)							
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 FTSAs)							
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)	%	87			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	84			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	69			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	84			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	70			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	72			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	74			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	76			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	76			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	76			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	76			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	77			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	77			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	82			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	69			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	76			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	84			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	70			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	81			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	76			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	78			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	78			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	71			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	76			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	72			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	74			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	70			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	73			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	74			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	74			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M22-No0028315	NCP	%	89			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M22-No0028315	NCP	%	77			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M22-No0028315	NCP	%	68			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-No0028315	NCP	%	71			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M22-No0028315	NCP	%	73			50-150	Pass	
Perfluorononanoic acid (PFNA)	M22-No0028315	NCP	%	72			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M22-No0028315	NCP	%	76			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-No0028315	NCP	%	80			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-No0028315	NCP	%	78			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-No0028315	NCP	%	88			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-No0028315	NCP	%	82			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M22-No0028315	NCP	%	79			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-No0028315	NCP	%	83			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-No0028315	NCP	%	81			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-No0028315	NCP	%	74			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-No0028315	NCP	%	77			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-No0028315	NCP	%	65			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-No0028315	NCP	%	67			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M22-No0028315	NCP	%	68			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-No0028315	NCP	%	69			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-No0028315	NCP	%	78			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-No0028315	NCP	%	74			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-No0028315	NCP	%	66			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-No0028315	NCP	%	76			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-No0028315	NCP	%	73			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-No0028315	NCP	%	65			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-No0028315	NCP	%	68			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-No0028315	NCP	%	78			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-No0028315	NCP	%	74			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-No0028315	NCP	%	76			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M22-No0030229	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M22-No0030229	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

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

Authorised by:

[redacted] Analytical Services Manager
[redacted] Senior Analyst-PFAS

[redacted]

[redacted]

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 or please click here.

Cardno

Chain of Custody

Sheet 1 of 1

PM Name: [redacted]

Phone: [redacted] Fax: [redacted] Mobile: [redacted]

Address: Level 6, 501 Swanston Street, Melbourne, Vic, 3000

PM Email: [redacted]

Results Email (please email results to **all** listed):

[redacted]

Project Number: NSW_0315_PFASOMP Site:

Laboratory (name, phone, & contact person): ALS

[redacted]

Sample ID	Laboratory ID	Container	Sampling Date	Sampling Time	Sample Matrix: Sediment	Groundwater	Surface Water			Sample preservation: Ice/ Ice Bricks				Analysis: PFAS Standard Suite
0315_SW680_20221104		2	4/11/2022				X			X				x

Environmental Division
Melbourne
Work Order Reference
EM2222365

Telephone : +61-3-8549 9600

Sampler: I attest that the proper field sampling procedures were used during the collection of these samples.		Sampler name: (print and signature)	Maya Brennan	Date: 04/11/2022
Relinquished by (Sampler): (print and signatu[redacted]	Date	Time	[redacted] (Courier/Lab): (print and si	Date 11/11/22	Time 17.20
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time

Please supply results electronically in spreadsheet and ESDAT files.

Turn around time: (24 hour/48 hour/3 days/5 days) Please circle

Revision 1
Approved 23 May 2013

[redacted]

Printed 11/11/2022

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2222365**		
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Me bourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	[redacted]	: [redacted]
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: ----	Telephone	: [redacted]
[redacted]	: [redacted]	[redacted]	: [redacted]
Project	: NSW_0315_PFASOMP	Page	: 1 of 2
Order number	: ----	Quote number	: EP2022MWHAUS0030 (EN/024/)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 11-Nov-2022 17:20	Issue Date	: 12-Nov-2022
Client Requested Due Date	: 21-Nov-2022	Scheduled Reporting Date	: **21-Nov-2022**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 9	Temperature	: 11.4°C - 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 direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **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 descr bed 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)
EM2222365-001	04-Nov-2022 00:00	0315_SW680_20221104	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ADDRESS

- A4 - AU Tax Invoice (INV)	Email	[redacted]

Bobby Wang

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

DERP LABREPORTS

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2222365**	Page	: 1 of 5
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022 17:20
Order number	: ----	Date Analysis Commenced	: 14-Nov-2022
C-O-C number	: ----	Issue Date	: 16-Nov-2022 16:49
Sampler	: ----		
Site	: ----		
Quote number	: EN/024/		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	Senior Organic Chemist	[redacted]

General Comments

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

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

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

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

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

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

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

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at ini ial 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: **SURFACE WATER** (Matrix: **WATER**)			*Sample ID*	**0315_SW680_20221104**	----	----	----	----
			Sampling date / time	04-Nov-2022 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM2222365-001**	--------	--------	--------	--------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0 02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0 02	µg/L	0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0 01	µg/L	**0.03**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.04**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW680_20221104	----	----	----	----
			Sampling date / time	04-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2222365-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.07**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.07**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.07**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**99.5**	----	----	----	----
13C8-PFOA	----	0.02	%	**99.5**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SURFACE WATER**

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

QUALITY CONTROL REPORT

Work Order	: **EM2222365**	Page	: 1 of 5
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: +[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022
Order number	: ----	Date Analysis Commenced	: 14-Nov-2022
C-O-C number	: ----	Issue Date	: 16-Nov-2022
Sampler	: ----		
Site	: ----		
Quote number	: EN/024/		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	Senior Organic Chemist	[redacted]

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4702618)									
EM2222283-001	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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: 4702618)									
EM2222283-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.43	0.39	9.2	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.08	0.08	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.12	0.11	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.10	0.10	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: 4702618)									
EM2222283-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4702618) - continued									
EM2222283-001	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4702618)									
EM2222283-001	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	0.08	0.08	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: 4702618)									
EM2222283-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.83	0.79	4.9	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	0.03	40.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.83	0.79	4.9	0% - 20%

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4702618)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	105	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	93.4	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	91.0	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	98.7	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	97.9	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	95.0	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4702618)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	99.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	94.1	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	92.2	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	92.1	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	94.9	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	103	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	90.0	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	109	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	90.3	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	108	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4702618)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	96.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	104	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	97.3	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	114	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	88.3	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	97.3	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	86.3	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4702618)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	102	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	109	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

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4702618) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	81.9	70.0	130
EP231P: PFAS Sums (QCLot: 4702618)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2222365**	Page	: 1 of 4
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: [redacted]
Contact	: [redacted]	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022
Site	: ----	Issue Date	: 16-Nov-2022
Sampler	: ----	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	17	5.88	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	17	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; o hers 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

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

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0315_SW680_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0315_SW680_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0315_SW680_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0315_SW680_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0315_SW680_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within he 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 / Analytical Methods	Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Evaluation	Quality Control Specification
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	**5.88**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	17	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

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

Preparation Methods	Method	Matrix	Method Descriptions
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

Cardno

Chain of Custody

PM Name: [redacted]
Phone: [redacted] Fax: [redacted] Mobile: [redacted]
Address: Level 6, 501 Swanston Street, Melbourne, Vic, 3000
PM Email: [redacted]
Results Email (please email results to all listed):
[redacted]

Project Number: NSW_0315_PFASOMP Site: Kapooka
Laboratory (name, phone, & contact person): ALS
[redacted]

Sample ID	Laboratory ID	Container	Sampling Date	Sampling Time	Sediment	Groundwater	Surface Water			Ice/ Ice Bricks			PFAS Standard Suite
0315_MW625_20221103		2	3/11/2022			x				x			x

Environmental Division Melbourne
Work Order Reference
EM2222366
Telephone: + 61-3-8549 9600

Sampler: I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler name: (print and signature) [redacted] Date: 04/11/2022

Relinquished by (Sampler): (print and signature) Maya Brennan	Date	Time	Received by (Courier/Lab): (print and signature) [redacted]	Date 11/11/22	Time 17:20
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time

Please supply results electronically in spreadsheet and ESDAT files.

Turn around time: (24 hour/48 hour/3 days/5 days) Please circle

Revision 1
Approved 23 May 2013

[redacted]

Printed 11/11/2022

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM2222366**

Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted] VIC 3000	[redacted]	: [redacted]
[redacted]	: [redacted]	[redacted]	: [redacted]
Telephone	: ----	Telephone	: +[redacted]
Facsimile	: ----	Facsimile	: +[redacted]
Project	: NSW_0315_PFASOMP	Page	: 1 of 2
Order number	: ----	Quote number	: EP2022MWHAUS0030 (EN/024/)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Kapooka		
Sampler	:		

Dates

Date Samples Received	: 11-Nov-2022 17:20	Issue Date	: 12-Nov-2022
Client Requested Due Date	: 18-Nov-2022	Scheduled Reporting Date	: **18-Nov-2022**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 9	Temperature	: 11.4°C
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 direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **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 descr bed 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)
EM2222366-001	03-Nov-2022 00:00	0315_MW625_20221103	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ADDRESS

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

DERP LABREPORTS

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

CERTIFICATE OF ANALYSIS

Work Order	: **EM2222366**	Page	: 1 of 5
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental [redacted]
[redacted]	[redacted]	Contact	: [redacted]
Address	[redacted]	Address	[redacted]
Telephone	: ----	Telephone	[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022 17:20
Order number	: ----	Date Analysis Commenced	: 14-Nov-2022
C-O-C number	: ----	Issue Date	: 16-Nov-2022 15:28
Sampler	: ----		
Site	: Kapooka		
Quote number	: EN/024/		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	Senior Organic Chemist	[redacted]

General Comments

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

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

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

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

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

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

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

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

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW625_20221103	----	----	----	----
			Sampling date / time	03-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2222366-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0 02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0 02	µg/L	0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0 01	µg/L	0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW625_20221103	----	----	----	----
			Sampling date / time	03-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2222366-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**100**	----	----	----	----
13C8-PFOA	----	0.02	%	**94.4**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **GROUNDWATER**

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2222366**	Page	: 1 of 4
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	[redacted]
Contact	: [redacted]	Telephone	: +[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022
Site	: Kapooka	Issue Date	: 16-Nov-2022
Sampler	: ----	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	17	5.88	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	17	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; o hers 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

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

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0315_MW625_20221103	**03-Nov-2022**	**15-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	02-May-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0315_MW625_20221103	**03-Nov-2022**	**15-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	02-May-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0315_MW625_20221103	**03-Nov-2022**	**15-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	02-May-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0315_MW625_20221103	**03-Nov-2022**	**15-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	02-May-2023	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0315_MW625_20221103	**03-Nov-2022**	**15-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	02-May-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	**5.88**	**10.00**	✘	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	17	**0.00**	**5.00**	✘	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

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

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

Cardno

Chain of Custody

Sheet 1 of 1

PM Name: [redacted]	
Phone: [redacted] Fax: [redacted] Mobile: [redacted]	
Address: [redacted]	
PM Email: [redacted]	
Results Email (please email results to **all** listed): [redacted]	
Project Number: NSW_0315_PFASOMP	Site: Kapooka
Laboratory (name, phone, & contact person): ALS [redacted]	

	Sample ID	Laboratory ID	Container	Sampling Date	Sampling Time	Sample Matrix: Sediment	Sample Matrix: Groundwater	Sample Matrix: Surface Water			Sample preservation: Ice/ Ice Bricks				Analysis: PFAS Standard Suite
1	0315_MW601_20221104		2	4/11/2022			x				x				x
2	0315_MW624_20221104		2	4/11/2022			x				x				x
3	0315_SW677_20221104		2	4/11/2022				x			x				x
4	0315_SW614_20221104		2	4/11/2022				x			X				x
5	0315_SD677_20221104		2 (eurofins containers)	4/11/2022		x					X				x
6	0315_SD614_20221104		2 (eurofins containers)	4/11/2022		x					X				x

Environmental Division
Melbourne
Work Order Reference
EM2222368

Telephone : + 61-3-8549 9600

Sampler: I attest that the proper field sampling procedures were used during the collection of these samples.		Sampler name: (print and signature) [redacted]		Date: 4/11/2022	
Relinquished by (Sampler): (print and signature) [redacted]	Date	Time	Received by (Courier/Lab): (print and s [redacted]	Date 11/11/22	Time 17:20
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time

Please supply results electronically in spreadsheet and ESDAT files.

Turn around time: (24 hour/48 hour/3 days/5 days) Please circle

Page of

Revision 1
Approved 23 May 2013

[redacted]

Printed 11/11/2022

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2222368**		
Client	: STANTEC AUSTRALIA PTY LTD	Laboratory	: Environmental Division [redacted]
[redacted]	[redacted]	[redacted]	[redacted]
Address	[redacted]	Address	[redacted]
E-mail	: [redacted]	E-mail	[redacted]
Telephone	: ----	Telephone	: +6138549 9609
Facsimile	: ----	Facsimile	: +61-3-8549 9626
Project	: NSW_0315_PFASOMP	Page	: 1 of 3
Order number	: ----	Quote number	: EP2022MWHAUS0030 (EN/024/)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Kapooka		
Sampler	:		

Dates

Date Samples Received	: 11-Nov-2022 17:20	Issue Date	: 12-Nov-2022
Client Requested Due Date	: 21-Nov-2022	Scheduled Reporting Date	: **21-Nov-2022**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 9	Temperature	: 11.4°C - 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 direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **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 descr bed 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	SO L - EA055-103 Moisture Content	SO L - EP231X (solids) PFAS - Full Suite (28 analytes)
EM2222368-005	04-Nov-2022 00:00	0315_SD677_20221104	✓	✓
EM2222368-006	04-Nov-2022 00:00	0315_SD614_20221104	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)
EM2222368-001	04-Nov-2022 00:00	0315_MW601_20221104	✓
EM2222368-002	04-Nov-2022 00:00	0315_MW624_20221104	✓
EM2222368-003	04-Nov-2022 00:00	0315_SW677_20221104	✓
EM2222368-004	04-Nov-2022 00:00	0315_SW614_20221104	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ADDRESS

- A4 - AU Tax Invoice (INV)	Email	[redacted]

[redacted] of Analysis - NATA (COA) Email [redacted]

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

DERP LABREPORTS

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

CERTIFICATE OF ANALYSIS

Work Order	: **EM2222368**	Page	: 1 of 9
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	[redacted]
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: 4 [redacted]
Telephone	: ----	Telephone	: +[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022 17:20
Order number	: ----	Date Analysis Commenced	: 14-Nov-2022
C-O-C number	: ----	Issue Date	: 17-Nov-2022 15:03
Sampler	: ----		
Site	: Kapooka		
Quote number	: EN/024/		
No. of samples received	: 6		
No. of samples analysed	: 6		

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]	Non-Metals Team Leader	[redacted]
[redacted]	Senior Organic Chemist	[redacted]

General Comments

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

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

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

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

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

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

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

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

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW601_20221104	0315_MW624_20221104	----	----	----
			Sampling date / time	04-Nov-2022 00:00	04-Nov-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2222368-001	EM2222368-002	--------	--------	--------
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	**0.04**	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	**0.03**	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	**0.43**	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	**0.03**	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.34**	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	**0.02**	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW601_20221104	0315_MW624_20221104	----	----	----
			Sampling date / time	04-Nov-2022 00:00	04-Nov-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2222368-001	EM2222368-002	--------	--------	--------
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.89**	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.77**	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.83**	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**96.5**	**96.7**	----	----	----
13C8-PFOA	----	0.02	%	**99.1**	**96.1**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	0315_SD677_20221104	0315_SD614_20221104	----	----	----
			Sampling date / time	04-Nov-2022 00:00	04-Nov-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2222368-005	EM2222368-006	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**46.5**	**23.4**	----	----	----
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	**0.0074**	**0.0073**	----	----	----
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	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	0315_SD677_20221104	0315_SD614_20221104	----	----	----
			Sampling date / time	04-Nov-2022 00:00	04-Nov-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2222368-005	EM2222368-006	--------	--------	--------
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0074**	**0.0073**	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0074**	**0.0073**	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0074**	**0.0073**	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**72.2**	**88.5**	----	----	----
13C8-PFOA	----	0.0002	%	**74.5**	**86.2**	----	----	----

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW677_20221104	0315_SW614_20221104	----	----	----
			Sampling date / time	04-Nov-2022 00:00	04-Nov-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2222368-003	EM2222368-004	--------	--------	--------
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0 01	µg/L	**0.02**	**0.02**	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0 02	µg/L	0.02	0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0 01	µg/L	**0.04**	**0.05**	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0 02	µg/L	0.02	0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: **SURFACE WATER** (Matrix: **WATER**)			*Sample ID*	**0315_SW677_20221104**	**0315_SW614_20221104**	----	----	----
			Sampling date / time	04-Nov-2022 00:00	04-Nov-2022 00:00	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EM2222368-003**	**EM2222368-004**	--------	--------	--------
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.06**	**0.07**	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.06**	**0.07**	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.06**	**0.07**	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**97.8**	**97.2**	----	----	----
13C8-PFOA	----	0.02	%	**95.8**	**94.8**	----	----	----

Surrogate Control Limits

Sub-Matrix: **GROUNDWATER**

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

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	68	136
13C8-PFOA	----	69	133

Sub-Matrix: **SURFACE WATER**

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

QUALITY CONTROL REPORT

Work Order	: **EM2222368**	Page	: 1 of 7
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: [redacted]
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: +[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022
Order number	: ----	Date Analysis Commenced	: 14-Nov-2022
C-O-C number	: ----	Issue Date	: 17-Nov-2022
Sampler	: ----		
Site	: Kapooka		
Quote number	: EN/024/		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	Non-Metals Team Leader	[redacted]
[redacted]	Senior Organic Chemist	[redacted]

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4702122)									
EM2222368-005	0315_SD677_20221104	EA055: Moisture Content	----	0.1	%	46.5	42.9	8.0	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4699204)									
EM2222355-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706 91 4	0 0002	mg/kg	5 0 µg/kg	0 0050	0 0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4699204)									
EM2222355-001	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231 Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<5 µg/kg	<0.005	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4699204)									
EM2222355-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4699204) - continued									
EM2222355-001	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<10.0 µg/kg	<0.0100	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<10.0 µg/kg	<0.0100	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4699204)									
EM2222355-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<10.0 µg/kg	<0.0100	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 4699204)									
EM2222355-001	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	<50.0 µg/kg	<0.0500	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<5.0 µg/kg	<0.0050	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<10.0 µg/kg	<0.0100	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4699204)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	102	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	90.6	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	96.4	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	91.9	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	109	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	85.5	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4699204)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	96.6	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.6	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.7	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.8	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.0	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	114	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.0	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	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	0.00312 mg/kg	76.2	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4699204)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.3	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	105	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	97.9	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	107	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	93.2	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.5	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	70.2	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4699204)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	93.7	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00119 mg/kg	101	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	91.4	65.0	137

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4699204) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00121 mg/kg	79.1	70.0	130
EP231P: PFAS Sums (QCLot: 4699204)								
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	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4703116)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	99.8	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	97.2	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	99.1	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	99.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	91.1	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4703116)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.1	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	94.3	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	92.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	92.3	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	97.3	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	89.5	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	88.3	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	95.2	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	91.0	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	98.4	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4703116)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	92.5	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	90.7	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	88.4	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	97.9	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	93.2	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	102	65.0	136

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4703116) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	90.0	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4703116)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	94.1	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 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	105	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	80.0	70.0	130
EP231P: PFAS Sums (QCLot: 4703116)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	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: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
				Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4699204)							
EM2222368-005	0315_SD677_20221104	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	89 2	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	75 2	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	89.7	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	77 3	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	0.00121 mg/kg	71 9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4699204)							
EM2222368-005	0315_SD677_20221104	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	83.7	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	91 0	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	72.6	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	76.4	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	83 8	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	74 3	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	104	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	81 8	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	95 2	69.0	135

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4699204) - continued							
EM2222368-005	0315_SD677_20221104	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	87.7	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	73.6	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4699204)							
EM2222368-005	0315_SD677_20221104	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	72.4	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	97.7	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	79 8	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	117	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	# 67.9	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	# 59.4	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	62 2	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4699204)							
EM2222368-005	0315_SD677_20221104	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	84 0	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00119 mg/kg	80 2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	75.4	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00121 mg/kg	72 5	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2222368**	Page	: 1 of 5
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	[redacted]
Contact	: [redacted]	Telephone	[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022
Site	: Kapooka	Issue Date	: 17-Nov-2022
Sampler	: ----	No. of samples received	: 6
Order number	: ----	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, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EM2222368--005	0315_SD677_20221104	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP231C: Perfluoroalkyl Sulfonamides	EM2222368--005	0315_SD677_20221104	**N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)**	1691-99-2	67.9 %	70.0-130%	**Recovery less than lower data quality objective**
EP231C: Perfluoroalkyl Sulfonamides	EM2222368--005	0315_SD677_20221104	**N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)**	2355-31-9	59.4 %	63.0-144%	**Recovery less than lower data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	19	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	19	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / *Container / Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055)								
0315_SD677_20221104,	0315_SD614_20221104	**04-Nov-2022**	**----**	----	----	**15-Nov-2022**	18-Nov-2022	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0315_SD677_20221104,	0315_SD614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	25-Dec-2022	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X)								
0315_SD677_20221104,	0315_SD614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	25-Dec-2022	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X)								
0315_SD677_20221104,	0315_SD614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	25-Dec-2022	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0315_SD677_20221104,	0315_SD614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	25-Dec-2022	✓
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X)								
0315_SD677_20221104,	0315_SD614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	25-Dec-2022	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
0315_MW601_20221104, 0315_SW677_20221104,	0315_MW624_20221104, 0315_SW614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X)								
0315_MW601_20221104, 0315_SW677_20221104,	0315_MW624_20221104, 0315_SW614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X)								
0315_MW601_20221104, 0315_SW677_20221104,	0315_MW624_20221104, 0315_SW614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
0315_MW601_20221104, 0315_SW677_20221104,	0315_MW624_20221104, 0315_SW614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)								
0315_MW601_20221104, 0315_SW677_20221104,	0315_MW624_20221104, 0315_SW614_20221104	**04-Nov-2022**	**15-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	03-May-2023	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within he 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 / *Analytical Methods*	*Method*	Count *QC*	Count *Regular*	Rate (%) ***Actual***	Rate (%) ***Expected***	*Evaluation*	*Quality Control Specification*
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type / *Analytical Methods*	*Method*	Count *QC*	Count *Regular*	Rate (%) ***Actual***	Rate (%) ***Expected***	*Evaluation*	*Quality Control Specification*
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	19	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	19	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

Cardno

Chain of Custody

Sheet 1 of 2

PM Name: [redacted]
Phone: [redacted] Fax: [redacted] Mobile: [redacted]
Address: Level 6, 501 Swanston Street, Melbourne, Vic, 3000
PM Email: [redacted]
Results Email (please email results to all listed):
- [redacted]
- derp.labreports@esdat.com.au

Project Number: NSW_0315_PFASOMP Site: Kapcoka
Laboratory (name, phone, & contact person): ALS
[redacted]

Sample ID	Laboratory ID	Container	Sampling Date	Sampling Time	Sample Matrix: Sediment	Sample Matrix: Groundwater	Sample Matrix: Surface Water	Sample preservation: Ice/ Ice Bricks	Analysis: PFAS Standard Suite	Comments
0315_SD127_20221103	1	1	3/11/2022		X			X	X	
0315_SD136_20221103	2	1	3/11/2022		X			X	X	
0315_SD106_20221103	3	3	3/11/2022		X			X	X	For lab internal QC
0315_SD118_20221103	4	1	3/11/2022		X			X	X	
0315_SD108_20221103	5	3	3/11/2022		X			X	X	For lab internal QC
0315_SD103_20221103	6	1	3/11/2022		X			X	X	
0315_SD107_20221103	7	1	3/11/2022		X			X	X	
0315_SD111_20221103	8	1	3/11/2022		X			X	X	
0315_SD121_20221104	9	1	4/11/2022		X			X	X	
0315_MW109_20221103	10	2	3/11/2022			X		X	X	
0315_MW008_20221103	11	2	3/11/2022			X		X	X	
0315_MW103_20221103	12	2	3/11/2022			X		X	X	
0315_MW104_20221103	13	2	3/11/2022			X		X	X	
0315_MW107_20221103	14	2	3/11/2022			X		X	X	
0315_MW110_20221103	15	6	3/11/2022			X		X	X	For lab internal QC
0315_SW103_20221103	16	2	3/11/2022				X	X	X	
0315_SW136_20221103	17	2	3/11/2022				X	X	X	
0315_SW149_20221103	18	2	3/11/2022				X	X	X	
0315_SW107_20221103	19	2	3/11/2022				X	X	X	
0315_SW127_20221103	20	2	3/11/2022				X	X	X	

Environmental Division
Melbourne
Work Order Reference
EM2222407

Telephone : + 61-3-8545 9600

Sampler: I attest that the proper field sampling procedures were used during the collection of these samples. Sampler name: (print and signature) [redacted] Date: 4/11/2022

Relinquished by (Sampler): (print and signature)	Date	Time	Received by (Courier/Lab): (print and signature) [redacted]	Date 11/11/22	Time 17:20
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time

Please supply results electronically in spreadsheet and ESDAT files.

Turn around time: (24 hour/48 hour/3 days/5 days) Please circle

Page of

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Sheet 2 of 2

PM Na[redacted]
Phon[redacted]ax: +61 3 8415 7788 Mobile: [redacted]
Address: Level 6, 501 Swanston Street, Melbourne, Vic, 3000
PM Emai[redacted]
Results Email (please email results to **all** listed):
[redacted]
Project Number: NSW_0315_PFASOMP Site:
Laboratory (name, phone, & contact person): ALS
[redacted]

Sample ID		Laboratory ID	Container	Sampling Date	Sampling Time	Sediment	Groundwater	Surface Water	Water	Ice/ Ice Bricks	PFAS Standard Suite	Comments
0315_SW144_20221103		21	2	3/11/2022				X		X	X	
0315_SW108_20221103		22	2	3/11/2022				X		X	X	
0315_SW148_20221103		23	2	3/11/2022				X		X	X	
0315_SW106_20221103		24	6	3/11/2022				X		X	X	For lab internal QC
0315_SW111_20221103		25	2	3/11/2022				X		X	X	
0315_SW118_20221103		26	~~2~~ 6	3/11/2022				X		X	X	
0315_SW146_20221103	SW140 BW	27	6	3/11/2022				X		X	X	For lab internal QC
0315_SW121_20221104	146	28	2	4/11/2022				X		X	X	
0315_QC101_20221103		29	2	3/11/2022					X	X	X	
0315_QC102_20221103		30	2	3/11/2022					X	X	X	
0315_QC103_20221103		31	1	3/11/2022		X				X	X	
0315_QC104_20221103		32	2	3/11/2022					X	X	X	
0315_QC105_20221103		33	1	3/11/2022		X				X	X	
0315_QC301_20221103		34	2	3/11/2022					X	X	X	
0315_QC302_20221104		35	2	4/11/2022					X	X	X	
0315_QC501_20221102		36	2	2/11/2022					X	X	X	
0315_QC502_20221103		37	2	3/11/2022					X	X	X	
0315_QC503_20221104		38	2	4/11/2022					X	X	X	

Sampler: I attest that the proper field sampling procedures were used during the collection of these samples. Sampler name: (print and signature) Maya Brennan Date: 4/11/2022

Relinquished by (Sampler): (print and signature)	Date	Time	Received by (Courier/Lab): (print and si	Date		Time
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date		Time
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date		Time

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2222407**		
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division [redacted] Me bourne
Contact	: [redacted]	Contact	[redacted]
Address	[redacted]	Address	3171
E-mail	: Bobby.Wang@cardno.com.au	E-mail	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Facsimile	: ----	Facsimile	: [redacted]
Project	: NSW_0315_PFASOMP	Page	: 1 of 3
Order number	: ----	Quote number	: EP2022MWHAUS0030 (EN/024/)
C-O-C number	: COC Kapooka -Base.xls	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Kapooka - base		
Sampler	: MB		

Dates

Date Samples Received	: 11-Nov-2022 17:20	Issue Date	: 15-Nov-2022
Client Requested Due Date	: 21-Nov-2022	Scheduled Reporting Date	: **17-Nov-2022**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 9	Temperature	: 11.4'c - Ice present
Receipt Detail	:	No. of samples received / analysed	: 38 / 38

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
- **For sample 027 - A sample ID discrepancy has been noted on the COC, ID has been logged as per the COC. Please inform ALS if changes are to be made to the SRN.**
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **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 descr bed 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*	SO L - EA055-103 Moisture Content	SO L - EP231X (solids) PFAS - Full Suite (28 analytes)
EM2222407-001	03-Nov-2022 00:00	0315_SD127_20221103	✓	✓
EM2222407-002	03-Nov-2022 00:00	0315_SD136_20221103	✓	✓
EM2222407-003	03-Nov-2022 00:00	0315_SD106_20221103	✓	✓
EM2222407-004	03-Nov-2022 00:00	0315_SD118_20221103	✓	✓
EM2222407-005	03-Nov-2022 00:00	0315_SD108_20221103	✓	✓
EM2222407-006	03-Nov-2022 00:00	0315_SD103_20221103	✓	✓
EM2222407-007	03-Nov-2022 00:00	0315_SD107_20221103	✓	✓
EM2222407-008	03-Nov-2022 00:00	0315_SD111_20221103	✓	✓
EM2222407-009	04-Nov-2022 00:00	0315_SD121_20221104	✓	✓
EM2222407-031	03-Nov-2022 00:00	0315_QC103_20221103	✓	✓
EM2222407-033	03-Nov-2022 00:00	0315_QC105_20221103	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EP231X PFAS - Full Suite (28 analytes)
EM2222407-010	03-Nov-2022 00:00	0315_MW109_20221103	✓
EM2222407-011	03-Nov-2022 00:00	0315_MW008_20221103	✓
EM2222407-012	03-Nov-2022 00:00	0315_MW103_20221103	✓
EM2222407-013	03-Nov-2022 00:00	0315_MW104_20221103	✓
EM2222407-014	03-Nov-2022 00:00	0315_MW107_20221103	✓
EM2222407-015	03-Nov-2022 00:00	0315_MW110_20221103	✓
EM2222407-016	03-Nov-2022 00:00	0315_SW103_20221103	✓
EM2222407-017	03-Nov-2022 00:00	0315_SW136_20221103	✓
EM2222407-018	03-Nov-2022 00:00	0315_SW149_20221103	✓
EM2222407-019	03-Nov-2022 00:00	0315_SW107_20221103	✓
EM2222407-020	03-Nov-2022 00:00	0315_SW127_20221103	✓
EM2222407-021	03-Nov-2022 00:00	0315_SW144_20221103	✓

			WATER - EP231X PFAS - Full Suite (28 analytes)
EM2222407-022	03-Nov-2022 00:00	0315_SW108_20221103	✓
EM2222407-023	03-Nov-2022 00:00	0315_SW148_20221103	✓
EM2222407-024	03-Nov-2022 00:00	0315_SW106_20221103	✓
EM2222407-025	03-Nov-2022 00:00	0315_SW111_20221103	✓
EM2222407-026	03-Nov-2022 00:00	0315_SW118_20221103	✓
EM2222407-027	03-Nov-2022 00:00	0315_SW140_20221103	✓
EM2222407-028	04-Nov-2022 00:00	0315_SW121_20221104	✓
EM2222407-029	03-Nov-2022 00:00	0315_QC101_20221103	✓
EM2222407-030	03-Nov-2022 00:00	0315_QC102_20221103	✓
EM2222407-032	03-Nov-2022 00:00	0315_QC104_20221103	✓
EM2222407-034	03-Nov-2022 00:00	0315_QC301_20221103	✓
EM2222407-035	04-Nov-2022 00:00	0315_QC302_20221104	✓
EM2222407-036	02-Nov-2022 00:00	0315_QC501_20221102	✓
EM2222407-037	03-Nov-2022 00:00	0315_QC502_20221103	✓
EM2222407-038	04-Nov-2022 00:00	0315_QC503_20221104	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ADDRESS

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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2222407**	Page	: 1 of 23
Client	: **STANTEC AU[redacted]TRALIA PTY LTD**	Laboratory	: [redacted]
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: +[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022 17:20
Order number	: ----	Date Analysis Commenced	: 14-Nov-2022
C-O-C number	: COC Kapooka -Base.xls	Issue Date	: 17-Nov-2022 14:58
Sampler	: MB		
Site	: Kapooka - base		
Quote number	: EN/024/		
No. of samples received	: 38		
No. of samples analysed	: 38		

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]	Non-Metals Team Leader	[redacted]
[redacted]	Senior Organic Chemist	[redacted]

General Comments

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

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

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

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

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

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

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

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

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW109_20221103	0315_MW008_20221103	0315_MW103_20221103	0315_MW104_20221103	0315_MW107_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-010	EM2222407-011	EM2222407-012	EM2222407-013	EM2222407-014
				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	**0.03**
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	**0.09**	**0.06**	<0.01	**0.08**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	**0.04**	<0.01	<0.01	**0.01**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	**0.03**	<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	**0.02**	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW109_20221103	0315_MW008_20221103	0315_MW103_20221103	0315_MW104_20221103	0315_MW107_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-010	EM2222407-011	EM2222407-012	EM2222407-013	EM2222407-014
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<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	**0.13**	**0.11**	<0.01	**0.12**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	**0.13**	**0.06**	<0.01	**0.09**
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	**0.13**	**0.11**	<0.01	**0.12**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**93.9**	**96.8**	**97.6**	**98.8**	**91.7**
13C8-PFOA	----	0.02	%	**97.3**	**97.5**	**98.5**	**101**	**98.0**

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW110_20221103	----	----	----	----
			Sampling date / time	03-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2222407-015	--------	--------	--------	--------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0 02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0 02	µg/L	0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0 01	µg/L	0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW110_20221103	----	----	----	----
			Sampling date / time	03-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2222407-015	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**86.9**	----	----	----	----
13C8-PFOA	----	0.02	%	**96.4**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	0315_SD127_20221103	0315_SD136_20221103	0315_SD106_20221103	0315_SD118_20221103	0315_SD108_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-001	EM2222407-002	EM2222407-003	EM2222407-004	EM2222407-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	23.1	30.7	26.4	20.4	26.5
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	**0.0009**	**0.0030**	**0.0040**	**0.0025**	**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
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	0315_SD127_20221103	0315_SD136_20221103	0315_SD106_20221103	0315_SD118_20221103	0315_SD108_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-001	EM2222407-002	EM2222407-003	EM2222407-004	EM2222407-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<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	**0.0009**	**0.0030**	**0.0040**	**0.0025**	**0.0006**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0009**	**0.0030**	**0.0040**	**0.0025**	**0.0006**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0009**	**0.0030**	**0.0040**	**0.0025**	**0.0006**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**103**	**94.2**	**89.8**	**104**	**104**
13C8-PFOA	----	0.0002	%	**99.4**	**88.0**	**81.5**	**97.6**	**102**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	0315_SD103_20221103	0315_SD107_20221103	0315_SD111_20221103	0315_SD121_20221104	0315_QC103_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	04-Nov-2022 00:00	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-006	EM2222407-007	EM2222407-008	EM2222407-009	EM2222407-031
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	23.2	23.6	22.7	29.6	22.1
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	**0.0003**	<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	**0.0063**	**0.0027**	**0.0004**	**0.0017**	**0.0014**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	**0.0004**	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	0315_SD103_20221103	0315_SD107_20221103	0315_SD111_20221103	0315_SD121_20221104	0315_QC103_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	04-Nov-2022 00:00	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-006	EM2222407-007	EM2222407-008	EM2222407-009	EM2222407-031
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0070**	**0.0027**	**0.0004**	**0.0017**	**0.0014**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0066**	**0.0027**	**0.0004**	**0.0017**	**0.0014**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0066**	**0.0027**	**0.0004**	**0.0017**	**0.0014**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**114**	**112**	**114**	**103**	**107**
13C8-PFOA	----	0.0002	%	**97.2**	**88.0**	**105**	**102**	**101**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	0315_QC105_20221103	----	----	----	----
			Sampling date / time	03-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2222407-033	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**28.6**	----	----	----	----
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	**0.0029**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	0315_QC105_20221103	----	----	----	----
			Sampling date / time	03-Nov-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2222407-033	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0029**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0029**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0029**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**104**	----	----	----	----
13C8-PFOA	----	0.0002	%	**73.2**	----	----	----	----

Analytical Results

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

Compound	CAS Number	LOR	Unit	0315_SW103_20221103	0315_SW136_20221103	0315_SW149_20221103	0315_SW107_20221103	0315_SW127_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00
				EM2222407-016	EM2222407-017	EM2222407-018	EM2222407-019	EM2222407-020
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	**0.03**	<0.02	<0.02	<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	**0.14**	**0.13**	<0.01	**0.11**	<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	**0.22**	**0.17**	**0.16**	**0.14**	<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	**0.03**	**0.03**	**0.02**	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	**0.02**	**0.02**	**0.01**	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW103_20221103	0315_SW136_20221103	0315_SW149_20221103	0315_SW107_20221103	0315_SW127_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-016	EM2222407-017	EM2222407-018	EM2222407-019	EM2222407-020
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.41**	**0.38**	**0.19**	**0.25**	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.36**	**0.30**	**0.16**	**0.25**	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.41**	**0.38**	**0.19**	**0.25**	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**95.9**	**98.6**	**94.3**	**96.1**	**102**
13C8-PFOA	----	0.02	%	**97.4**	**101**	**99.5**	**102**	**98.7**

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW144_20221103	0315_SW108_20221103	0315_SW148_20221103	0315_SW106_20221103	0315_SW111_20221103
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-021	EM2222407-022	EM2222407-023	EM2222407-024	EM2222407-025
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	**0.05**	**0.02**	<0.01	**0.02**	**0.02**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.12**	**0.01**	**0.16**	<0.01	**0.02**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

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

Compound	CAS Number	LOR	Unit	0315_SW144_20221103	0315_SW108_20221103	0315_SW148_20221103	0315_SW106_20221103	0315_SW111_20221103
Sampling date / time				03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00
				EM2222407-021	EM2222407-022	EM2222407-023	EM2222407-024	EM2222407-025
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.17**	**0.03**	**0.16**	**0.02**	**0.04**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.17**	**0.03**	**0.16**	**0.02**	**0.04**
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.17**	**0.03**	**0.16**	**0.02**	**0.04**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**97.8**	**94.9**	**94.0**	**99.1**	**103**
13C8-PFOA	----	0.02	%	**96.5**	**94.3**	**98.4**	**100**	**98.9**

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW118_20221103	0315_SW140_20221103	0315_SW121_20221104	----	----
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	04-Nov-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2222407-026	EM2222407-027	EM2222407-028	--------	--------
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0 01	µg/L	**0.10**	**0.03**	**0.04**	----	----
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	**0.13**	0.01	**0.09**	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0 02	µg/L	0.02	0.02	0.02	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW118_20221103	0315_SW140_20221103	0315_SW121_20221104	----	----
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	04-Nov-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2222407-026	EM2222407-027	EM2222407-028	--------	--------
				Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.23**	**0.03**	**0.13**	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.23**	**0.03**	**0.13**	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.23**	**0.03**	**0.13**	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**104**	**104**	**97.1**	----	----
13C8-PFOA	----	0.02	%	**102**	**101**	**101**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0315_QC101_20221103	0315_QC102_20221103	0315_QC104_20221103	0315_QC301_20221103	0315_QC302_20221104
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	04-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-029	EM2222407-030	EM2222407-032	EM2222407-034	EM2222407-035
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	**0.04**	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	**0.01**	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0315_QC101_20221103	0315_QC102_20221103	0315_QC104_20221103	0315_QC301_20221103	0315_QC302_20221104
			Sampling date / time	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	03-Nov-2022 00:00	04-Nov-2022 00:00
Compound	CAS Number	LOR	Unit	EM2222407-029	EM2222407-030	EM2222407-032	EM2222407-034	EM2222407-035
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	**0.05**	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	**0.05**	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	**0.05**	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**105**	**93.4**	**98.6**	**104**	**94.0**
13C8-PFOA	----	0.02	%	**103**	**100**	**97.1**	**96.5**	**100**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0315_QC501_20221102	0315_QC502_20221103	0315_QC503_20221104	----	----
			Sampling date / time	02-Nov-2022 00:00	03-Nov-2022 00:00	04-Nov-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2222407-036	EM2222407-037	EM2222407-038	--------	--------
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<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	<0.01	<0.01	<0.01	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0315_QC501_20221102	0315_QC502_20221103	0315_QC503_20221104	----	----
			Sampling date / time	02-Nov-2022 00:00	03-Nov-2022 00:00	04-Nov-2022 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2222407-036	EM2222407-037	EM2222407-038	--------	--------
				Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<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	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**98.9**	**99.7**	**102**	----	----
13C8-PFOA	----	0.02	%	**103**	**100**	**102**	----	----

Surrogate Control Limits

Sub-Matrix: **GROUNDWATER**

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

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP231S: PFAS Surrogate			
13C4-PFOS	----	68	136
13C8-PFOA	----	69	133

Sub-Matrix: **SURFACE WATER**

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

Sub-Matrix: **WATER**

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

QUALITY CONTROL REPORT

Work Order	: **EM2222407**	Page	: 1 of 15
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: [redacted]
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: +[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022
Order number	: ----	Date Analysis Commenced	: 14-Nov-2022
C-O-C number	: COC Kapooka -Base.xls	Issue Date	: 17-Nov-2022
Sampler	: MB		
Site	: Kapooka - base		
Quote number	: EN/024/		
No. of samples received	: 38		
No. of samples analysed	: 38		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	Non-Metals Team Leader	[redacted]
[redacted]	Senior Organic Chemist	[redacted]

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4700924)									
EM2222384-107	Anonymous	EA055: Moisture Content	----	0.1	%	17.6	12.8	31.7	0% - 50%
EM2222407-008	0315_SD111_20221103	EA055: Moisture Content	----	0.1	%	22.7	20.5	10.2	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4701133)									
EM2222363 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
EM2222407-006	0315_SD103_20221103	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	0.0003	0.0003	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	0.0063	0.0064	1 9	0% 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4701133)									
EM2222363-001	Anonymous	EP231 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
		EP231 Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4701133) - continued									
EM2222363-001	Anonymous	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EM2222407-006	0315_SD103_20221103	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: 4701133)									
EM2222363-001	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
EM2222407-006	0315_SD103_20221103	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 4701133)									
EM2222363-001	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
EM2222407-006	0315_SD103_20221103	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: 4701133)									
EM2222363-001	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
EM2222407-006	0315_SD103_20221103	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0070	0.0071	1.4	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0066	0.0067	1.5	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0066	0.0067	1.5	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 4704848)									
EM2222407-015	0315_MW110_20221103	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
EM2222407-024	0315_SW106_20221103	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.03	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit

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: 4704849)									
EM2222407-026	0315_SW118_20221103	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.10	0.10	0.0	0% - 50%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.13	0.14	12.0	0% - 50%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4704848)									
EM2222407-015	0315_MW110_20221103	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
EM2222407-024	0315_SW106_20221103	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: 4704849)									
EM2222407-026	0315_SW118_20221103	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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 4704849) - continued									
EM2222407-026	0315_SW118_20221103	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4704848)									
EM2222407-015	0315_MW110_20221103	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
EM2222407-024	0315_SW106_20221103	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: 4704849)									
EM2222407-026	0315_SW118_20221103	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 sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 4704849) - continued									
EM2222407-026	0315_SW118_20221103	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: 4704848)									
EM2222407-015	0315_MW110_20221103	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
EM2222407-024	0315_SW106_20221103	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: 4704849)									
EM2222407-026	0315_SW118_20221103	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: 4704848)									
EM2222407-015	0315_MW110_20221103	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
EM2222407-024	0315_SW106_20221103	EP231X: Sum of PFAS	----	0.01	µg/L	0.02	0.03	40.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.02	0.03	40.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.02	0.03	40.0	No Limit
EP231P: PFAS Sums (QC Lot: 4704849)									
EM2222407-026	0315_SW118_20221103	EP231X: Sum of PFAS	----	0.01	µg/L	0.23	0.26	12.2	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231P: PFAS Sums (QC Lot: 4704849) - continued									
EM2222407-026	0315_SW118_20221103	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.23	0.24	4.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.23	0.26	12.2	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**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4701133)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	104	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	92.7	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	88.2	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	101	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	99.1	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	88.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4701133)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	86.9	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.7	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.9	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.1	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.3	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.9	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.2	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.2	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	79.0	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	91.8	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4701133)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.9	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	106	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	86.0	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	88.3	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	88.7	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.7	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	79.3	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4701133)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	91.8	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00119 mg/kg	95.4	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	100	65.0	137

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4701133) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00121 mg/kg	80.9	70.0	130
EP231P: PFAS Sums (QCLot: 4701133)								
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	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4704848)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	101	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	97.1	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	95.2	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	96.6	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	95.3	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	95.6	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4704849)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	101	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	95.9	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	93.4	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	97.7	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	97.7	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	93.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4704848)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	93.6	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	92.4	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	97.5	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.3	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	95.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.9	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	95.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	103	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	95.7	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	94.3	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	105	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4704849)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	93.2	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	91.2	72.0	129

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4704849) - continued								
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	93.2	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	95.0	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	96.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	96.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	101	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	96.3	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	94.8	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	97.5	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4704848)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	99.3	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	124	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	99.2	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	97.0	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	96.5	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	115	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	85.3	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4704849)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	93.7	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	114	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	105	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	98.9	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	93.6	70.0	130
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	91.3	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4704848)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	98.9	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 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	98.9	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	80.6	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4704849)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	LCS Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4704849) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	97.5	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	103	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	103	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	81.7	70.0	130
EP231P: PFAS Sums (QCLot: 4704848)								
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: 4704849)								
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: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4701133)							
EM2222363-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	91 8	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	87 9	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	77.6	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	91 2	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	75.4	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00121 mg/kg	74.6	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4701133)							
EM2222363-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	83 8	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	81.7	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	86.6	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	84.7	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	87 5	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	91.6	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	87 2	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	89.6	64.0	136

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: 4701133) - continued							
EM2222363-002	Anonymous	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	83 3	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	74 9	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	87 8	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4701133)							
EM2222363-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	80.6	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	91 0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	93.4	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	92.7	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	84.4	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	73.6	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	67.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4701133)							
EM2222363-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	86 3	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00119 mg/kg	87 2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	96 2	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00121 mg/kg	80.6	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4704848)							
EM2222407-015	0315_MW110_20221103	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	103	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	103	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	96 8	68.0	131
		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	95.1	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	86 2	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4704849)							
EM2222407-026	0315_SW118_20221103	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	102	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	90.1	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	95 8	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	99 2	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	98.7	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	93.1	53.0	142

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: 4704848)							
EM2222407-015	0315_MW110_20221103	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	73 0	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	87 0	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	88 3	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	89 8	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	91 0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	90 9	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	83 2	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	85 9	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	85.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	76 9	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	86 3	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4704849)							
EM2222407-026	0315_SW118_20221103	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	74 0	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	79 8	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	91 0	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	90 9	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	92 0	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	92.4	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	88 9	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	96 0	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	96 2	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	84.4	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	91.6	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4704848)							
EM2222407-015	0315_MW110_20221103	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	93 0	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	89 2	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	80 2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	86 2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	87.6	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	90 0	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	77 0	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4704849)							
EM2222407-026	0315_SW118_20221103	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	94.7	67.0	137

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4704849) - continued							
EM2222407-026	0315_SW118_20221103	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	92.4	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	83 0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	93.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	90 9	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	92 9	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	75.6	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4704848)							
EM2222407-015	0315_MW110_20221103	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	96 0	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	102	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	97.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	70.7	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4704849)							
EM2222407-026	0315_SW118_20221103	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	98.6	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	107	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	93.6	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	78 3	70.0	130

Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2222407**	Page	: 1 of 8
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: [redacted]
Contact	: [redacted]	Telephone	: +[redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 11-Nov-2022
Site	: Kapooka - base	Issue Date	: 17-Nov-2022
Sampler	: MB	No. of samples received	: 38
Order number	: ----	No. of samples analysed	: 38

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	3	34	8.82	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; o hers 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	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055)								
0315_SD127_20221103,	0315_SD136_20221103,	**03-Nov-2022**	**----**	----	----	**14-Nov-2022**	17-Nov-2022	✓
0315_SD106_20221103,	0315_SD118_20221103,							
0315_SD108_20221103,	0315_SD103_20221103,							
0315_SD107_20221103,	0315_SD111_20221103,							
0315_QC103_20221103,	0315_QC105_20221103							
HDPE Soil Jar (EA055)								
0315_SD121_20221104		**04-Nov-2022**	**----**	----	----	**14-Nov-2022**	18-Nov-2022	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0315_SD127_20221103,	0315_SD136_20221103,	**03-Nov-2022**	**14-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓
0315_SD106_20221103,	0315_SD118_20221103,							
0315_SD108_20221103,	0315_SD103_20221103,							
0315_SD107_20221103,	0315_SD111_20221103,							
0315_QC103_20221103,	0315_QC105_20221103							
HDPE Soil Jar (EP231X)								
0315_SD121_20221104		**04-Nov-2022**	**14-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X)								
0315_SD127_20221103,	0315_SD136_20221103,	**03-Nov-2022**	**14-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓
0315_SD106_20221103,	0315_SD118_20221103,							
0315_SD108_20221103,	0315_SD103_20221103,							
0315_SD107_20221103,	0315_SD111_20221103,							
0315_QC103_20221103,	0315_QC105_20221103							
HDPE Soil Jar (EP231X)								
0315_SD121_20221104		**04-Nov-2022**	**14-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X)								
0315_SD127_20221103,	0315_SD136_20221103,	**03-Nov-2022**	**14-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓
0315_SD106_20221103,	0315_SD118_20221103,							
0315_SD108_20221103,	0315_SD103_20221103,							
0315_SD107_20221103,	0315_SD111_20221103,							
0315_QC103_20221103,	0315_QC105_20221103							
HDPE Soil Jar (EP231X)								
0315_SD121_20221104		**04-Nov-2022**	**14-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0315_SD127_20221103,	0315_SD136_20221103,	**03-Nov-2022**	**14-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓
0315_SD106_20221103,	0315_SD118_20221103,							
0315_SD108_20221103,	0315_SD103_20221103,							
0315_SD107_20221103,	0315_SD111_20221103,							
0315_QC103_20221103,	0315_QC105_20221103							
HDPE Soil Jar (EP231X)								
0315_SD121_20221104		**04-Nov-2022**	**14-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X)								
0315_SD127_20221103,	0315_SD136_20221103,	**03-Nov-2022**	**14-Nov-2022**	02-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓
0315_SD106_20221103,	0315_SD118_20221103,							
0315_SD108_20221103,	0315_SD103_20221103,							
0315_SD107_20221103,	0315_SD111_20221103,							
0315_QC103_20221103,	0315_QC105_20221103							
HDPE Soil Jar (EP231X)								
0315_SD121_20221104		**04-Nov-2022**	**14-Nov-2022**	03-May-2023	✓	**15-Nov-2022**	24-Dec-2022	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation

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) 0315_QC501_20221102	**02-Nov-2022**	**16-Nov-2022**	01-May-2023	✓	**16-Nov-2022**	01-May-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW109_20221103, 0315_MW008_20221103, 0315_MW103_20221103, 0315_MW104_20221103, 0315_MW107_20221103, 0315_MW110_20221103, 0315_SW103_20221103, 0315_SW136_20221103, 0315_SW149_20221103, 0315_SW107_20221103, 0315_SW127_20221103, 0315_SW144_20221103, 0315_SW108_20221103, 0315_SW148_20221103, 0315_SW106_20221103, 0315_SW111_20221103, 0315_SW118_20221103, 0315_SW140_20221103, 0315_QC101_20221103, 0315_QC102_20221103, 0315_QC104_20221103, 0315_QC301_20221103, 0315_QC502_20221103	**03-Nov-2022**	**16-Nov-2022**	02-May-2023	✓	**16-Nov-2022**	02-May-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW121_20221104, 0315_QC302_20221104, 0315_QC503_20221104	**04-Nov-2022**	**16-Nov-2022**	03-May-2023	✓	**16-Nov-2022**	03-May-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0315_QC501_20221102	**02-Nov-2022**	**16-Nov-2022**	01-May-2023	✓	**16-Nov-2022**	01-May-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW109_20221103, 0315_MW008_20221103, 0315_MW103_20221103, 0315_MW104_20221103, 0315_MW107_20221103, 0315_MW110_20221103, 0315_SW103_20221103, 0315_SW136_20221103, 0315_SW149_20221103, 0315_SW107_20221103, 0315_SW127_20221103, 0315_SW144_20221103, 0315_SW108_20221103, 0315_SW148_20221103, 0315_SW106_20221103, 0315_SW111_20221103, 0315_SW118_20221103, 0315_SW140_20221103, 0315_QC101_20221103, 0315_QC102_20221103, 0315_QC104_20221103, 0315_QC301_20221103, 0315_QC502_20221103	**03-Nov-2022**	**16-Nov-2022**	02-May-2023	✓	**16-Nov-2022**	02-May-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW121_20221104, 0315_QC302_20221104, 0315_QC503_20221104	**04-Nov-2022**	**16-Nov-2022**	03-May-2023	✓	**16-Nov-2022**	03-May-2023	✓

Matrix: **WATER**

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

Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0315_QC501_20221102		**02-Nov-2022**	**16-Nov-2022**	01-May-2023	✓	**16-Nov-2022**	01-May-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW109_20221103, 0315_MW103_20221103, 0315_MW107_20221103, 0315_SW103_20221103, 0315_SW149_20221103, 0315_SW127_20221103, 0315_SW108_20221103, 0315_SW106_20221103, 0315_SW118_20221103, 0315_QC101_20221103, 0315_QC104_20221103, 0315_QC502_20221103	0315_MW008_20221103, 0315_MW104_20221103, 0315_MW110_20221103, 0315_SW136_20221103, 0315_SW107_20221103, 0315_SW144_20221103, 0315_SW148_20221103, 0315_SW111_20221103, 0315_SW140_20221103, 0315_QC102_20221103, 0315_QC301_20221103,	**03-Nov-2022**	**16-Nov-2022**	02-May-2023	✓	**16-Nov-2022**	02-May-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW121_20221104, 0315_QC503_20221104	0315_QC302_20221104,	**04-Nov-2022**	**16-Nov-2022**	03-May-2023	✓	**16-Nov-2022**	03-May-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0315_QC501_20221102		**02-Nov-2022**	**16-Nov-2022**	01-May-2023	✓	**16-Nov-2022**	01-May-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW109_20221103, 0315_MW103_20221103, 0315_MW107_20221103, 0315_SW103_20221103, 0315_SW149_20221103, 0315_SW127_20221103, 0315_SW108_20221103, 0315_SW106_20221103, 0315_SW118_20221103, 0315_QC101_20221103, 0315_QC104_20221103, 0315_QC502_20221103	0315_MW008_20221103, 0315_MW104_20221103, 0315_MW110_20221103, 0315_SW136_20221103, 0315_SW107_20221103, 0315_SW144_20221103, 0315_SW148_20221103, 0315_SW111_20221103, 0315_SW140_20221103, 0315_QC102_20221103, 0315_QC301_20221103,	**03-Nov-2022**	**16-Nov-2022**	02-May-2023	✓	**16-Nov-2022**	02-May-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW121_20221104, 0315_QC503_20221104	0315_QC302_20221104,	**04-Nov-2022**	**16-Nov-2022**	03-May-2023	✓	**16-Nov-2022**	03-May-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)								
0315_QC501_20221102		**02-Nov-2022**	**16-Nov-2022**	01-May-2023	✓	**16-Nov-2022**	01-May-2023	✓
HDPE (no PTFE) (EP231X)								
0315_MW109_20221103,	0315_MW008_20221103,	**03-Nov-2022**	**16-Nov-2022**	02-May-2023	✓	**16-Nov-2022**	02-May-2023	✓
0315_MW103_20221103,	0315_MW104_20221103,							
0315_MW107_20221103,	0315_MW110_20221103,							
0315_SW103_20221103,	0315_SW136_20221103,							
0315_SW149_20221103,	0315_SW107_20221103,							
0315_SW127_20221103,	0315_SW144_20221103,							
0315_SW108_20221103,	0315_SW148_20221103,							
0315_SW106_20221103,	0315_SW111_20221103,							
0315_SW118_20221103,	0315_SW140_20221103,							
0315_QC101_20221103,	0315_QC102_20221103,							
0315_QC104_20221103,	0315_QC301_20221103,							
0315_QC502_20221103								
HDPE (no PTFE) (EP231X)								
0315_SW121_20221104,	0315_QC302_20221104,	**04-Nov-2022**	**16-Nov-2022**	03-May-2023	✓	**16-Nov-2022**	03-May-2023	✓
0315_QC503_20221104								

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within he 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	14	**14.29**	**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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	34	**8.82**	**10.00**	✗	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
QuEChERS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES

Cardno

now

Stantec

Bore ID	Property	Easting	Northing	Monitoring Date	Bore Depth (m)	Top of casing (mAHD)	Top of Screen (mBTOC)	Bottom of Screen (mBTOC)	SWL (mbTOC)[1]	RL (mAHD)	Water Colour	Turbidity
MW008	On-site	524926.6	6114754.4	03/11/2022	12.56	-	-	-	5.84	-	Clear	Low
MW103	On-site	526845.6	6110958.8	03/11/2022	53.50	225.8	49	52	23.525	202.28	Clear	Low
MW104	On-site	526597.8	6111277.7	03/11/2022	54.44	231.87	38	53	34.310	197.56	Brown	High
MW107	On-site	526628.4	6111282.8	03/11/2022	14.4	230.54	12.5	15.5	11.645	-	Cloudy	Medium
MW109	On-site	525096.0	6114455.5	03/11/2022	35.27	193.62	24.4	33.4	22.454	171.17	Cloudy	Low
MW110	On-site	525327.6	6114785.0	03/11/2022	22.30	180.29	17.4	20.9	8.936	171.35	Clear	Low
MW601	Off-site	527164.1	6112666.0	03/11/2022	17.230	205.3	10	16	5.241	200.06	Cloudy	Moderate
MW624	Off-site	527138.1	6112814.3	03/11/2022	53.89	205.92	29	51	8.640	197.28	Clear	Low
MW625	Off-site	[redacted]	[redacted]	03/11/2022	22.17	174.572	15.5	21.5	6.226	168.35	Cloudy	Low

1. A consolidated gauging round was completed on 2 November 2022.
2. As measured from the top of the Hydrasleeve.

Bore ID	Property	Easting	Northing	Monitoring Date	Other Observations on Bore/Site	Hydrasleeve Deployment Depth (mBTOC)[2]	Duplicate Samples	Temp (C^0)	DO (mg/L)	EC (ms/Cm)	TDS (mg/L)	pH	Eh (mV)
MW008	On-site	524926.6	6114754.4	03/11/2022	Sampled using Low Flow	N/A	-	18.1	3.01	1.21	788	6.79	110.6
MW103	On-site	526845.6	6110958.8	03/11/2022	-	50.5	-	18.4	1.34	2.01	1308	6.36	-28.1
MW104	On-site	526597.8	6111277.7	03/11/2022	Grey-brown sediment in sleeve	45.6	-	18.0	2.58	-	-	6.22	191.5
MW107	On-site	526628.4	6111282.8	03/11/2022	-	14.5	-	17.1	0.79	1.72	1117	6.81	-20.3
MW109	On-site	525096.0	6114455.5	03/11/2022	-	28.2	0315_QC101_20221103 & 0315_QC201_20221103	19.9	0.52	1.14	740	6.72	14.0
MW110	On-site	525327.6	6114785.0	03/11/2022	Brown sediment in sleeve	17.1	Internal Lab QC Taken	19.7	2.16	2.14	1390	6.64	90.4
MW601	Off-site	527164.1	6112666.0	03/11/2022	-	12.1	-	20.0	2.51	0.65	419	6.9	118.4
MW624	Off-site	527138.1	6112814.3	03/11/2022	Slight organic odour	45.2	-	16.7	0.55	3.96	2572	6.79	-204.5
MW625	Off-site	524517.0	6114881.7	03/11/2022	-	17.7	-	18.6	2.9	1.51	982	6.34	4

1. A consolidated gauging round was completed on 2 November 202
2. As measured from the top of the Hydrasleeve.

Sample ID	Property	Easting	Northing	Monitoring Date	Sample Depth (m)	Water Body Depth	Flow Rate	Water Colour	Turbidity	Other Observations	Duplicate Samples	Temp (C^0)	DO (mg/L)	EC (ms/Cm)	TDS (mg/L)	pH	Eh (mV)
SW103	On-Base	526271.4	6110348.6	03/11/2022	0.1	0.2	Slow	Clear	Low	High water level	-	16.3	5.13	0.23	147.9	7.1	145.3
SW106	On-Base	526717.6	6109926.1	03/11/2022	0.1	0.15	Slow	Clear	Low	-	Internal Lab QC Taken	13.7	5.67	0.15	95.7	6.69	174.5
SW107	On-Base	526752.7	6110464.8	03/11/2022	0.1	0.2	Slow	Clear	Low	Higher water level	-	13.2	4.95	0.15	97.2	6.65	162.6
SW108	On-Base	526719.2	6110895.1	03/11/2022	0.1	5	Slow	Clear	Low	High water level	-	16.7	5.27	0.68	438.8	8.15	147.6
SW111	On-Base	526686.5	6111169.2	03/11/2022	0.2	5	Slow	Clear	Low	Stagnant organic matter on surface.	-	17.8	6.76	0.35	230.7	8.75	103.4
SW118	On-Base	526946.5	6110587.0	03/11/2022	0.1	0.5	Slow	Clear	Low	-	-	13.4	6.11	0.14	91.3	6.9	158.9
SW121	On-Base	527077.5	6111316.7	03/11/2022	0.1	0.5	Slow	Cloudy	Low	-	-	12	5.13	0.16	101.8	6.53	76.8
SW127	On-Base	524610.6	6108182.2	03/11/2022	0.2	1	Slow	Cloudy	Medium	High water level and suspended sediment	0315_QC101_20221103 & 0315_QC201_20221103	13.6	4	0.07	45.2	5.2	216.2
SW136	On-Base	526132.2	6110304.8	03/11/2022	0.1	0.3	Slow	Clear	Low	-	-	17.3	3.65	0.24	157.2	6.82	139
SW140	On-Base	526449.8	6109549.2	03/11/2022	0.2	2	Slow	Clear	Low	High water level	0315_QC102_20221103 & 0315_QC202_20221103	14.9	2.71	0.48	309.7	6.33	173.5
SW144	On-Base	526185.0	6110390.0	03/11/2022	0.1	0.1	Fast	Clear	Low	Slight sewage odour	Internal Lab QC Taken	16.8	2.54	0.84	543.4	8.14	16
SW148	On-Base	526404.5	6110931.5	03/11/2022	0.1	0.1	Fast	Brown	High	Strong sewage odour	-	18.4	0.94	0.84	546.7	7.75	62.9
SW149	On-Base	526455.0	6111012.0	03/11/2022	0.05	0.05	Slow	Cloudy	Medium	Minimal water in sewer	-	14.5	5.41	0.39	252.9	7.73	87.4
SW614	Off-Base	527151.5	6112749.5	04/11/2022	0.1	0.2	Medium	Clear	Low	-	-	11.9	5.75	0.11	73.5	6.75	28.4
SW677	Off-Base	526647.3	6114308.7	04/11/2022	0.1	0.2	Medium	Cloudy	Low	-	-	15	6.11	0.12	75.1	7.34	-33.2
SW680	Off-Base	[redacted]	[redacted]	04/11/2022	0.1	2	Slow	Cloudy	Low	-	-	15	5.13	0.12	80.8	7.48	-27.8

Location ID	Property	Easting	Northing	Monitoring Date	Observations	Duplicate Samples
SD103	On-base	526271.4	6110348.6	03/11/2022	Sandy gravelly clay, brown, wet, low plasticity, organic matter, gravels, no odour no staining, taken at 0.1m.	-
SD106	On-base	526717.6	6109926.1	03/11/2022	Silty clay, grey brown, wet, low to moderate plasticity, trace sand and rootlets, no odour no staining, taken at 0.1m.	Internal Lab QC Taken
SD107	On-base	526752.7	6110464.8	03/11/2022	Silty clay, grey brown, wet, low to moderate plasticity, organic matter, trace sand, no odour no staining, taken at 0.1m.	-
SD108	On-base	526719.2	6110895.1	04/11/2022	Silty clay with sand and gravels, brown to orange mottled grey, low to medium plasticity, wet, tree rootlets, no odour, no staining.	Internal Lab QC Taken
SD111	On-base	526686.5	6111169.2	03/11/2022	Silty clay, brown, wet, low to moderate plasticity, trace sand and gravel, no odour no staining, taken at 0.2m.	-
SD118	On-base	526946.5	6110587.0	03/11/2022	Silty clay, red brown, wet, low plasticity, organic matter, trace sand, no odour no staining, taken at 0.1m.	-
SD121	On-base	527077.5	6111316.7	04/11/2022	Silty clay, grey brown, wet, low to moderate plasticity, organic matter, trace sand, no odour no staining, taken at 0.1m.	-
SD127	On-base	524610.6	6108182.2	03/11/2022	Sandy clay, brown, wet, low to moderate plasticity, no odour no staining, trace rootlets taken at 0.2m.	0315_QC103_20221103 & 0315_QC203_20221103
SD136	On-base	526133.0	6110304.1	03/11/2022	Sandy silty clay, brown mottled with grey and orange, wet, low to moderate plasticity, minor organic matter, trace gravels, no odour no staining, taken at 0.1m.	0315_QC105_20221103 & 0315_QC205_20221103
SD614	Off-base	527151.5	6112749.5	04/11/2022	Silty clay, grey brown, wet, low to moderate plasticity, organic matter, trace gravels, no odour no staining, roots and rootlets taken at 0.1m.	-
SD677	Off-base	526647.3	6114308.7	04/11/2022	Silty clay, brown grey, wet, low to moderate plasticity, gravels, no odour no staining, roots and rootlets taken at 0.1m.	-

F3.04 – Groundwater Sampling Field Record

Site / Project: PFAS Investigation and Management Plan	Client: Department of Defence	Sampled By: MB
Job No: DEF19008	Bore ID: MW008	Date: 03/11/2022
Bore / Site Details		
Bore Condition: Good Is it Locked: Yes	If not locked, explanation?	Type of Protection Cap / Cover: Other Open wells behind locked gate
Bore Depth (bTOC): 12.56	Inner casing/ screen type & diameter:	Screen interval (bgl):
SWL (bTOC): 5.95	Pump Depth: 11.5	SWL Date/Time: 03/11/2022 2:33 PM
Other Observations on Bore/ Site:		
Bore Purge Data		
Purge method: Low Flow	Bore Volume (L):	Purge Date: 03/11/2022
Purge rate (L/min): 0.2	Total Purge volume (L):	LNAPL / PSH Thickness (mm):

Purge Field Physicochemical Measurements:

	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8	Reading 9	Reading 10	Reading 11	Reading 12
Start Time:	15:49	15:54	15:59	16:04	16:09	16:14	16:19	16:24				
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)	3.01	0.44	0.18	0.15								
EC (S/Cm) ±3%	1,212	1,223	1,204	1,211								
pH ±0.1	6.79	6.67	6.63	6.61								
Eh (mV) ±10mV	110.6	114.1	115.8	116.1								
Temp (ºC)	18.1	17.9	18	18.3								
SWL (m) after												
Cum. Volume (L)	2	4	6	8								
Water Colour	Clear	Clear	Clear	Clear								
Turbidity ±10%	Low	Low										
Other Observations / Notes	No odour	No odour										

Sample Container & Preservation Data									
Number of sample container: (Include QC samples)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Container Volume									
Container Type									
Filtration									
Preservation									
Number of sample container: (Include QC samples)	10	11	12	13	14	15	16		
Container Volume									
Container Type									
Filtration									
Preservation									
Sample Number (for Lab ID):									
QC Dup Sample No.:									

Bore Damage Images	Bore Images
	 Image Description:

31/10/22

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 11E101629

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
2. pH 7.00		pH 7.00		386467	pH 7.00
3. pH 4.00		pH 4.00		394432	pH 3.94
4. mV		238.46mV		390802/387761	237.8mV
5. EC		2.76mS		385041	2.76mS
6. Temp		20.7°C		MultiTherm	20.7°C
7. DO		0ppm		379624	0.01ppm

Calibrated by: [redacted]

Calibration date: 31/10/2022

Next calibration due: 30/11/2022

Instrument Quality Report
Interface Meter

engip

Enqip #:	18035
Company:	Stantec Australia Pty Ltd
Consultant:	[redacted]
PO #:	DEF19008
Certificate #:	26478

INSTRUMENT IDENTIFICATION

Instrument Type:	Solinst Interface Meter
Model Number:	122
Serial Number:	IM-1607

INSPECTION RECORD

Battery:	PASS	**Water Tone:**	PASS
Tape Condition:	PASS	**Hydrocarbon Tone:**	PASS

Tested By: [redacted]

Test Date: 31/10/2022

enqip
116 Thistlethwaite St, South Melbourne 3205
P 1300 218 987
E info@enqip.com.au | **W** www.enqip.com.au

Instrument Quality Report
Interface Meter

enqip

Enqip #: 18035
Company: Stantec Australia Pty Ltd
Consultant: [redacted]
PO #: DEF19008
Certificate #: 26479

INSTRUMENT IDENTIFICATION

Instrument Type: Solinst Interface Meter
Model Number: 122
Serial Number: 313058

INSPECTION RECORD

Battery:	PASS	**Water Tone:**	PASS
Tape Condition:	PASS	**Hydrocarbon Tone:**	PASS

Tested By: [redacted]

Test Date: 31/10/2022

Date of Bump Test	Job Number	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)
4/11	DEFR008	11E101629	100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 6.88 Y / N pH 9.22 Y / N EC: 2,760µS/cm Y / N	15.2	pH 4.00: 4.01 pH 6.88: 6.90 pH 9.22: 9.21 Temp: 15.0 EC: 2699	pH 4.00: (± pH 0.2) Y / N pH 6.88: (± pH 0.2) Y / N pH 9.22: (± pH 0.2) Y / N Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N		MB	[signature]
			100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 6.88 Y / N pH 9.22 Y / N EC: 2,760µS/cm Y / N		pH 4.00: pH 6.88: pH 9.22: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 6.88: (± pH 0.2) Y / N pH 9.22: (± pH 0.2) Y / N Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N			
			100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 6.88 Y / N pH 9.22 Y / N EC: 2,760µS/cm Y / N		pH 4.00: pH 6.88: pH 9.22: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 6.88: (± pH 0.2) Y / N pH 9.22: (± pH 0.2) Y / N Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N			
			100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 6.88 Y / N pH 9.22 Y / N EC: 2,760µS/cm Y / N		pH 4.00: pH 6.88: pH 9.22: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 6.88: (± pH 0.2) Y / N pH 9.22: (± pH 0.2) Y / N Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N			
			100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 6.88 Y / N pH 9.22 Y / N EC: 2,760µS/cm Y / N		pH 4.00: pH 6.88: pH 9.22: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 6.88: (± pH 0.2) Y / N pH 9.22: (± pH 0.2) Y / N Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N			
			100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 6.88 Y / N pH 9.22 Y / N EC: 2,760µS/cm Y / N		pH 4.00: pH 6.88: pH 9.22: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 6.88: (± pH 0.2) Y / N pH 9.22: (± pH 0.2) Y / N Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N			
			100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 6.88 Y / N pH 9.22 Y / N EC: 2,760µS/cm Y / N		pH 4.00: pH 6.88: pH 9.22: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 6.88: (± pH 0.2) Y / N pH 9.22: (± pH 0.2) Y / N Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N			
			100% Saturation? Y N	0% Calibration? Y N NA	pH 4.00 Y / N pH 6.88 Y / N pH 9.22 Y / N EC: 2,760µS/cm Y / N		pH 4.00: pH 6.88: pH 9.22: Temp: EC:	pH 4.00: (± pH 0.2) Y / N pH 6.88: (± pH 0.2) Y / N pH 9.22: (± pH 0.2) Y / N Temp: (± 2°C) Y / N EC: (± 150µS/cm) Y / N			

APPENDIX

E

DATA QUALITY REVIEW

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Data Quality Review
Blamey Barracks, Kapooka, NSW

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.

Cardno undertook a review of its QA/QC as part of the data validation exercise. The findings are summarised below.

QA/QC Aspects	Evidence and Evaluation
	QA Documentation
Sampling and Analysis Quality Plan and Data Quality Objectives	Cardno was engaged by Department of Defence (the client) to carry out the PFAS Ongoing Monitoring Plan (OMP) at Blamey Barracks Kapooka, Kapooka, NSW, 2661 (the site). The monitoring event was conducted from 2 November 2022 until 4 November 2022, and was in general accordance with the scope and limitations presented in Cardno's Sampling and Analysis Quality Plan (SAQP) of 25 October 2022 (Our Ref: OMP002.6.5_Kapooka_SAQP_Rev3). The assessment was carried out in general compliance with the following: ▪ 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. ▪ Department of Defence (2019), Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring. ▪ Department of Defence, Department of Energy, 2018, Quality System Manual Schedule B15. ▪ Department of Defence (2021), Defence Contamination Management Manual (DCMM), Annex L – Data Management, August 2018, Amended June 2021. ▪ NSW EPA (2002), The NSW State Groundwater Dependant Ecosystems Policy, April 2002. ▪ NSW EPA (2004), Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales, Publication 1669.2, March 2004 ▪ NSW EPA (2016), Designing Sampling Programs for Sites Potentially Contaminated by PFAS. ▪ NSW EPA (2014), Waste Classification Guidelines – Part 1: Classification of Waste, November 2014. ▪ EPA Victoria (2009), Industrial Waste Resources Guidelines, Sampling and Analysis of Waters, Wastewaters, Soils and Wastes, Publication 701. ▪ Heads of Environmental Protection Authority's Australia and New Zealand (HEPA) (2020), PFAS National Environmental Management Plan (NEMP) Version 2.0, January 2020.

<table>
<tr><th>QA/QC Aspects</th><th>Evidence and Evaluation</th></tr>
<tr><td></td><td>National Environment Protection Council (NEPC), 1999, National Environmental Protection (Assessment of Site Contamination) Measure (as amended 2013) (ASC NEPM).
National Health and Medical Research Council (NHMRC) (2019), Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water, August 2019.
USEPA (2006), Guidance for the Data Quality Objectives Process (EPA QA/G-4).
A quality control program was implemented during the investigation and the quality assurance procedures used have been reiterated in the report.
The investigation was carried out in accordance with the Safe Work method Statements (SWMS) and Health, Safety and Environmental Management Plan (HSEMP) for the site. Detailed work plans were also provided for each phase of investigation and are outlined in the SAQP.
The Data Quality Objectives were expressed in terms of the purpose of the assessment and the relevant assessment criteria.</td></tr>
<tr><td>Data Validation Report</td><td>This review constitutes a data validation review. This was supported by an Esdat generated “QAQC Checker” excel report, summarised in Tables B4 and B5, Appendix B.</td></tr>
<tr><td colspan="2" align="center">Data Representativeness</td></tr>
<tr><td>Holding Times</td><td>Groundwater, surface water and sediment sample analysis holding times were in conformance with EPA Publication IWRG701 2009 ’Sampling and Analysis of Waters, Wastewaters, Soils and Wastes.</td></tr>
<tr><td>Background Samples</td><td>No background samples were collected as part of this assessment.</td></tr>
<tr><td>Equipment Decontamination</td><td>The decontamination methodology conducted during this investigation is documented in the body of the report, and was in general conformance with the SAQP.
All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent (Liquinonx), then double rinsed with clean water before the sample collection.</td></tr>
<tr><td colspan="2" align="center">Data Precision and Accuracy</td></tr>
<tr><td>QC Testing –
Blind Replicates
(Primary Lab)</td><td> Groundwater Acceptance Criteria: RPD < 30%
Groundwater Samples Analysed: 9
Blind Replicate Samples Analysed: 1
Blind Replicate Analyte Pairs: 28 (excludes ‘analytes’ that are a summation of other analytes)
Number of Analyte Pairs Exceeding Criteria: 0
Percentage of Analyte Pairs Exceeding Criteria: 0%
There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B4, Appendix B.
 Surface water Acceptance Criteria: RPD < 30 %
Surface water Samples Analysed: 16
Blind Replicate Samples Analysed: 2
Blind Replicate Analyte Pairs: 56 (excludes ‘analytes’ that are a summation of other analytes)
Number of Analyte Pairs Exceeding Criteria: 0
Percentage of Analyte Pairs Exceeding Criteria: 0%
There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B4, Appendix B.
 Sediment </td></tr>
</table>

QA/QC Aspects	Evidence and Evaluation
	▪ Acceptance Criteria: RPD < 30 % ▪ Soil Samples Analysed: 11 ▪ Blind Replicate Samples Analysed: 2 ▪ Blind Replicate Analyte Pairs: 56 (excludes 'analytes' that are a summation of other analytes) ▪ Number of Analyte Pairs Exceeding Criteria: 1 ▪ Percentage of Analyte Pairs Exceeding Criteria: 1.8% The RPD exceedance observed for PFOS is considered to be minor and is due to low reported concentrations of analytes close to the LOR and the heterogeneous nature of the sediment. RPD results are presented in Table B5, Appendix B.
QC Testing – Field Splits (Secondary Lab)	***Groundwater*** ▪ Acceptance Criteria: RPD < 30% ▪ Groundwater Samples Analysed: 9 ▪ Blind Replicate Samples Analysed: 1 ▪ Blind Replicate Analyte Pairs: 28 (excludes 'analytes' that are a summation of other analytes) ▪ Number of Analyte Pairs Exceeding Criteria: 0 ▪ Percentage of Analyte Pairs Exceeding Criteria: 0% There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B4, Appendix B. ***Surface water*** ▪ Acceptance Criteria: RPD < 30 % ▪ Surface water Samples Analysed: 16 ▪ Blind Replicate Samples Analysed: 2 ▪ Blind Replicate Analyte Pairs: 56 (excludes 'analytes' that are a summation of other analytes) ▪ Number of Analyte Pairs Exceeding Criteria: 0 ▪ Percentage of Analyte Pairs Exceeding Criteria: 0% There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B4, Appendix B. ***Sediment*** ▪ Acceptance Criteria: RPD < 30 % ▪ Soil Samples Analysed: 11 ▪ Blind Replicate Samples Analysed: 2 ▪ Blind Replicate Analyte Pairs: 56 (excludes 'analytes' that are a summation of other analytes) ▪ Number of Analyte Pairs Exceeding Criteria: 0 ▪ Percentage of Analyte Pairs Exceeding Criteria: 0% There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B5, Appendix B.
Trip Blanks	Three (3) trip blanks were collected and laboratory tested for PFAS. All analytes were reported below the limit of reporting (LOR). Trip blank results are presented in Table B6, Appendix B.
Laboratory Internal QC	Evidence of the laboratories internal QC testing is present and complete. Both ALS (the primary laboratory) and Eurofins-mgt performed internal QC with adequate testing and mostly satisfactory results for matrix spikes, method blanks and laboratory duplicates.
Laboratory Method Detection Limit	Laboratory reports indicate the method detection limits were lower than the respective assessment criteria.
NATA endorsement of laboratory reports	Laboratory reports were stamped with the NATA endorsement stamp and signature. Laboratory reports are included in Appendix C of this report.

QA/QC Aspects	Evidence and Evaluation
Calibration of Field Equipment	All field equipment used was calibrated by the equipment supplier. Additionally, daily bump tests were performed of the water quality meter throughout the monitoring event. Certificates are included in Appendix D of this report.
Decontamination and Equipment Blanks	All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection. Two (2) rinsate blank samples were tested for PFAS, of which all reported PFAS concentrations below the laboratory LOR. Results are shown in Table B6, Appendix B.
Data Comparability	
Full Review of Data	Once all results have been received, Cardno undertook a full review of the data for any anomalies in consideration of historical data at each location (where available), such as first-time detections or new exceedances of adopted criteria being reported at locations which have not had detections or exceedances previously. Where potentially anomalous data is identified or suspected, further confirmatory measures were undertaken such as re-extraction and reanalysis of the sample by the laboratory and/or additional data quality review. The samples from the following monitoring locations were re-extracted and re-analysed by the laboratory: MW103, SW106, SW144, SW148, SW149 and SW677. All originally reported results were confirmed through re-extraction and re-analysis.
Standard Procedures	Fieldwork procedures are detailed in the report and followed the work methods outlined in the SAQP.
Qualified Personnel	Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.
Volatile Losses	Volatile losses are not applicable to PFAS.
Sample Integrity	Field Chain of Custody forms are included in Appendix C of this report and demonstrate sample integrity.
Data Completeness	
Completeness of Test Program	The scope of work undertaken was generally consistent with that set out in the SAQP. Variations to the SAQP are detailed in the Factual Report.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection process for surface water, groundwater or sediment and therefore, the data set used as the basis for the assessment is considered valid and complete.

APPENDIX

F

INFORMATION ABOUT ENVIRONMENTAL REPORTS

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About Site Environmental Assessment Reports

1. Introduction

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

2. What is an ESA?

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

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

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

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

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

3. The ESA Process

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

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

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

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

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

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

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

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

4. Environmental Assessment Report

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

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

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

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

5. Limitations of Environmental Assessment Report

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

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

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

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

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

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

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

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

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

Cardno now Stantec
19 August 2022

APPENDIX

D

E4 FACTUAL REPORT

Cardno

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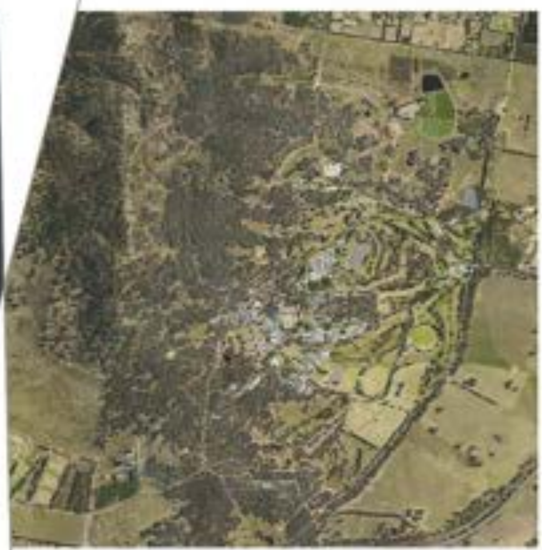
PFAS OMP Factual Report

Biannual Sampling Event April 2023

Blamey Barracks Kapooka

DEF19008



Prepared for
Department of Defence

27 June 2023

Cardno

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Document Information

Prepared for	Department of Defence
Project Name	PFAS OMP Factual Report
File Reference	OMP002_Kapooka_E4 FactualReport_Rev2.docx
Job Reference	DEF19008
Date	27 June 2023
Version Number	2
Effective Date	27/06/2023

Author(s):
[redacted]

Approved By:
[redacted]

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
00	16/05/2023	Internal Draft	[redacted]	
0	22/05/2023	External Draft		
1	20/06/2023	Revised Draft		
2	27/06/2023	Final		

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Appendices

Tables

List of Abbreviations and Units

Chemical Names

DO	Dissolved Oxygen
PFAS	Per- and Poly-fluoroalkyl Substances
PFHxS	Perfluorohexane sulfonate, or perfluorohexane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate, or perfluorooctane sulfonic acid
TDS	Total Dissolved Solids (salinity of water)

Technical Terms

AFFF	Aqueous Film-Forming Foam
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AS	Australian Standard
BGL	Below Ground Level
CoC	Chain of Custody
EC	Electrical Conductivity
EPA	Environment Protection Authority
HHERA	Human Health and Ecological Risk Assessment
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
ORP	Oxidation Reduction Potential
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan
SWL	Standing Water Level
WTP	Wastewater Treatment Plant

Units

Ha	Hectares
mAHD	Metres above Australian Height Datum
mBGL	Metres Below Ground Level
mbTOC	Metres below Top of Casing
mg/kg	Milligrams per Kilogram (approximately equivalent to ppm)
mg/L	Milligrams per Litre
mm	Millimetre
mV	Millivolt
ppm	Parts per Million
µg/L	Micrograms per Litre
µS/cm	Micro Siemens per Centimetre (Electrical Conductivity – Water)

Base Specific

OMP	Ongoing Monitoring Plan
ESdat	Environmental data management software

1 Introduction

1.1 Background

Cardno, now Stantec (Cardno) was engaged by the Department of Defence ("Defence") to carry out the Per- and Poly-Fluoroalkyl Substances (PFAS) Ongoing Monitoring Plan (OMP) at Blamey Barracks Kapooka ("the Base"). The location of the Base is displayed in Figure 1 of Appendix A.

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

> Cardno, 6 April 2023, Reference: DEF19008, *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP), Rev4*, Blamey Barracks Kapooka

For the purposes of this report:

> The "On-Base Management Area" is defined as a portion of the Base including the eastern built-up portion of the Base from the Former Quarry in the south to the Wastewater Treatment Plant (WTP) in the north. It extends as far west as the natural ridgeline that runs north-south through the middle of the Base and to the east to include the Kapooka Creek flow pathway (Figure 1, Appendix A);

> The "Off-Base Management Area" includes the Kapooka Creek flow pathway on public land and all private properties which have some portion of the flow pathway passing through them. This area stretches from the Base, north all the way to the Murrumbidgee River (Figure 1, Appendix A);

> The "Management Area" (MA) is comprised of the "On-Base Management Area" and the "Off-Base Management Area" (Figure 1, Appendix A).

> The "Monitoring Area" is defined as the Base and the surrounding Off-Base areas that collectively encompasses the network of OMP monitoring locations (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 in groundwater, surface water and sediment, 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 Aqueous Film Forming Foam (AFFF). The OMP will also provide confirmation of our current understanding of risk.

The purpose of this PFAS OMP factual report is to provide an up-to-date status of the condition of the Base 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 April 2023 sampling event and provision of analytical results with supporting tables and figures.

> To provide confirmation of the current understanding of risk.

> To provide supporting data for the assessment of management actions, where relevant.

1.3 Relevant Guidelines

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

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

> 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*.

> Department of Defence, (2019a), *Contamination Management Manual* (DCMM), August 2019.

> Department of Defence, (2019b), *Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring*.

> EPA NSW, (2002), *The NSW State Groundwater Dependant Ecosystems Policy*, April 2002.

> EPA NSW, (2004), *Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales*, Publication 1669.2, March 2004

> NSW EPA, (2016), Designing Sampling Programs for Sites Potentially Contaminated by PFAS.

> Heads of Environmental Protection Authority's Australia and New Zealand (HEPA), (2020), *PFAS National Environmental Management Plan (NEMP)*, Version 2.0, January 2020.

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

> National Health and Medical Research Council (NHMRC), (2019), *Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water*, August 2019.

> Standards Australia, (1998), *AS/NZ 5667:1998, Water quality – sampling*.

> 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)*.

2 Scope of Work

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

2.1 Review / Revision of the SAQP

Cardno undertook a review of the SAQP prior to commencement of sampling and completed updates to bring the SAQP in line with *the PFAS Ongoing Monitoring Program Sampling, Analysis and Quality Plan Guidance* (2023) document. The SAQP (Cardno, 2023) will be reviewed and revised (as required) prior to the next monitoring event scheduled for October 2023.

2.2 Groundwater Monitoring

Sampling of groundwater monitoring wells was performed in accordance with the SAQP, applying methods set out in Section 3.1 of this report. The groundwater monitoring wells monitored as part of the OMP biannual event are presented in Table 2-1, and are shown in Figure 2, Appendix A.

Table 2-1 Groundwater Monitoring Locations

Monitoring Area	Location ID	Total
Wastewater Treatment Plant	On-Base: MW103, MW104, MW107	3 Location IDs
Former Commandants House	On-Base: MW008, MW109, MW110 Off-Base: MW625	4 Location IDs
Kapooka Creek flow pathway	Off-Base: MW601, MW624	2 Location IDs

2.3 Surface Water Monitoring

Sampling of surface water locations was performed in general accordance with the SAQP, applying methods set out in Section 3.2 of this report. The surface water sampling locations monitored as part of the OMP are presented in Table 2-2, and are shown in Figure 2, Appendix A.

Table 2-2 Surface Water Monitoring Locations

Monitoring Area	Location ID	Total
Overland drainage pathways on-Base	On-Base: SW103, SW106, SW107, SW118, SW136	5 Location IDs
Kapooka Creek	On-Base: SW121 Off-Base: SW614, SW677, SW680	4 Location IDs
Sewer	On-Base: SW140, SW144, SW148, SW149	4 Location IDs
Wastewater treatment plant ponds	On-Base: SW108, SW111	2 Location IDs

Monitoring Area	Location ID	Total
Overland drainage pathways – Former Quarry	On-Base: SW127	1 Location ID

2.4 Sediment Monitoring

Sampling of sediment locations was performed in accordance with the SAQP, applying methods set out in Section 3.3 of this report. The sediment sampling locations monitored as part of the OMP are presented in Table 2-3, and are shown in Figure 2, Appendix A.

Table 2-3 Sediment Monitoring Locations

Monitoring Area	Location ID	Total
Overland drainage pathways on-Base	SD103, SD106, SD107, SD118, SD136	5 Location IDs
Kapooka Creek	On-Base: SD121 Off-Base: SD614, SD677	3 Location IDs
Wastewater treatment plant ponds	On-Base: SD108, SD111	2 Location IDs
Overland drainage pathways – Former Quarry	On-Base: SD127	1 Location ID

2.5 Data Management

All the data included in the report has been collected, uploaded to the ESdat database and reviewed according to the data management requirements of the DCMM Annex L (Defence, 2021b).

2.6 Deviations from the OMP SAQP

Deviations from the SAQP were attributed to a lack of sampling media, as summarised in Table 2-4. On-Base and off-Base sampling and testing was undertaken at nine groundwater monitoring wells, 15 surface water monitoring locations and 11 sediment monitoring locations.

Table 2-4 Deviations from the SAQP

Location	Deviation	Comment/Justification	Impact on Existing Dataset
		Surface Water	
SW677	Not Sampled	Location Dry	Potential data gap – historically, location is dry most of the times visited for sampling, with only one sample collected in November 2022. PFOS and Sum of PFHxS and PFOS results were reported above Limit of Reporting (LOR) but below criteria. This location is the most down-stream monitoring location along the Kapooka Creek pathway and thus closest to down-stream receptors. Consideration should be given on an alternative location to sample should this location be dry.

3 Methodology

3.1 Groundwater Sampling Methodology

Groundwater monitoring was undertaken as detailed in Table 3-1.

Table 3-1 Groundwater Sampling Method

Activity	Details
Dates of Field Activity	11 to 16 April 2023

Activity	Details
Well Gauging	Standing Water Levels (SWL) were gauged using an interface probe. All wells were measured against a specified mark at the top of the well casing.
Groundwater Field Parameters	Groundwater water quality parameter field measurements (field parameters) were recorded with a water quality meter after sample collection using extra sample water from within the HydraSleeve® decanted into a clean jar. With the exception of MW008, sampling was completed via HydraSleeve® technique. MW008 was sampled by low-flow micropurge as specified in the OMP (Jacobs, 2021b), which states that “MW008 is not suitable for sampling with HydraSleeve due to the approximate one-metre diameter of the well”. Groundwater field parameters were monitored and recorded during groundwater removal (purging), prior to collecting groundwater samples for laboratory analysis. The following field parameters were recorded using a water quality meter: ▪ pH. ▪ Electrical conductivity (EC). ▪ Oxidation reduction potential (ORP). ▪ Dissolved oxygen (DO). ▪ Temperature. Field parameters measured by the water quality meter were recorded on field data records. All field instruments (e.g. water quality meter) were calibrated to verify the accuracy of the measurements taken. Bump tests were also completed daily by field staff during the monitoring event. Calibration certificates and bump test records have been provided in Appendix D.
Deployment of HydraSleeve®	The HydraSleeves® were deployed with attached weights in order for sample collection to begin at the lowest point of the well screen. All existing HydraSleeves® were replaced during the initial gauging round on 12 April 2023. HydraSleeve® were left in wells for a minimum of 24 hours to allow restabilisation of the well following the slight disturbance caused by sampler deployment, before sampling.
Retrieval of HydraSleeves® (Sample Collection)	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 (to minimise changes in chemistry) via a discharge tube. All HydraSleeves® were replaced with new HydraSleeves® after sampling in preparation for the next sampling event.
Sample collection by low-flow Micropurge (MW008)	Groundwater sampling commenced once the water quality field parameters had stabilised, indicating that they represent natural groundwater in the aquifer. Samples were collected directly into appropriately preserved laboratory supplied bottles and packed in chilled containers for delivery to the laboratory under Chain of Custody (CoC) documentation. Disposable High-Density Polyethylene (HDPE) tubing was utilised for sampling and was taken off-Base for disposal following completion of sampling.
Decontamination procedure	New HydraSleeves® were used at each groundwater monitoring well, thus removing the need for decontamination. All re-usable sampling equipment and down-hole equipment (interface probe and low flow pump) were 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 was labelled with the sample location, date, project identification number and sampler’s initials. 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).

Activity	Details
Laboratory Testing	All groundwater samples were analysed for the full PFAS analytical suite (see SAQP for full list of analytes). The primary laboratory was ALS Global Laboratories (Springvale), and the secondary laboratory (quality control) was Eurofins (Dandenong South). 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 quality control samples were collected as follows and analysed for the full PFAS analytical suite: ▪ Field duplicate (intra-laboratory) samples at one per 10 water samples (one sample). ▪ Field triplicate (inter-laboratory) samples at one per 10 water samples (one sample). ▪ Rinsate blank samples at one per day [collected off re-used sampling/down-hole equipment] (five samples total). ▪ Trip blank samples of one per shipment included in the chilled sample containers upon transport to the laboratory (four samples total).

3.2 Surface Water Sampling Methodology

Surface water monitoring was undertaken using a grab method as detailed in Table 3-2.

Table 3-2 Surface Water Sampling Method

Item	Details
Dates of Field Activity	11 to 16 April 2023
Water Level Gauging	Water depths were measured where relevant with an interface probe, limiting water disturbance.
Field parameters	Surface water field parameters (i.e. pH, EC, ORP, DO, and temperature) were recorded at the time of sampling using a pre-calibrated water quality meter. Field observations such colour, odours, suspended solids, sheen presence, condition of the water body that was sampled from such as the type (lake, stream etc.) and channel width were also recorded on field sampling sheets.
Sampling Method	Where possible, the samples were collected directly into sample containers. The sample bottles were positioned at least 10 cm below the surface water level and above the sediment bed and orientated with the opening facing downwards to avoid the collection of surface films. Where access to surface water samples was difficult, the samples were collected by attaching the sample bottles to a long-handled sampling device (telescopic pole) which was directly filled by lowering the sample bottle into the surface water body. The sample bottles were attached so that the telescopic pole was not in direct contact with the opening of the sample bottle. Samples were collected in accordance with Australian/New Zealand Standards (AS/NZS 5667.1:1998) '*Water quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*'.
Decontamination	All re-usable sampling equipment (telescopic pole) were thoroughly washed using phosphate-free detergent (Liquinox), and subsequently double rinsed with clean water before the sample collection.
Sample identification, preservation, transport and holding times.	Each sample was labelled with the sample location, date, project identification number and sampler's initials. Sample labelling and naming was in accordance with Annex L of the DCMM (Defence, 2021b). Samples were contained in 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).

Item	Details
Laboratory Testing	All surface water samples were analysed for the full PFAS analytical suite (see SAQP for full list of analytes). The primary laboratory was ALS Global Laboratories (Springvale), and the secondary laboratory (quality control) was Eurofins (Dandenong South). 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	Surface water quality control samples were collected as follows and analysed for the full PFAS analytical suite: ▪ Field duplicate (intra-laboratory) samples at one per 10 water samples (two samples). ▪ Field triplicate (inter-laboratory) samples at one per 10 water samples (two samples). ▪ Rinsate blank samples at one per day [collected off re-used sampling equipment] (five samples total). ▪ Trip blank samples of one per shipment included in the chilled sample containers upon transport to the laboratory (four samples total).

3.3 Sediment Sampling Methodology

Sediment monitoring was undertaken as detailed in Table 3-3.

Table 3-3 Sediment Sampling Method

Item	Details
Dates of Field Activity	11 to 16 April 2023
Sample Collection	Sediment samples were collected from the approximate midpoint of the flow pathway and collected from the top ten centimetres after removal of the immediate surface material using the required hand tools (e.g. hand trowel, sediment corer or hand auger), with samples placed directly into appropriately labelled, laboratory supplied sample containers and packed in chilled containers for delivery to the laboratory under CoC documentation. Sediment samples were collected after the co-located surface water sample was collected to prevent agitating sediments into the water body and surface water sample matrix. At each sampling location, the sediment sample was visually assessed and observations (physical description including makeup, colour, visible signs of contamination and moisture) recorded on field data sheets.
Decontamination	All re-usable sampling equipment (hand trowel or sediment corer) were thoroughly washed using phosphate-free detergent (Liquinox), and subsequently double rinsed with clean water before the sample collection.
Sample identification, preservation, transport and holding times.	Each sample was labelled with the sample location, date, project identification number and sampler's initials. Sample labelling and naming was in accordance with Annex L of the DCMM (Defence, 2021b). Samples were contained in 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).
Laboratory Testing	All sediment samples were analysed for the full PFAS analytical suite (see SAQP for full list of analytes). The primary laboratory was ALS Global Laboratories (Springvale), and the secondary laboratory (quality control) was Eurofins (Dandenong South). Both laboratories are NATA-accredited for the parameters tested. Copies of the NATA stamped laboratory reports and CoC documentation are included in Appendix C.

Item	Details
Laboratory Testing – Quality Control	Sediment quality control samples were collected as follows and analysed for the full PFAS analytical suite: ▪ Field duplicate (intra-laboratory) samples at one per 10 sediment samples (two samples). ▪ Field triplicate (inter-laboratory) samples at one per 10 sediment samples (two samples). ▪ Rinsate blank samples at one per day [collected off re-used sampling equipment] (five samples total). ▪ Trip blank samples of one per shipment included in the chilled sample containers upon transport to the laboratory (four samples total).

3.4 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.

> Data Comparability.

> Data Set Completeness.

A detailed review of these aspects has been undertaken, the results of which are presented in Appendix E. A summary of the data validation from the QA/QC review is included in Section 4.5 below.

3.5 Assessment Criteria

3.5.1 Groundwater and Surface Water

The adopted assessment criteria for groundwater and surface water are detailed in Table 3-4. The assessment levels adopted for groundwater and surface water are based upon the PFAS screening criteria specified in the OMP (Jacobs, 2021c), which were adopted based on the guidance in the PFAS NEMP (HEPA, 2020).

Table 3-4 Criteria for Groundwater and Surface Water

Exposure Scenario	Adopted Assessment Criteria		Guidance
	PFHxS / PFOS	PFOA	
	µg/L		
Human Health - Drinking Water Quality Guideline[1]	0.07[2]	0.56	HEPA 2020
Human Health - Surface Water Recreational	2[2]	10	HEPA 2020
Ecological (95% species protection)	0.13[3]	220	HEPA 2020

1. Drinking Water screening guidelines have been adopted for screening purposes for Industrial Water use, Stock Water use and Agriculture/Parks/Gardens Water use.
2. Combined PFOS and PFHxS.
3. PFOS only. 95% species protection guideline values adopted for screening of results, in accordance with the OMP (Jacobs, 2021c).

3.5.2 Sediment

There are currently no Australian regulatory endorsed assessment levels for risk posed to ecology or human health by PFAS in sediment.

4 Field Observations and Results

4.1 Conditions Impacting the Sampling Event

In the seven days prior to the sampling event, 29.4 mm of rain was recorded at the nearest weather station (74272), located on the Kapooka Base. April 2023 rainfall was 65.8 mm, which is higher than the monthly April average between 2018 and 2022 of 39.6 mm.

No on-Base activities with the potential to impact sample collection or the results were noted.

4.2 Groundwater

4.2.1 Summary of Field Observations

4.2.1.1 Water quality parameter field measurements

Stabilised water quality field parameters, water colour and turbidity observations recorded during the groundwater sampling program are presented in field sampling record sheets, included in Appendix D. Water quality field parameters for ORP at MW103 saw an increase from -28.1 mV in November 2022 to 99.8 mV within this event. MW625 saw a decrease in ORP from 4 mV in November 2022 to -63.8 mV within this event. MW109 saw significant changes to water quality field parameters with an order of magnitude increase in DO from 0.52 mg/L to 7.39 mg/L, with TDS decreasing from 740 mg/L to 9.7 mg/L, and ORP increasing from 14.0 mV to 178.9 mV.

Water quality field parameters for all other locations were generally consistent with November 2022. Groundwater varied from clear to brown with low to high turbidity.

4.2.1.2 Groundwater Elevation and Flow Direction

Groundwater elevation during this sampling event ranged from 170.78 mAHD (MW625) to 202.73 mAHD (MW103), which is generally consistent with previous monitoring events

Regional groundwater flow is inferred to be in a north-westerly direction, towards the Murrumbidgee River, consistent with previous monitoring events.

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

4.2.2 Groundwater Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria, and are presented in Table B1, Appendix B, and summarised in Table 4-1 below. Of the nine primary samples that were tested, PFOA was reported above the LOR in one sample, and PFOS+PFHxS in three samples.

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 >LOR	No. Results Above Criteria	Significant Concentration Changes[3]
PFOS	MW601	0.13[2]	0.21	3	1	-
PFOA	NA	0.56[1]	0.01	1	0	-
PFOS+PFHxS	MW008, MW107, MW601	0.07[1]	0.57	3	3	-

1. Drinking water assessment criteria
2. Ecological assessment criteria
3. Significant concentration change defined as an order of magnitude increase or decrease

No first-time detections of PFOS, PFOS+PFHxS or PFOA or new exceedances of guideline values were reported. The laboratory reports are provided in Appendix C.

Results have also been compared against available historical data. No locations reported a significant change in concentration for this monitoring event.

4.3 Surface Water

4.3.1 Summary of Field Observations

4.3.1.1 Water quality parameter field measurements

Water quality field parameters, water colour and turbidity observations recorded during the surface water sampling program are presented in field sampling record sheets, included in Appendix D. Field observations indicated that sampled locations generally had lower water levels and slower flow rates compared with the previous monitoring event in November 2022, due to the November event occurring shortly after heavy rainfall and flooding. SW103, SW136, SW144 and SW148 saw significant decreases in ORP, while SW680 saw a significant increase. Surface water varied from clear to brown with generally low turbidity.

4.3.2 Laboratory Results

The results of laboratory analysis have been compared against adopted assessment criteria, presented in Table B2, Appendix B, and summarised in Table 4-2 below. Of the 15 primary samples that were tested, PFOA was not reported above the LOR, with PFOS+PFHxS reported above the LOR in 13 samples.

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

Analytes	Locations Exceeding Criteria	Lowest Criteria (µg/L)	Max Conc. (µg/L)	No. Analytical Results >LOR	No. Results Above Criteria	Significant Concentration Changes[3]
PFOS	SW103, SW121	0.13[2]	0.23[4]	12	2	SW148, SW149 (decrease)
PFOA	NA	0.56[1]	-	-	-	-
PFOS+PFHxS	SW103, SW107, SW121, SW680	0.07[1]	0.32[4]	13	5	SW148, SW149 (decrease)

1. Drinking water assessment criteria
2. Ecological assessment criteria
3. Significant concentration change defined as an order of magnitude increase or decrease
4. QC Result

Results have also been compared to available historical data. Two locations have reported a significant change in concentration for this monitoring event:

- SW148: PFOS+PFHxS has decreased by one order of magnitude from a previous result of 0.16 µg/L in November 2022 to 0.01 µg/L in this event. PFOS has also decreased by one order of magnitude from a previous result of 0.16 µg/L in November 2022 to 0.01 µg/L in this event.
- SW149: PFOS+PFHxS has decreased by one order of magnitude from a previous result of 0.16 µg/L in November 2022 to <0.01 µg/L in this event. PFOS has also decreased by one order of magnitude from a previous result of 0.16 µg/L in November 2022 to <0.01 µg/L in this event.

All other concentrations reported during this event were generally consistent with previous sampling events.

A summary of locations where a first-time detection of PFOS, PFOS+PFHxS or PFOA or a new exceedance of guideline values were reported, is provided in 0 below. The laboratory reports are provided in Appendix C.

Table 4-3 Summary of Surface Water Results with First-time Detections or New Exceedances

Deviation Type	Surface Water Location	PFOS+PFHxS concentration (µg/L)		PFOA concentration (µg/L)		PFOS concentration (µg/L)	
		April 2023	Previous Maximum	April 2023	Previous Maximum	April 2023	Previous Maximum
First-time detections	SW106	0.04	0.02	<0.01	<0.01	0.02	<0.01

Note:
Location with first-time detection of PFOS+PFHxS, PFOA or PFOS in latest monitoring round
Location with a new exceedance of lowest adopted guideline values in latest monitoring round
Bold: Exceedance of lowest adopted guideline values

Findings are summarised as follows:

> One surface water monitoring location (SW106) reported a first-time detection of PFOS.

4.3.3 Summary of Monitoring Network Condition and Repairs

During the field works, Cardno undertook minor repairs at SW144 by bending the gatic lift nail on the sewer pit cover into its original place using a hammer. No other changes to the monitoring network condition were noted.

4.4 Sediment

4.4.1 Summary of Field Observations

Odour, colour and other observations recorded during the sediment sampling program are presented in field sampling record sheets, included in Appendix D. Field observations were generally consistent with the previous monitoring event in November 2022.

4.4.2 Laboratory Results

National assessment criteria have not been established for PFAS in sediment. The results of laboratory analysis have been compared against historical results, presented in Table B3, Appendix B and summarised below:

> Of the 11 primary samples analysed, two samples reported PFOA concentrations above the LOR, and 10 samples reported PFOS+PFHxS concentrations above the LOR.

> No locations reported a significant change in concentration for this monitoring event.

> Two sediment sampling locations (SD103 and SD136) reported a first-time detection of PFOA. No other first-time detection of PFOS, Sum of PFHxS and PFOS or PFOA were reported.

4.5 Data Validation

The data validation process has concluded that there are no significant systematic errors in the data collection process. Therefore, the data set used as the basis for the surface water, groundwater and sediment assessment is considered valid and complete. A detailed Data Quality Review is included in Appendix E.

5 Summary and Conclusions

Cardno conducted the April 2023 biannual groundwater, surface water and sediment monitoring event at Blamey Barracks Kapooka as part of the PFAS OMP. On-Base and off-Base sampling and testing was undertaken at nine groundwater monitoring wells, 15 surface water locations and 11 sediment locations.

Groundwater levels were gauged in all accessible wells before sampling. Regional groundwater flow is inferred to be in a north-westerly direction, towards the Murrumbidgee River, consistent with the previous monitoring event.

Table 5-1 Summary of Results

Activity	Details
Deviations from OMP SAQP	> One surface water location (SW677) could not be sampled as the location was dry.
Groundwater Analytical Results	> Nine groundwater samples were collected in total. > No locations reported a first-time detection for PFOS, PFOS+PFHxS or PFOA. > No locations reported a new exceedance of the lowest adopted assessment criteria for PFOS, PFOA or PFOS+PFHxS. > No significant concentration changes were reported, and results were generally consistent with results reported in the previous event.
Surface Water Analytical Results	> 15 surface water samples were collected in total. > One surface water monitoring location (SW106) reported a first-time detection of PFOS. > No locations reported a first-time detection for PFOS+PFHxS or PFOA. > Two surface water monitoring locations (SW148 and SW149) reported an order of magnitude decrease in PFOS and PFOS+PFHxS results compared to the previous event. > All other results were generally consistent with results reported in the previous event.
Sediment Analytical Results	> 11 sediment samples were collected in total. > No sediment locations reported a first-time detection for PFOS or PFOS+PFHxS. > Two sediment locations (SD103 and SD136) reported a first-time detection for PFOA. > No significant concentration changes were reported, and results were generally consistent with results reported in the previous event.
Next Scheduled Monitoring Event	> The next OMP monitoring event is scheduled for October 2023. > SAQP to be reviewed and updated as required prior to the next monitoring event. > Consideration should be given by Defence, the PMAP Lead Consultant and the OMP Service Provider, on an alternative location to sample in the future should SW677 be dry. > No other actions which require completion prior to the next monitoring round have been identified.

6 References

General References

1. Australian and New Zealand Guidelines, (2018), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.
2. Department of Defence (2019b), *Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring*.
3. Department of Defence, Department of Energy, 2018, *Quality System Manual Schedule B15*.
4. Department of Defence (2021a) *Defence OMP Factual Report Preparation Guidance*, Revised May 2021.
5. Department of Defence (2021b), *Defence Contamination Management Manual (DCMM), Annex L – Data Management*, August 2018, Amended June 2021.
6. Directorate of PFAS Investigation and Remediation Infrastructure Division (2023), *PFAS Ongoing Monitoring Program Sampling, Analysis and Quality Plan Guidance*, Version 0.1, January 2023, Department of Defence.
7. National Environment Protection Council (2013), *National Environment Protection (Assessment of Site Contamination) Measure,* December 1999, Amended April 2013.
8. NSW EPA (2002), The NSW State Groundwater Dependant Ecosystems Policy, April 2002.
9. NSW EPA (2004), Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales, Publication 1669.2, March 2004.
10. NSW EPA (2016), Designing Sampling Programs for Sites Potentially Contaminated by PFAS.
11. NSW EPA (2014), Waste Classification Guidelines – Part 1: Classification of Waste, November 2014.
12. Environmental Protection Agency (United States EPA; 2002) EPA/240/R-02/004 *Guidance on Environmental Data Verification and Data Validation,* November 2002.
13. The Heads of EPAs Australia and New Zealand (HEPA; 2020) *PFAS National Environmental Management Plan (NEMP) Version 2.0*, January 2020.
14. National Environment Protection Council (NEPC; 1999 - amended 2013) *National Environmental Protection (Assessment of Site Contamination) Measure (as amended),* registered May 2013.
15. National Health and Medical Research Council (2011 – updated 2018) *National Water Quality Management Strategy Australian Drinking Water Guidelines*, 6 August 2018.
16. Nation Health and Medical Research Council (NHMRC; 2019) *Guidance on Per and Poly-fluoroalkyl Substances (PFAS) in Recreational Water,* August 2019.
17. 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*.
18. US EPA (2006) *Guidance for the Data Quality Objectives Process* (EPA QA/G-4), United States Environmental Protection Agency.
19. US EPA (2002) *Guidance on Environmental Data Verification and Data Validation,* Reference: EPA/240/R-02/004, United States Environmental Protection Agency, November 2002.

Base Specific References

20. Jacobs (2019) Blamey Barracks *Comprehensive PFAS Investigation. Detailed Site Investigation (DSI)*, September 2019.
21. Jacobs (2021a) Blamey Barracks *Comprehensive PFAS Investigation. Human Health and Ecological Risk Assessment (HHERA)*, 23 June 2021.
22. Jacobs (2021b) *Blamey Barracks Kapooka; PFAS Management Area Plan (PMAP)*, June 2021.
23. Jacobs (2021c) *PFAS Ongoing Monitoring Plan*, June 2021.
24. Cardno (2023) *PFAS Ongoing Monitoring Plan Sampling and Analysis Quality Plan (SAQP),* Rev4, Blamey Barracks Kapooka. Prepared for Department of Defence, 6 April 2023.

APPENDIX

A

FIGURES

Cardno

now

Stantec

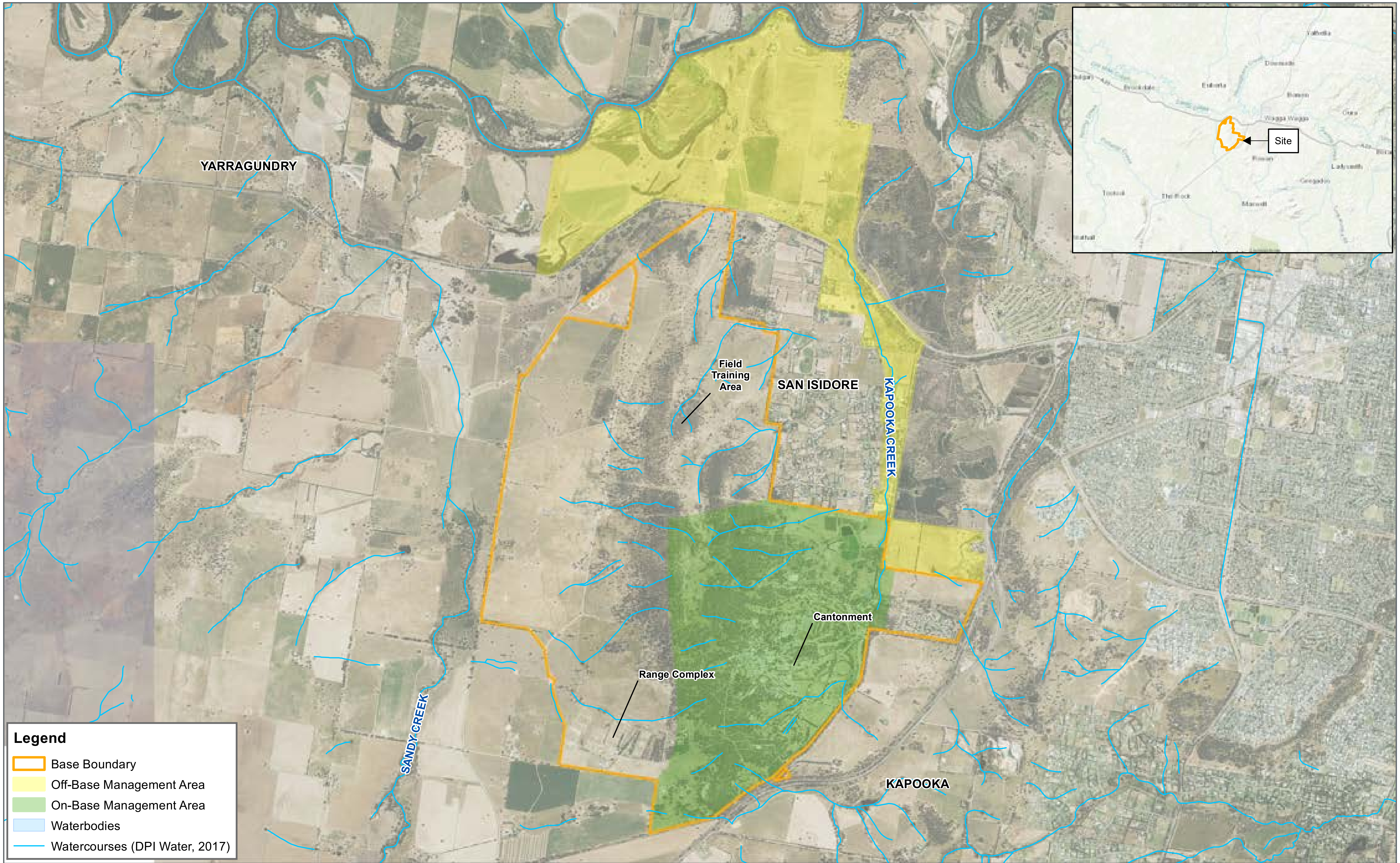

FIGURE 1

1:40,000 Scale at A3

Metres

0 1,000 2,000

Site Locality Plan & Management Areas

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-03-24 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0164-SiteLocalityPlan_K.mxd 02
Aerial Imagery Supplied by Metromap (February, 2022)

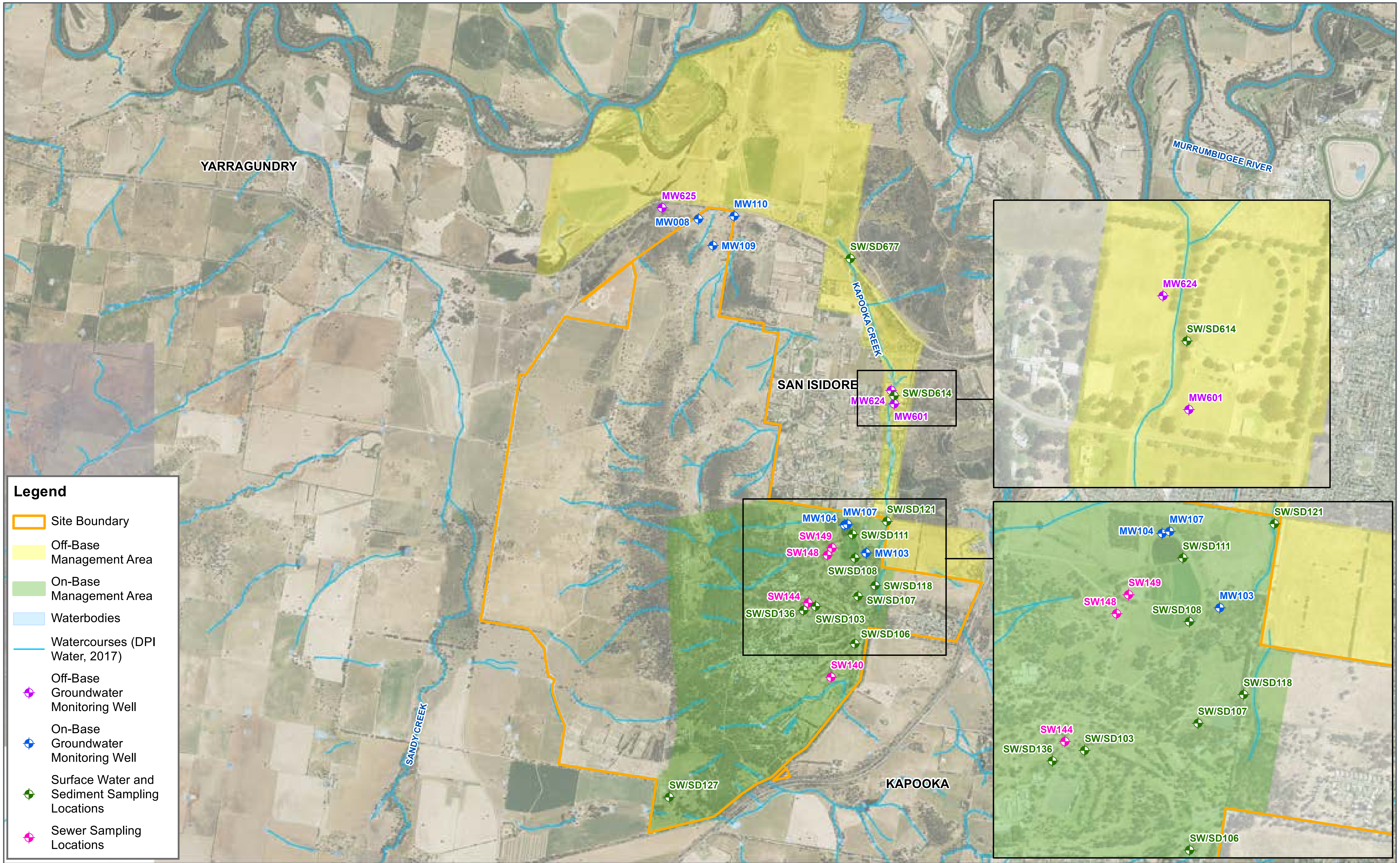

FIGURE 2

1:40,000 Scale at A3

Metres

0 1,000 2,000

Sampling Locations

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno – Stantec

Map Produced by Cardno now Stantec
Date: 2023-06-20 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0166-SampleLocationsN_K.mxd 02
Aerial Imagery Supplied by Metromap (February, 2022)

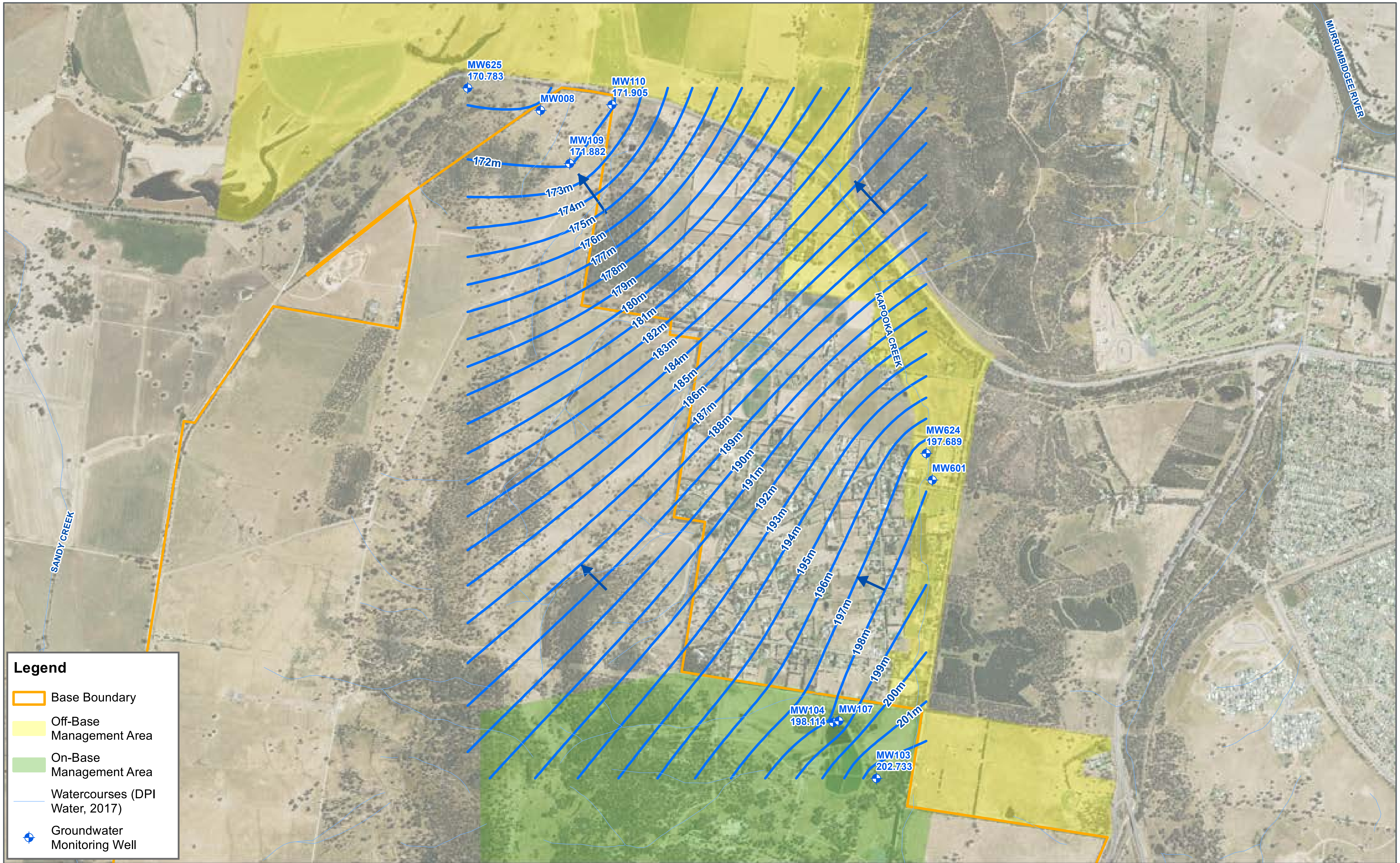

FIGURE 3

1:20,000 Scale at A3

Metres

0 500 1,000

Groundwater Elevation Contours (April, 2023)

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-06-20 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0335-GW_Contours_E4_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

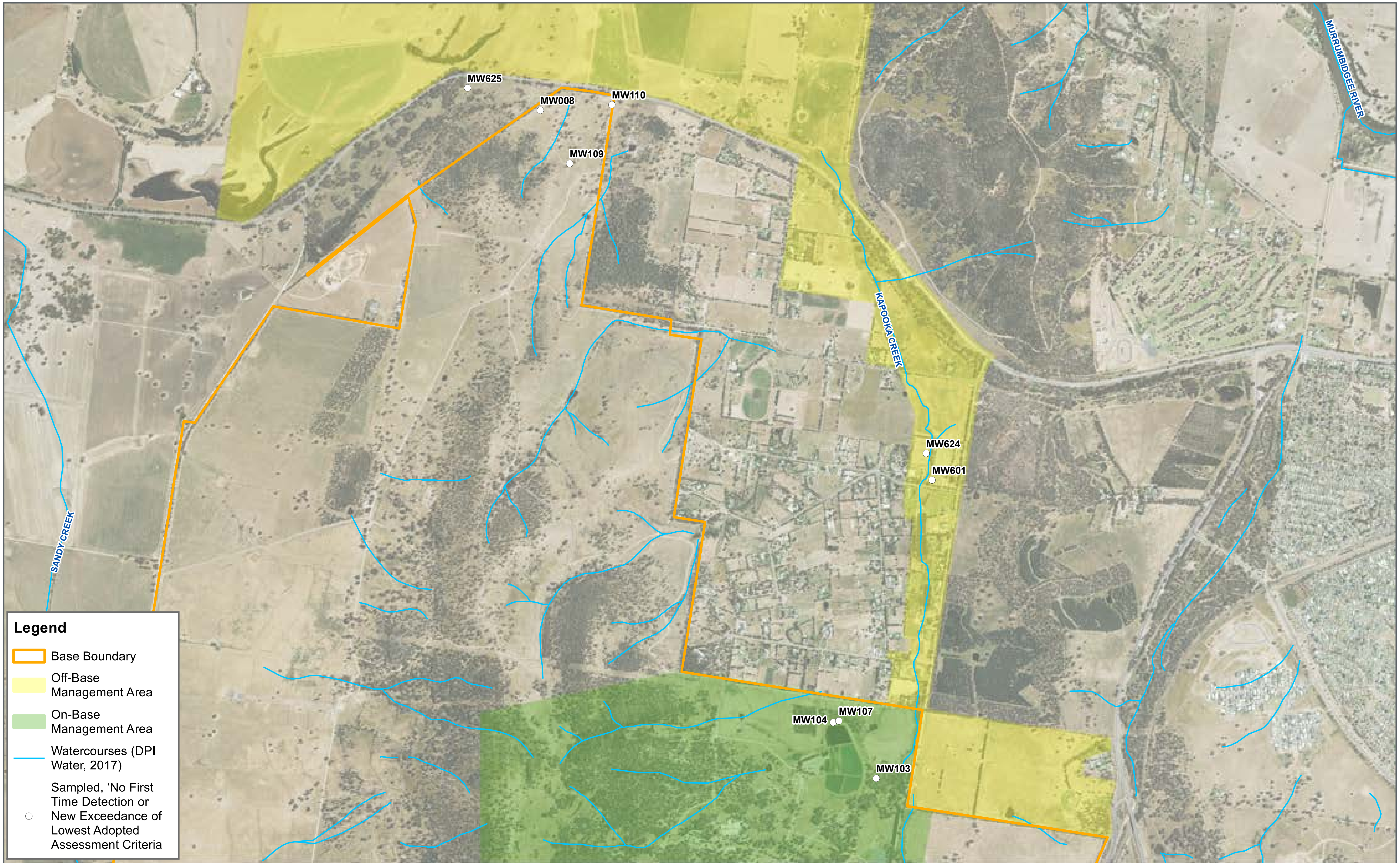

FIGURE 4

1:20,000 Scale at A3

Metres

0 500 1,000

PFAS Results Summary - Goundwater (April, 2023)

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-06-20 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0336-GW_PFAS_Summary_E4_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

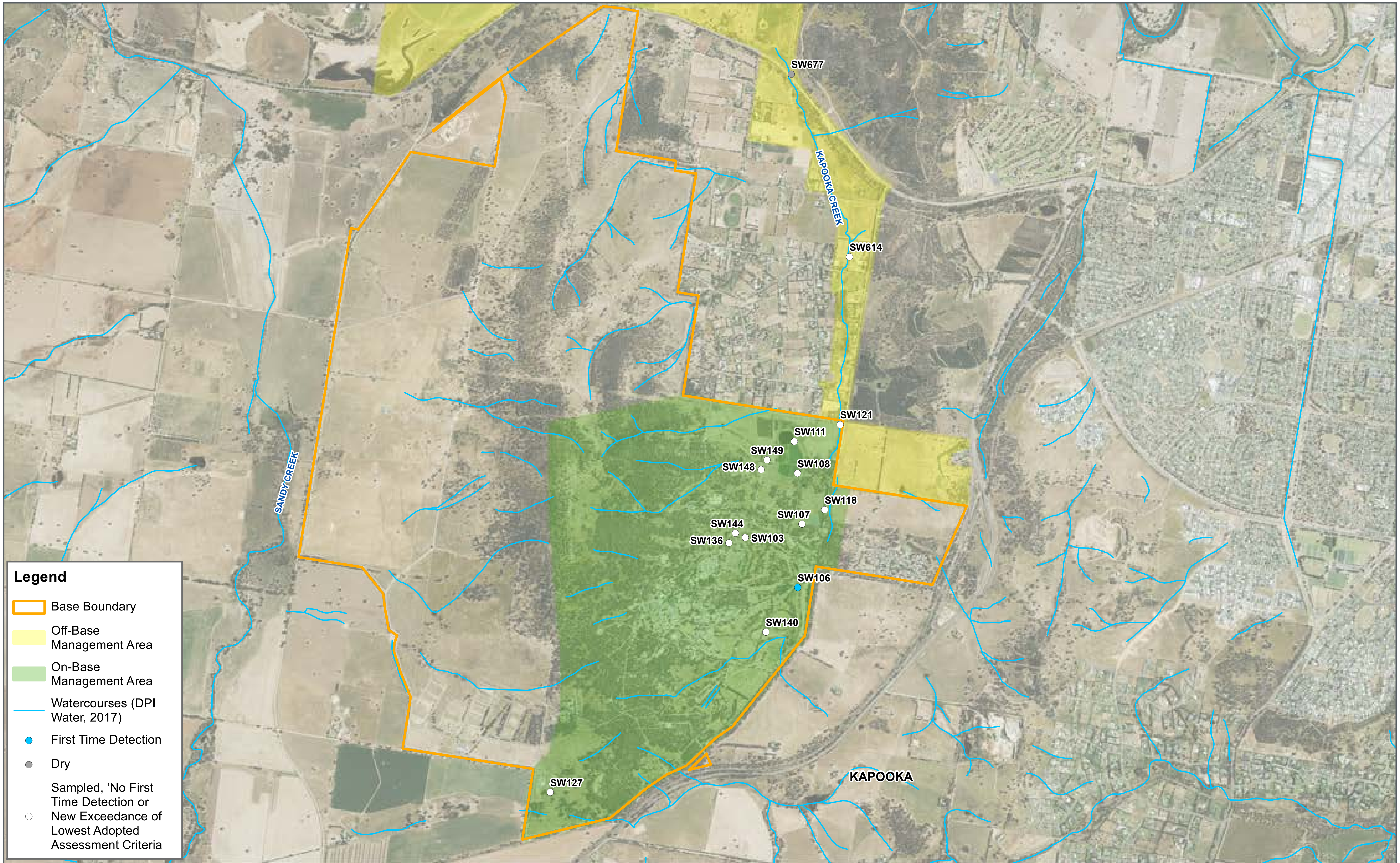

FIGURE 5

1:30,000 Scale at A3

Metres 0 500 1,000

PFAS Results Summary - Surface water (April, 2023)

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-06-20 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0337-SW_PFAS_Summary_E4_K.mxd 01
Aerial Imagery Supplied by Metromap (February 2022)

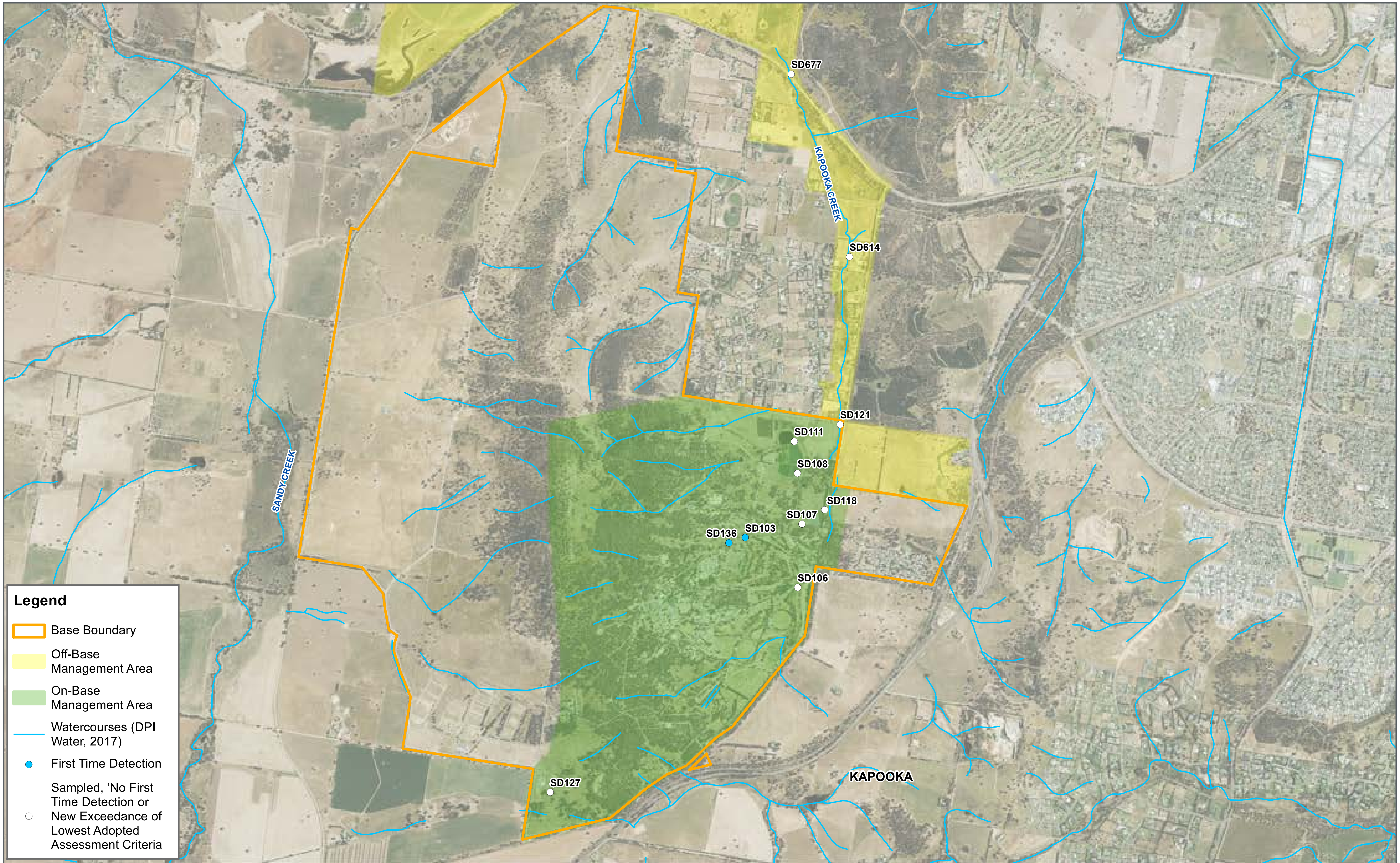

FIGURE 6

1:30,000 Scale at A3

Metres 0 500 1,000

PFAS Results Summary - Sediment (April, 2023)

BIANNUAL SAMPLING EVENT
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno now Stantec

Map Produced by Cardno now Stantec
Date: 2023-06-20 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0338-SED_PFAS_Summary_E4_K.mxd 01
Aerial Imagery Supplied by Metromap (February, 2022)

APPENDIX

B

DATA ASSESSMENT TABLES

						Perfluorocarbons															
						Perfluorooctane sulfonic acid (PFOS)	**Perfluorooctanoate (PFOA)**	**Sum of PFHxS and PFOS**	**Perfluorobutane sulfonic acid (PFBS)**	**Perfluoropentane sulfonic acid (PFPeS)**	**Perfluorohexane sulfonic acid (PFHxS)**	**Perfluoroheptane sulfonic acid (PFHpS)**	**Perfluorodecanesulfonic acid (PFDS)**	**Perfluorobutanoic acid (PFBA)**	**Perfluoropentanoic acid (PFPeA)**	**Perfluorohexanoic acid (PFHxA)**	**Perfluoroheptanoic acid (PFHpA)**	**Perfluorononanoic acid (PFNA)**	**Perfluorodecanoic acid (PFDA)**	**Perfluoroundecanoic acid (PFUnDA)**	**Perfluorododecanoic acid (PFDoDA)**
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
					LOR	0.0003	0.0005	0.0003	0.0005	0.0005	0.0005	0.0005	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
PFAS NEMP 2.0 Table 1 Health Drinking Water							**0.56**	**0.07**													
PFAS NEMP 2.0 Table 1 Health Recreational Water							*10*	*2*													
PFAS NEMP 2.0 Table 5 Freshwater 95%						0.13	220														
Location Code	**Monitoring Zone**	**Sampled Date**	**Field ID**	**Sample Type**	**Lab Report No.**																
MW008	On-Base	16/03/2017	0315_MW008_170316	Normal	ES1706394	0.0252	<0.0005	**0.111**	0.0145	0.0088	0.0855	0.0034	<0.0005	0.023	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
		18/12/2018	0315_QC202_181218	Interlab_D	635075	0.09	<0.01	**0.23**	0.01	0.01	0.14	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		18/12/2018	0315_MW008_S_181218	Normal	ES1838696	0.04	<0.01	**0.14**	<0.02	<0.02	0.1	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC102_181218	Field_D	ES1838696	0.04	<0.01	**0.14**	<0.02	<0.02	0.1	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC104_181218	Field_D	ES1838696	0.04	<0.01	**0.15**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		9/03/2020	0315_QC201_200309	Interlab_D	239048	0.05	<0.01	**0.18**	0.01	<0.01	0.13	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05
		9/03/2020	0315_MW008_S_200309	Normal	ES2008982	0.06	<0.01	**0.23**	<0.02	<0.02	0.17	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC101_200309	Field_D	ES2008982	0.06	<0.01	**0.23**	<0.02	<0.02	0.17	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		28/10/2021	0315_MW008_20211028	Normal	ES2139229	0.03	<0.01	**0.11**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		28/04/2022	0315_MW008_20220428	Normal	EM2208205	0.02	<0.01	**0.1**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		3/11/2022	0315_MW008_20221103	Normal	EM2222407	0.04	<0.01	**0.13**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		12/04/2023	0315_MW008_20230412	Normal	EM2306946	0.02	<0.01	**0.11**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW103		20/02/2019	0315_MW103_S_190220	Normal	ES1905450	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		28/10/2021	0315_MW103_20211028	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		29/04/2022	0315_MW103_20220429	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		3/11/2022	0315_MW103_20221103	Normal	EM2222407	<0.01	0.02	0.06	<0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
		13/04/2023	0315_MW103_20230413	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC105_20230413	Field_D	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC205_20230413	Interlab_D	982794	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW104		20/02/2019	0315_MW104_S_190220	Normal	ES1905450	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		28/10/2021	0315_MW104_20211028	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		28/04/2022	0315_MW104_20220428	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		3/11/2022	0315_MW104_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		15/04/2023	0315_MW104_20230415	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW107		30/01/2019	0315_MW107_P_190130	Normal	ES1902996	<0.01	<0.01	**0.1**	<0.02	<0.02	0.1	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		7/03/2019	0315_MW107_P_190307	Normal	ES1907492	0.02	<0.01	0.07	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		29/04/2022	0315_MW107_20220429	Normal	EM2208205	0.02	0.02	**0.14**	0.02	0.02	0.12	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		3/11/2022	0315_MW107_20221103	Normal	EM2222407	0.01	<0.01	**0.09**	0.03	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		13/04/2023	0315_MW107_20230413	Normal	EM2306946	0.01	0.01	**0.09**	0.03	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorocarbons															
						Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
					LOR	0.0003	0.0005	0.0003	0.0005	0.0005	0.0005	0.0005	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
PFAS NEMP 2.0 Table 1 Health Drinking Water							**0.56**	**0.07**													
PFAS NEMP 2.0 Table 1 Health Recreational Water							*10*	*2*													
PFAS NEMP 2.0 Table 5 Freshwater 95%						0.13	220														
MW109	On-Base	10/03/2020	0315_MW109_S_200310	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		27/10/2021	0315_QC205_20211027	Interlab_D	837707	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		27/10/2021	0315_MW109_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC105_20211027	Field_D	ES2139230	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		27/04/2022	0315_MW109_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC101_20220427	Field_D	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC201_20220427	Interlab_D	889626	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		3/11/2022	0315_QC204_20221103	Interlab_D	940511	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
		3/11/2022	0315_MW109_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
			0315_QC104_20221103	Field_D	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		13/04/2023	0315_MW109_20230413	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW110		10/03/2020	0315_MW110_S_200310	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		28/10/2021	0315_MW110_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		27/04/2022	0315_MW110_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		3/11/2022	0315_MW110_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		13/04/2023	0315_MW110_20230413	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW601	Off-Base	29/01/2019	0315_QC201_190129	Interlab_D	638493	0.01	<0.01	**0.1**	0.01	0.01	0.09	<0.01	<0.01	<0.05	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01
		29/01/2019	0315_MW601_S_190129	Normal	ES1902996	0.01	<0.01	**0.15**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02
			0315_QC101_190129	Field_D	ES1902996	0.01	<0.01	**0.15**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		18/02/2019	0315_MW601_S_190218	Normal	ES1905450	0.02	<0.01	**0.25**	<0.02	<0.02	0.23	<0.02	<0.02	<0.1	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		12/03/2020	0315_MW601_P_200312	Normal	ES2008982	0.16	0.01	**0.89**	0.06	0.08	0.73	0.03	<0.02	<0.1	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
		27/10/2021	0315_MW601_20211027	Normal	ES2139235	0.17	<0.01	**0.59**	0.03	0.03	0.42	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
		28/04/2022	0315_MW601_20220428	Normal	EM2208229	0.2	0.01	**0.65**	0.03	0.04	0.45	0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
		4/11/2022	0315_MW601_20221104	Normal	EM2222368	0.34	<0.01	**0.77**	0.04	0.03	0.43	0.03	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		13/04/2023	0315_MW601__20230413	Normal	EM2306926	0.21	<0.01	**0.57**	0.02	0.04	0.36	0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
MW624		11/03/2020	0315_MW624_S_200311	Normal	ES2008982	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		27/10/2021	0315_MW624_20211027	Normal	ES2139235	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		20/12/2021	MW624	Normal	EM2125953	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		28/04/2022	0315_MW624_20220428	Normal	EM2208229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		4/11/2022	0315_MW624_20221104	Normal	EM2222368	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		13/04/2023	0315_MW624_20230413	Normal	EM2306926	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MW625		21/05/2020	0315_MW625_S_200521	Normal	ES2017986	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		26/10/2021	0315_MW625_20211026	Normal	ES2139232	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		27/04/2022	0315_MW625_20220427	Normal	EM2208223	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		3/11/2022	0315_MW625_20221103	Normal	EM2222366	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
		13/04/2023	0315_MW625__20230413	Normal	EM2306925	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorocarbons																
						Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
						µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/kg	mg/L
					LOR	0.0005	0.0005	0.0005	0.001	0.000001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0003	0.00001	0.00001
PFAS NEMP 2.0 Table 1 Health Drinking Water																					
PFAS NEMP 2.0 Table 1 Health Recreational Water																					
PFAS NEMP 2.0 Table 5 Freshwater 95%																					
MW008	On-Base	16/03/2017	0315_MW008_170316	Normal	ES1706394	<0.0005	<0.0005	<0.0005	<0.001	<0.000001	<0.001	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	0.16	-	-
		18/12/2018	0315_QC202_181218	Interlab_D	635075	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.25	-	0.00023
		18/12/2018	0315_MW008_S_181218	Normal	ES1838696	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.14	-	-
			0315_QC102_181218	Field_D	ES1838696	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.14	-	-
			0315_QC104_181218	Field_D	ES1838696	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.15	-	-
		9/03/2020	0315_QC201_200309	Interlab_D	239048	<0.1	<0.5	<0.1	<0.05	<0.00005	<0.1	<0.5	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	0.19	0.00005	-
		9/03/2020	0315_MW008_S_200309	Normal	ES2008982	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23	-	-
			0315_QC101_200309	Field_D	ES2008982	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23	-	-
		28/10/2021	0315_MW008_20211028	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11	-	-
		28/04/2022	0315_MW008_20220428	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.1	-	-
		3/11/2022	0315_MW008_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13	-	-
		12/04/2023	0315_MW008_20230412	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11	-	-
MW103		20/02/2019	0315_MW103_S_190220	Normal	ES1905450	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		28/10/2021	0315_MW103_20211028	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		29/04/2022	0315_MW103_20220429	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		3/11/2022	0315_MW103_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.11	-	-
		13/04/2023	0315_MW103_20230413	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
			0315_QC105_20230413	Field_D	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
			0315_QC205_20230413	Interlab_D	982794	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	-	<0.00001
MW104		20/02/2019	0315_MW104_S_190220	Normal	ES1905450	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		28/10/2021	0315_MW104_20211028	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		28/04/2022	0315_MW104_20220428	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.18	<0.05	<0.05	0.18	-	-
		3/11/2022	0315_MW104_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		15/04/2023	0315_MW104_20230415	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
MW107		30/01/2019	0315_MW107_P_190130	Normal	ES1902996	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.1	-	-
		7/03/2019	0315_MW107_P_190307	Normal	ES1907492	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-	-
		29/04/2022	0315_MW107_20220429	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.07	<0.05	<0.05	0.27	-	-
		3/11/2022	0315_MW107_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.12	-	-
		13/04/2023	0315_MW107_20230413	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13	-	-

Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
						Perfluorocarbons															
						µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/kg	mg/L
					LOR	0.0005	0.0005	0.0005	0.001	0.000001	0.001	0.001	0.0005	0.0005	0.001	0.001	0.001	0.001	0.0003	0.00001	0.00001
PFAS NEMP 2.0 Table 1 Health Drinking Water																					
PFAS NEMP 2.0 Table 1 Health Recreational Water																					
PFAS NEMP 2.0 Table 5 Freshwater 95%																					
MW109	On-Base	10/03/2020	0315_MW109_S_200310	Normal	ES2008982	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		27/10/2021	0315_QC205_20211027	Interlab_D	837707	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	-	<0.00001
		27/10/2021	0315_MW109_20211027	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
			0315_QC105_20211027	Field_D	ES2139230	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		27/04/2022	0315_MW109_20220427	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
			0315_QC101_20220427	Field_D	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
			0315_QC201_20220427	Interlab_D	889626	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	-	<0.00001
		3/11/2022	0315_QC204_20221103	Interlab_D	940511	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	-	<0.00001
		3/11/2022	0315_MW109_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
			0315_QC104_20221103	Field_D	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		13/04/2023	0315_MW109_20230413	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
MW110		10/03/2020	0315_MW110_S_200310	Normal	ES2008982	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		28/10/2021	0315_MW110_20211027	Normal	ES2139229	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		27/04/2022	0315_MW110_20220427	Normal	EM2208205	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		3/11/2022	0315_MW110_20221103	Normal	EM2222407	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		13/04/2023	0315_MW110_20230413	Normal	EM2306946	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
MW601	Off-Base	29/01/2019	0315_QC201_190129	Interlab_D	638493	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.14	-	0.0001
		29/01/2019	0315_MW601_S_190129	Normal	ES1902996	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.18	-	-
			0315_QC101_190129	Field_D	ES1902996	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.15	-	-
		18/02/2019	0315_MW601_S_190218	Normal	ES1905450	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.29	-	-
		12/03/2020	0315_MW601_P_200312	Normal	ES2008982	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.11	-	-
		27/10/2021	0315_MW601_20211027	Normal	ES2139235	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.68	-	-
		28/04/2022	0315_MW601_20220428	Normal	EM2208229	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.78	-	-
		4/11/2022	0315_MW601_20221104	Normal	EM2222368	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.89	-	-
		13/04/2023	0315_MW601__20230413	Normal	EM2306926	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.68	-	-
MW624		11/03/2020	0315_MW624_S_200311	Normal	ES2008982	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		27/10/2021	0315_MW624_20211027	Normal	ES2139235	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.05	<0.05	<0.05	0.05	-	-
		20/12/2021	MW624	Normal	EM2125953	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		28/04/2022	0315_MW624_20220428	Normal	EM2208229	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		4/11/2022	0315_MW624_20221104	Normal	EM2222368	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		13/04/2023	0315_MW624_20230413	Normal	EM2306926	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.23	<0.05	<0.05	0.23	-	-
MW625		21/05/2020	0315_MW625_S_200521	Normal	ES2017986	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		26/10/2021	0315_MW625_20211026	Normal	ES2139232	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		27/04/2022	0315_MW625_20220427	Normal	EM2208223	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		3/11/2022	0315_MW625_20221103	Normal	EM2222366	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-
		13/04/2023	0315_MW625__20230413	Normal	EM2306925	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-	-

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

Table B2: Surface Water Analytical Results

						Perfluorocarbons																														
Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPe	Perfluorohexane sulfonic acid (PFHxS	Perfluoroheptane sulfonic acid (PFHp	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamid	2-(N-methylperfluoro-1-octane sulfon	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamido	N-Methyl perfluorooctane sulfonamid	N-Ethyl perfluorooctane sulfonamido	4:2 Fluorotelomer sulfonic acid (4:2 F	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2	Sum of PFAS	Sum of enHealth PFAS (PFHxS + PFO
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L
					LOR	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.05	0.00005	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.05	0.01	0.00001
PFAS NEMP 2.0 Table 1 Health Drinking Water							**0.56**	**0.07**																												
PFAS NEMP 2.0 Table 1 Health Recreational Water							*10*	*2*																												
PFAS NEMP 2.0 Table 5 Freshwater 95%						0.13	220																													
SW103	On-Base	10/12/2018	0315_SW103_181210	Normal	ES1837611	0.67	0.05	**1.31**	0.1	0.06	0.64	0.02	<0.02	<0.1	0.13	0.18	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.89	-
		26/10/2021	0315_QC203_20211026	Interlab_D	837707	1	0.03	**1.31**	0.02	0.02	0.31	0.02	<0.01	<0.05	0.06	0.07	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	1.55	0.00134
		26/10/2021	0315_QC103_20211026	Field_D	ES2139230	0.74	0.03	**0.99**	0.02	<0.02	0.25	<0.02	<0.02	<0.1	0.06	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	1.17	-
			0315_SW103_20211026	Normal	ES2139229	0.6	0.02	**0.82**	<0.02	<0.02	0.22	<0.02	<0.02	<0.1	0.06	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.96	-
		28/04/2022	0315_SW103_20220428	Normal	EM2208205	0.19	<0.01	**0.28**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.28	-
		3/11/2022	0315_SW103_20221103	Normal	EM2222407	0.22	0.02	**0.36**	<0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.41	-
		12/04/2023	0315_QC104_20230412	Field_D	EM2306946	0.16	<0.01	**0.24**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.24	-
			0315_QC204_20230412	Interlab_D	982794	0.23	<0.01	**0.32**	<0.01	<0.01	0.09	<0.01	<0.01	<0.05	0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.36	0.00032
			0315_SW103_20230412	Normal	EM2306946	0.16	<0.01	**0.24**	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.24	-
SW106		16/12/2018	0315_SW106_181216	Normal	ES1838218	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		3/11/2022	0315_SW106_20221103	Normal	EM2222407	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02	-
		12/04/2023	0315_SW106_20230412	Normal	EM2306946	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04	-
SW107		10/12/2018	0315_SW107_181210	Normal	ES1837611	0.43	0.03	**0.65**	0.02	<0.02	0.22	<0.02	<0.02	<0.1	0.03	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.77	-
		26/10/2021	0315_SW107_20211026	Normal	ES2139229	0.18	0.01	**0.25**	<0.02	<0.02	0.07	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.26	-
		2/05/2022	0315_SW107_20220502	Normal	EM2208205	0.15	<0.01	**0.2**	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.2	-
		3/11/2022	0315_SW107_20221103	Normal	EM2222407	0.14	<0.01	**0.25**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.25	-
		12/04/2023	0315_SW107_20230412	Normal	EM2306946	0.13	<0.01	**0.2**	<0.02	<0.02	0.07	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.17	<0.05	<0.05	0.37	-
SW108		15/12/2018	0315_SW108_181215	Normal	ES1838218	0.02	0.02	0.06	0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.1	-
		26/10/2021	0315_SW108_20211026	Normal	ES2139229	0.01	<0.01	0.02	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02	-
		2/05/2022	0315_SW108_20220502	Normal	EM2208205	0.02	0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05	-
		3/11/2022	0315_SW108_20221103	Normal	EM2222407	0.01	<0.01	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03	-
		13/04/2023	0315_SW108_20230413	Normal	EM2306946	0.01	<0.01	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05	-
SW111		15/12/2018	0315_SW111_181215	Normal	ES1838218	0.03	0.02	**0.11**	0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.18	-
		26/10/2021	0315_SW111_20211026	Normal	ES2139229	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04	-
		27/04/2022	0315_SW111_20220427	Normal	EM2208205	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04	-
		3/11/2022	0315_SW111_20221103	Normal	EM2222407	0.02	<0.01	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04	-
		13/04/2023	0315_SW111_20230413	Normal	EM2306946	0.01	<0.01	0.04	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.04	-
SW118		30/11/2018	0315_SW118_181130	Normal	ES1836659	0.52	0.02	**0.67**	<0.02	<0.02	0.15	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.72	-
		13/12/2018	0315_SW118_181213	Normal	ES1837950	0.07	<0.01	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
		28/04/2022	0315_SW118_20220428	Normal	EM2208205	0.18	<0.01	**0.24**	<0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.24	-
		3/11/2022	0315_SW118_20221103	Normal	EM2222407	0.13	<0.01	**0.23**	<0.02	<0.02	0.1	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.23	-
		12/04/2023	0315_SW118_20230412	Normal	EM2306946	0.02	<0.01	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.09	<0.05	<0.05	0.11	-
SW121		30/11/2018	0315_SW121_181130	Normal	ES1836659	0.28	0.02	**0.39**	<0.02	<0.02	0.11	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.44	-
		26/10/2021	0315_SW121_20211026	Normal	ES2139229	0.22	0.01	**0.31**	<0.02	<0.02	0.09	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.32	-
		28/04/2022	0315_SW121_20220428	Normal	EM2208205	0.16	<0.01	**0.21**	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.21	-
		4/11/2022	0315_SW121_20221104	Normal	EM2222407	0.09	<0.01	**0.13**	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13	-
		11/04/2023	0315_QC102_20230411	Field_D	EM2306946	0.16	<0.01	**0.22**	<0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.22	-
			0315_QC202_20230411	Interlab_D	982794	0.22	<0.01	**0.28**	<0.01	<0.01	0.06	<0.01	<0.01	<0.05	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.29	0.00028
			0315_SW121_20230411	Normal	EM2306946	0.17	<0.01	**0.23**	0.02	<0.02	0.06	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.25	-
SW127		14/12/2018	0315_SW127_181214	Normal	ES1838218	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		25/10/2021	0315_QC201_20211025	Interlab_D	837707	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.00001
		25/10/2021	0315_QC101_20211025	Field_D	ES2139230	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
			0315_SW127_20211025	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		27/04/2022	0315_SW127_20220427	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		3/11/2022	0315_QC201_20221103	Interlab_D	940511	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	<0.00001
		3/11/2022	0315_QC101_20221103	Field_D	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
			0315_SW127_20221103	Normal	EM2222407	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		12/04/2023	0315_SW127_20230412	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-

Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPe	Perfluorohexane sulfonic acid (PFHxS	Perfluoroheptane sulfonic acid (PFHp	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamid	2-(N-methylperfluoro-1-octane sulfona	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamido	N-Methyl perfluorooctane sulfonamid	N-Ethyl perfluorooctane sulfonamido	4:2 Fluorotelomer sulfonic acid (4:2 F	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2	Sum of PFAS	Sum of enHealth PFAS (PFHxS + PFO
						Perfluorocarbons																														
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L
					LOR	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.05	0.00005	0.05	0.05	0.02	0.02	0.05	0.05	0.05	0.05	0.01	0.00001
PFAS NEMP 2.0 Table 1 Health Drinking Water							**0.56**	**0.07**																												
PFAS NEMP 2.0 Table 1 Health Recreational Water							*10*	*2*																												
PFAS NEMP 2.0 Table 5 Freshwater 95%						0.13	220																													
SW136	On-Base	29/01/2019	0315_SW136_190129	Normal	ES1902996	1.48	0.11	*4.15*	0.26	0.24	2.67	0.04	<0.02	<0.1	0.17	0.44	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	5.57	-
		26/10/2021	0315_SW136_20211026	Normal	ES2139229	1.2	0.04	1.93	0.06	0.06	0.73	0.03	<0.02	<0.1	0.11	0.19	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	2.45	-
		27/04/2022	0315_QC102_20220427	Field_D	EM2208205	0.05	<0.01	0.07	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
			0315_QC202_20220427	Interlab_D	889626	0.06	<0.01	0.08	<0.01	<0.01	0.02	<0.01	<0.01	<0.05	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	0.11	0.00008
			0315_SW136_20220427	Normal	EM2208205	0.04	<0.01	0.05	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05	-
		3/11/2022	0315_SW136_20221103	Normal	EM2222407	0.17	0.02	0.3	0.03	<0.02	0.13	<0.02	<0.02	<0.1	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.38	-
		12/04/2023	0315_SW136_20230412	Normal	EM2306946	0.04	<0.01	0.06	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.06	-
SW140		29/01/2019	0315_SW140_190129	Normal	ES1902996	0.03	<0.01	0.25	0.04	0.03	0.22	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.32	-
		26/10/2021	0315_SW140_20211026	Normal	ES2139229	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02	-
		28/04/2022	0315_QC103_20220428	Field_D	EM2208205	<0.01	<0.01	0.01	<0.02	<0.02	0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.01	-
			0315_QC203_20220428	Interlab_D	889626	<0.01	<0.01	0.02	<0.01	<0.01	0.02	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	0.00002
			0315_SW140_20220428	Normal	EM2208205	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.02	-
		3/11/2022	0315_QC202_20221103	Interlab_D	940511	0.01	<0.01	0.04	<0.01	<0.01	0.03	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.00005	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	<0.1	0.00004
		3/11/2022	0315_QC102_20221103	Field_D	EM2222407	0.01	<0.01	0.05	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.05	-
			0315_SW140_20221103	Normal	EM2222407	<0.01	<0.01	0.03	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03	-
		12/04/2023	0315_SW140_20230412	Normal	EM2306946	<0.01	<0.01	0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.05	<0.05	<0.05	0.07	-
SW144		29/01/2019	0315_SW144_190129	Normal	ES1902996	0.01	<0.01	0.03	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03	-
		27/10/2021	0315_SW144_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		29/04/2022	0315_SW144_20220429	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		3/11/2022	0315_SW144_20221103	Normal	EM2222407	0.12	<0.01	0.17	<0.02	<0.02	0.05	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.17	-
		12/04/2023	0315_SW144_20230412	Normal	EM2306946	0.02	<0.01	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.11	<0.05	<0.05	0.13	-
SW148		29/01/2019	0315_SW148_190129	Normal	ES1902996	0.47	0.01	0.61	0.02	<0.02	0.14	<0.02	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.66	-
		27/10/2021	0315_SW148_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		28/04/2022	0315_SW148_20220428	Normal	EM2208205	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.06	<0.05	<0.05	0.06	-
		3/11/2022	0315_SW148_20221103	Normal	EM2222407	0.16	<0.01	0.16	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.16	-
		12/04/2023	0315_SW148_20230412	Normal	EM2306946	0.01	<0.01	0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.13	<0.05	<0.05	0.14	-
SW149		29/01/2019	0315_SW149_190129	Normal	ES1902996	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		27/10/2021	0315_SW149_20211027	Normal	ES2139229	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
		29/04/2022	0315_SW149_20220429	Normal	EM2208205	0.02	<0.01	0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	0.07	<0.05	<0.05	0.09	-
		3/11/2022	0315_SW149_20221103	Normal	EM2222407	0.16	0.01	0.16	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.19	-
		12/04/2023	0315_SW149_20230412	Normal	EM2306946	<0.01	<0.01	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	-
SW614	Off-Base	13/12/2018	0315_SW614_181213	Normal	ES1837950	0.03	<0.01	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.03	-
		27/10/2021	0315_SW614_20211027	Normal	ES2139235	0.27	<0.01	0.35	<0.02	<0.02	0.08	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.35	-
		4/11/2022	0315_SW614_20221104	Normal	EM2222368	0.05	<0.01	0.07	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
		16/04/2023	0315_SW614_20230416	Normal	EM2306926	0.07	<0.01	0.07	<0.02	<0.02	<0.01	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
SW677		4/11/2022	0315_SW677_20221104	Normal	EM2222368	0.04	<0.01	0.06	<0.02	<0.02	0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.06	-
SW680		10/12/2019	0315_SW680_191210	Normal	ES1941493	0.08	<0.01	0.12	<0.02	<0.02	0.04	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.12	-
		4/11/2022	0315_SW680_20221104	Normal	EM2222365	0.04	<0.01	0.07	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.07	-
		13/04/2023	0315_SW680_20230413	Normal	EM2306924	0.1	<0.01	0.13	<0.02	<0.02	0.03	<0.02	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.00005	<0.05	<0.05	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	0.13	-

Notes

Denotes first time detection above LOR in latest monitoring round

Denotes new exceedance of lowest adopted screening criteria in latest monitoring round

Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorocarbons																
						Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorononanesulfonic acid (PFNS)	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					LOR	0.0002	0.0002	0.0002	0.005	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.005	0.0002	0.0002	0.0002	0.0002
SD103	On-Base	10/12/2018	0315_SD103_181210	Normal	ES1837611	0.0086	<0.0002	0.0096	-	<0.0002	<0.0002	0.001	<0.0002	0.0003	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		26/10/2021	0315_QC104_20211026	Field_D	ES2139230	0.0126	<0.0002	0.0132	-	<0.0002	<0.0002	0.0006	<0.0002	0.0006	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
			0315_SD103_20211026	Normal	ES2139229	0.014	<0.0002	0.0146	-	<0.0002	<0.0002	0.0006	<0.0002	0.0004	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		28/04/2022	0315_QC105_20220428	Field_D	EM2208205	0.0163	<0.0002	0.0173	-	<0.0002	<0.0002	0.001	<0.0002	0.0005	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	0.0004	0.0002
			0315_QC205_20220428	Interlab_D	889626	0.013	<0.005	0.013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
			0315_SD103_20220428	Normal	EM2208205	0.0163	<0.0002	0.0175	-	<0.0002	<0.0002	0.0012	<0.0002	0.0007	<0.001	<0.0002	0.0002	-	<0.0002	<0.0002	0.0003	0.0002
		3/11/2022	0315_SD103_20221103	Normal	EM2222407	0.0063	<0.0002	0.0066	-	<0.0002	<0.0002	0.0003	<0.0002	0.0004	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		12/04/2023	0315_QC103_20230412	Field_D	EM2306946	0.0089	0.0002	0.0093	-	<0.0002	<0.0002	0.0004	<0.0002	0.0005	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	0.0002	<0.0002
			0315_QC203_20230412	Interlab_D	982794	0.014	<0.005	0.014	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
			0315_SD103_20230412	Normal	EM2306946	0.013	0.0002	0.0137	-	<0.0002	<0.0002	0.0007	<0.0002	0.0006	<0.001	0.0003	0.0002	-	<0.0002	<0.0002	0.0003	0.0002
SD106		16/12/2018	0315_SD106_181216	Normal	ES1838218	0.0076	<0.0002	0.008	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		26/10/2021	0315_SD106_20211026	Normal	ES2139229	0.0042	<0.0002	0.0042	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		28/04/2022	0315_SD106_20220428	Normal	EM2208205	0.0042	0.0002	0.0042	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	0.0012	<0.0002
		3/11/2022	0315_SD106_20221103	Normal	EM2222407	0.004	<0.0002	0.004	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		12/04/2023	0315_SD106_20230412	Normal	EM2306946	0.0053	<0.0002	0.0055	-	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
SD107		10/12/2018	0315_SD107_181210	Normal	ES1837611	0.0142	<0.0002	0.0149	-	<0.0002	<0.0002	0.0007	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		26/10/2021	0315_SD107_20211026	Normal	ES2139229	0.0051	<0.0002	0.0051	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		2/05/2022	0315_SD107_20220502	Normal	EM2208205	0.0037	<0.0002	0.0042	-	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		3/11/2022	0315_SD107_20221103	Normal	EM2222407	0.0027	<0.0002	0.0027	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		12/04/2023	0315_SD107_20230412	Normal	EM2306946	0.0033	<0.0002	0.0033	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
SD108		15/12/2018	0315_SD108_181215	Normal	ES1838218	0.0004	<0.0002	0.0004	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		26/10/2021	0315_SD108_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		2/05/2022	0315_SD108_20220502	Normal	EM2208205	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		3/11/2022	0315_SD108_20221103	Normal	EM2222407	0.0006	<0.0002	0.0006	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		13/04/2023	0315_SD108_20230413	Normal	EM2306946	0.0005	<0.0002	0.0005	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
SD111		15/12/2018	0315_SD111_181215	Normal	ES1838218	0.0041	<0.0002	0.0045	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	0.0003	<0.0002	<0.0002
		26/10/2021	0315_SD111_20211026	Normal	ES2139229	0.0008	<0.0002	0.0008	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		27/04/2022	0315_SD111_20220427	Normal	EM2208205	0.0005	<0.0002	0.0005	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		3/11/2022	0315_SD111_20221103	Normal	EM2222407	0.0004	<0.0002	0.0004	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		13/04/2023	0315_SD111_20230413	Normal	EM2306946	0.0008	<0.0002	0.0008	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
SD118		30/11/2018	0315_SD118_181130	Normal	ES1836659	0.0037	<0.0002	0.0037	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		26/10/2021	0315_SD118_20211026	Normal	ES2139229	0.0045	<0.0002	0.0045	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		28/04/2022	0315_SD118_20220428	Normal	EM2208205	0.0077	<0.0002	0.0077	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		3/11/2022	0315_SD118_20221103	Normal	EM2222407	0.0025	<0.0002	0.0025	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		12/04/2023	0315_SD118_20230412	Normal	EM2306946	0.0058	<0.0002	0.0058	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002

Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorocarbons																
						Perfluorooctane sulfonic acid (PFOS)	Perfluorooctanoate (PFOA)	Sum of PFHxS and PFOS	Perfluorononanesulfonic acid (PFNS)	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoropropanesulfonic acid (PFPrS)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					LOR	0.0002	0.0002	0.0002	0.005	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.005	0.0002	0.0002	0.0002	0.0002
SD121	On-Base	30/11/2018	0315_SD121_181130	Normal	ES1836659	0.0238	<0.0002	0.0246	-	<0.0002	<0.0002	0.0008	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		26/10/2021	0315_SD121_20211026	Normal	ES2139229	0.0016	<0.0002	0.0016	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		21/12/2021	QC101_211221	Field_D	EM2125953	0.0194	<0.0002	0.0197	-	<0.0002	-	0.0003	-	-	<0.001	<0.0002	<0.0002	-	<0.0002	-	-	-
			QC201_211221	Interlab_D	853128	0.033	<0.005	0.033	-	-	-	<0.005	-	-	-	-	-	-	-	-	-	-
			SD121	Normal	EM2125953	0.0184	<0.0002	0.0188	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		28/04/2022	0315_SD121_20220428	Normal	EM2208205	0.0009	<0.0002	0.0009	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		4/11/2022	0315_SD121_20221104	Normal	EM2222407	0.0017	<0.0002	0.0017	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		11/04/2023	0315_QC101_20230411	Field_D	EM2306946	0.0039	<0.0002	0.0039	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
			0315_QC201_20230411	Interlab_D	982794	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
			0315_SD121_20230411	Normal	EM2306946	0.0017	<0.0002	0.0017	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
SD127		14/12/2018	0315_SD127_181214	Normal	ES1838218	0.0007	<0.0002	0.0007	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		25/10/2021	0315_QC102_20211025	Field_D	ES2139230	0.0003	<0.0002	0.0003	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
			0315_SD127_20211026	Normal	ES2139229	0.0005	<0.0002	0.0005	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		27/04/2022	0315_SD127_20220427	Normal	EM2208205	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		3/11/2022	0315_QC203_20221103	Interlab_D	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
		3/11/2022	0315_QC103_20221103	Field_D	EM2222407	0.0014	<0.0002	0.0014	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
			0315_SD127_20221103	Normal	EM2222407	0.0009	<0.0002	0.0009	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		12/04/2023	0315_SD127_20230412	Normal	EM2306946	<0.0002	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
SD136		26/10/2021	0315_SD136_20211026	Normal	ES2139229	0.0046	<0.0002	0.005	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		27/04/2022	0315_QC104_20220427	Field_D	EM2208205	0.0606	<0.0002	0.0631	-	<0.0002	<0.0002	0.0025	0.0002	0.0005	<0.001	<0.0002	0.0004	-	<0.0002	<0.0002	<0.0002	<0.0002
			0315_QC204_20220427	Interlab_D	889626	0.052	<0.005	0.052	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
			0315_SD136_20220427	Normal	EM2208205	0.0393	<0.0002	0.0411	-	<0.0002	<0.0002	0.0018	<0.0002	0.0004	<0.001	<0.0002	0.0003	-	<0.0002	<0.0002	<0.0002	<0.0002
		3/11/2022	0315_QC205_20221103	Interlab_D	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
		3/11/2022	0315_QC105_20221103	Field_D	EM2222407	0.0029	<0.0002	0.0029	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
			0315_SD136_20221103	Normal	EM2222407	0.003	<0.0002	0.003	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		12/04/2023	0315_SD136_20230412	Normal	EM2306946	0.0246	0.0003	0.0282	-	<0.0002	<0.0002	0.0036	0.0003	0.0009	<0.001	0.0003	0.0008	-	0.0002	0.0002	0.0004	0.0005
SD614	Off-Base	18/12/2018	0315_SD614_181218	Normal	ES1838696	0.0094	<0.0002	0.0097	-	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		27/10/2021	0315_SD614_20211027	Normal	ES2139235	0.011	<0.0002	0.0114	-	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		20/12/2021	SD614	Normal	EM2125953	0.0093	<0.0002	0.0095	-	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		28/04/2022	0315_SD614_20220428	Normal	EM2208229	0.0075	<0.0002	0.0077	-	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		4/11/2022	0315_SD614_20221104	Normal	EM2222368	0.0073	<0.0002	0.0073	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		12/04/2023	0315_SD614_20230412	Normal	EM2306926	0.009	<0.0002	0.0092	-	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
SD677		26/10/2021	0315_SD677_20211026	Normal	ES2139235	0.0052	<0.0002	0.0052	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		21/12/2021	SD677	Normal	EM2125953	0.0075	<0.0002	0.0075	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		28/04/2022	0315_SD677_20220428	Normal	EM2208229	0.0068	<0.0002	0.0068	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		4/11/2022	0315_SD677_20221104	Normal	EM2222368	0.0074	<0.0002	0.0074	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002
		12/04/2023	0315_SD677_20230412	Normal	EM2306926	0.0066	<0.0002	0.0066	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002

Notes

Denotes first time detection above LOR in latest monitoring round

Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorocarbons																
						Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					LOR	0.0002	0.0002	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.005	0.005
SD103	On-Base	10/12/2018	0315_SD103_181210	Normal	ES1837611	<0.0002	<0.0002	<0.0005	0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0102	-	-
		26/10/2021	0315_QC104_20211026	Field_D	ES2139230	<0.0002	<0.0002	<0.0005	0.0004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0142	-	-
			0315_SD103_20211026	Normal	ES2139229	0.0003	<0.0002	<0.0005	0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0156	-	-
		28/04/2022	0315_QC105_20220428	Field_D	EM2208205	0.0003	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0187	-	-
			0315_QC205_20220428	Interlab_D	889626	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	0.013	0.013
			0315_SD103_20220428	Normal	EM2208205	0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0191	-	-
		3/11/2022	0315_SD103_20221103	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.007	-	-
		12/04/2023	0315_QC103_20230412	Field_D	EM2306946	0.0003	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0105	-	-
			0315_QC203_20230412	Interlab_D	982794	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	0.014	0.014
			0315_SD103_20230412	Normal	EM2306946	0.0004	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0159	-	-
SD106		16/12/2018	0315_SD106_181216	Normal	ES1838218	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.008	-	-
		26/10/2021	0315_SD106_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0042	-	-
		28/04/2022	0315_SD106_20220428	Normal	EM2208205	0.0004	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	0.0004	<0.0005	<0.0005	<0.0005	<0.0005	0.0064	-	-
		3/11/2022	0315_SD106_20221103	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.004	-	-
		12/04/2023	0315_SD106_20230412	Normal	EM2306946	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0055	-	-
SD107		10/12/2018	0315_SD107_181210	Normal	ES1837611	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0149	-	-
		26/10/2021	0315_SD107_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0051	-	-
		2/05/2022	0315_SD107_20220502	Normal	EM2208205	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0042	-	-
		3/11/2022	0315_SD107_20221103	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0027	-	-
		12/04/2023	0315_SD107_20230412	Normal	EM2306946	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0033	-	-
SD108		15/12/2018	0315_SD108_181215	Normal	ES1838218	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	-	-
		26/10/2021	0315_SD108_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	-	-
		2/05/2022	0315_SD108_20220502	Normal	EM2208205	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	-	-
		3/11/2022	0315_SD108_20221103	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	-	-
		13/04/2023	0315_SD108_ 20230413	Normal	EM2306946	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	-	-
SD111		15/12/2018	0315_SD111_181215	Normal	ES1838218	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0048	-	-
		26/10/2021	0315_SD111_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	-	-
		27/04/2022	0315_SD111_20220427	Normal	EM2208205	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	-	-
		3/11/2022	0315_SD111_20221103	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	-	-
		13/04/2023	0315_SD111_ 20230413	Normal	EM2306946	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	-	-
SD118		30/11/2018	0315_SD118_181130	Normal	ES1836659	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0037	-	-
		26/10/2021	0315_SD118_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0045	-	-
		28/04/2022	0315_SD118_20220428	Normal	EM2208205	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0077	-	-
		3/11/2022	0315_SD118_20221103	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	-	-
		12/04/2023	0315_SD118_20230412	Normal	EM2306946	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0058	-	-

Location Code	Monitoring Zone	Sampled Date	Field ID	Sample Type	Lab Report No.	Perfluorocarbons: Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FtS)	8:2 Fluorotelomer sulfonate (8:2 FtS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFAS	Sum of US EPA PFAS (PFOS + PFOA)*	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
					LOR	0.0002	0.0002	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.005	0.005
SD121	On-Base	30/11/2018	0315_SD121_181130	Normal	ES1836659	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0246	-	-
		26/10/2021	0315_SD121_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	-	-
		21/12/2021	QC101_211221	Field_D	EM2125953	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	-	-	-
			QC201_211221	Interlab_D	853128	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	-	0.033	0.033
			SD121	Normal	EM2125953	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0188	-	-
		28/04/2022	0315_SD121_20220428	Normal	EM2208205	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	-	-
		4/11/2022	0315_SD121_20221104	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0017	-	-
		11/04/2023	0315_QC101_20230411	Field_D	EM2306946	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0039	-	-
			0315_QC201_20230411	Interlab_D	982794	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	<0.005	<0.005
			0315_SD121_20230411	Normal	EM2306946	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0017	-	-
SD127		14/12/2018	0315_SD127_181214	Normal	ES1838218	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	-	-
		25/10/2021	0315_QC102_20211025	Field_D	ES2139230	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0003	-	-
			0315_SD127_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	-	-
		27/04/2022	0315_SD127_20220427	Normal	EM2208205	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	-	-
		3/11/2022	0315_QC203_20221103	Interlab_D	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	<0.005	<0.005
		3/11/2022	0315_QC103_20221103	Field_D	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	-	-
			0315_SD127_20221103	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	-	-
		12/04/2023	0315_SD127_20230412	Normal	EM2306946	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	-	-
SD136		26/10/2021	0315_SD136_20211026	Normal	ES2139229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.005	-	-
		27/04/2022	0315_QC104_20220427	Field_D	EM2208205	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0642	-	-
			0315_QC204_20220427	Interlab_D	889626	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	0.052	0.052	0.052
			0315_SD136_20220427	Normal	EM2208205	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0418	-	-
		3/11/2022	0315_QC205_20221103	Interlab_D	940511	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01	<0.005	<0.01	<0.005	<0.005	<0.05	<0.005	<0.005
		3/11/2022	0315_QC105_20221103	Field_D	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0029	-	-
			0315_SD136_20221103	Normal	EM2222407	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.003	-	-
		12/04/2023	0315_SD136_20230412	Normal	EM2306946	0.0004	0.0003	<0.0005	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.033	-	-
SD614	Off-Base	18/12/2018	0315_SD614_181218	Normal	ES1838696	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0097	-	-
		27/10/2021	0315_SD614_20211027	Normal	ES2139235	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0114	-	-
		20/12/2021	SD614	Normal	EM2125953	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0095	-	-
		28/04/2022	0315_SD614_20220428	Normal	EM2208229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0077	-	-
		4/11/2022	0315_SD614_20221104	Normal	EM2222368	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0073	-	-
		12/04/2023	0315_SD614_20230412	Normal	EM2306926	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0092	-	-
SD677		26/10/2021	0315_SD677_20211026	Normal	ES2139235	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0052	-	-
		21/12/2021	SD677	Normal	EM2125953	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0075	-	-
		28/04/2022	0315_SD677_20220428	Normal	EM2208229	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0068	-	-
		4/11/2022	0315_SD677_20221104	Normal	EM2222368	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0074	-	-
		12/04/2023	0315_SD677_20230412	Normal	EM2306926	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0066	-	-

Notes

Denotes first time detection above LOR in latest monitoring round

Table B4: Water RPD Results

ChemName		Units	LOR	EM2306946 0315_SW121_20230411 11/04/2023	EM2306946 0315_QC102_20230411 11/04/2023	RPD	EM2306946 0315_SW103_20230412 12/04/2023	EM2306946 0315_QC104_20230412 12/04/2023	RPD	EM2306946 0315_MW103_20230413 13/04/2023	EM2306946 0315_QC105_20230413 13/04/2023	RPD
	Sum of WA DWER PFAS (n=10)*	ug/L	0.01 : 0.05 (Interlab)	0.25	0.22	13	0.24	0.24	0	<0.01	<0.01	0
Perfluorocarbons												
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.17	0.16	6	0.16	0.16	0	<0.01	<0.01	0
	Perfluorooctanoate (PFOA)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
	Sum of PFHxS and PFOS	µg/L	0.01	0.23	0.22	4	0.24	0.24	0	<0.01	<0.01	0
	Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02 : 0.01 (Interlab)	0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.06	0.06	0	0.08	0.08	0	<0.01	<0.01	0
	Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorobutanoic acid (PFBA)	µg/L	0.1 : 0.05 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
	Perfluoropentanoic acid (PFPeA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluoroheptanoic acid (PFHpA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorononanoic acid (PFNA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorodecanoic acid (PFDA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorododecanoic acid (PFDoDA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
	2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	mg/l	5e-005	<0.00005	<0.00005	0	<0.00005	<0.00005	0	<0.00005	<0.00005	0
	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0	<0.02	<0.02	0
	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
	6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
	8:2 Fluorotelomer sulfonate (8:2 FtS)	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
	Sum of PFAS	µg/L	0.01 : 0.1 (Interlab)	0.25	0.22	13	0.24	0.24	0	<0.01	<0.01	0

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

Table B4: Water RPD Results

ChemName	Units	LOR	EM2306946 0315_SW121_20230411 11/04/2023	982794 0315_QC202_20230411 11/04/2023	RPD	EM2306946 0315_SW103_20230412 12/04/2023	982794 0315_QC204_20230412 12/04/2023	RPD	EM2306946 0315_MW103_20230413 13/04/2023	982794 0315_QC205_20230413 13/04/2023	RPD
Sum of WA DWER PFAS (n=10)*	ug/L	0.01 : 0.05 (Interlab)	0.25	0.29	15	**0.24**	**0.36**	**40**	<0.01	<0.05	0
Perfluorocarbons											
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.17	0.22	26	**0.16**	**0.23**	**36**	<0.01	<0.01	0
Perfluorooctanoate (PFOA)	µg/L	0.01	<0.01	<0.01	0	<0.01	<0.01	0	<0.01	<0.01	0
Sum of PFHxS and PFOS	µg/L	0.01	0.23	0.28	20	0.24	0.32	29	<0.01	<0.01	0
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02 : 0.01 (Interlab)	0.02	<0.01	**67**	<0.02	<0.01	0	<0.02	<0.01	0
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	0.06	0.06	0	0.08	0.09	12	<0.01	<0.01	0
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluorobutanoic acid (PFBA)	µg/L	0.1 : 0.05 (Interlab)	<0.1	<0.05	0	<0.1	<0.05	0	<0.1	<0.05	0
Perfluoropentanoic acid (PFPeA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	0.02	0	<0.02	<0.01	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	0.01	0	<0.02	0.02	0	<0.02	<0.01	0
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluorononanoic acid (PFNA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluorodecanoic acid (PFDA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.01	0	<0.02	<0.01	0	<0.02	<0.01	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.01	0	<0.05	<0.01	0	<0.05	<0.01	0
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.05	0	<0.02	<0.05	0	<0.02	<0.05	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	mg/l	5e-005	<0.00005	<0.00005	0	<0.00005	<0.00005	0	<0.00005	<0.00005	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.05	0	<0.02	<0.05	0	<0.02	<0.05	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.05	0	<0.02	<0.05	0	<0.02	<0.05	0
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.01	0	<0.05	<0.01	0	<0.05	<0.01	0
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0	<0.05	<0.05	0
8:2 Fluorotelomer sulfonate (8:2 FtS)	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.01	0	<0.05	<0.01	0	<0.05	<0.01	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.01	0	<0.05	<0.01	0	<0.05	<0.01	0
Sum of PFAS	µg/L	0.01 : 0.1 (Interlab)	0.25	0.29	15	**0.24**	**0.36**	**40**	<0.01	<0.1	0

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

Table B5: Soil RPD Results

		Lab Report No.	EM2306946	EM2306946		EM2306946	EM2306946		EM2306946	982794		EM2306946	982794	
		Field ID	0315_SD121_20230411	0315_QC101_20230411	**RPD**	0315_SD103_20230412	0315_QC103_20230412	**RPD**	0315_SD121_20230411	0315_QC201_20230411	**RPD**	0315_SD103_20230412	0315_QC203_20230412	**RPD**
		Sampled Date	11/04/2023	11/04/2023		12/04/2023	12/04/2023		11/04/2023	11/04/2023		12/04/2023	12/04/2023	
ChemName	**Units**	**LOR**												
Moisture Content	%	0.1	**23.6**	**32.7**	**32**	**38.6**	**1**	**190**	23.6			38.6		
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002 : 0.005 (Interlab)	**0.0017**	**0.0039**	**79**	**0.013**	**0.0089**	**37**	0.0017	<0.005	0	0.013	0.014	7
Perfluorooctanoate (PFOA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	0.0002	0.0002	0	<0.0002	<0.005	0	0.0002	<0.005	0
Sum of PFHxS and PFOS	mg/kg	0.0002 : 0.005 (Interlab)	**0.0017**	**0.0039**	**79**	**0.0137**	**0.0093**	**38**	0.0017	<0.005	0	0.0137	0.014	2
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.005	0
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.005	0
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	**0.0007**	**0.0004**	**55**	<0.0002	<0.005	0	0.0007	<0.005	0
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.005	0
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	0.0006	0.0005	18	<0.0002	<0.005	0	0.0006	<0.005	0
Perfluorobutanoic acid (PFBA)	mg/kg	0.001 : 0.005 (Interlab)	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.005	0	<0.001	<0.005	0
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	**0.0003**	**<0.0002**	**40**	<0.0002	<0.005	0	0.0003	<0.005	0
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	0.0002	<0.0002	0	<0.0002	<0.005	0	0.0002	<0.005	0
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.005	0
Perfluorononanoic acid (PFNA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.005	0
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	**0.0003**	**0.0002**	**40**	<0.0002	<0.005	0	0.0003	<0.005	0
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	0.0002	<0.0002	0	<0.0002	<0.005	0	0.0002	<0.005	0
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	0.0004	0.0003	29	<0.0002	<0.005	0	0.0004	<0.005	0
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.005	0
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.005	0
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.005	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.005	0
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.005	0
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.005	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.005	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002 : 0.01 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.01	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002 : 0.01 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.01	0
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.005	0
6:2 Fluorotelomer Sulfonate (6:2 FtS)	mg/kg	0.0005 : 0.01 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.01	0	<0.0005	<0.01	0
8:2 Fluorotelomer sulfonate (8:2 FtS)	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.005	0
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.005	0
Sum of PFAS	mg/kg	0.0002 : 0.05 (Interlab)	**0.0017**	**0.0039**	**79**	**0.0159**	**0.0105**	**41**	0.0017	<0.05	0	0.0159	<0.05	0

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

Table B6: Blank Results

ChemName	Units	LOR								
		Lab Report No.	EM2306946	EM2306946	EM2306946	EM2306946	EM2306946	EM2306946	EM2306946	EM2306946	EM2306946
		Field ID	0315_QC304_20230413	0315_QC306_20230415	0315_QC307_20230416	0315_QC301_20230411	0315_QC302_20230412	0315_QC503_20230413	0315_QC504_20230413	0315_QC502_20230412	0315_QC501_20230412
		Sampled Date	13/04/2023	15/04/2023	16/04/2023	11/04/2023	12/04/2023	13/04/2023	13/04/2023	12/04/2023	12/04/2023
		Sample Type	Rinsate	Rinsate	Rinsate	Rinsate	Rinsate	Trip_B	Trip_B	Trip_B	Trip_B
Sum of WA DWER PFAS (n=10)*	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanoate (PFOA)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid (PFBA)	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	mg/l	0.00005	<5e-005	<5e-005	<5e-005	<5e-005	<5e-005	<5e-005	<5e-005	<5e-005	<5e-005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FtS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonate (8:2 FtS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sum of PFAS	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

APPENDIX

C

LABORATORY CERTIFICATES

Cardno

now

Stantec

Cardno

Chain of Custody

Sheet 1 of 1

[redacted]

Results Email (please email results to all listed):

[redacted]

Project Number: NSW_0315_PFASDMP

Laboratory (name, phone,fax no & contact person) : [redacted]

Sample ID	Laboratory ID	Container	Sampling Date	Sampling Time	Sample Matrix: Water	Sample Matrix: Soil	Sample preservation: Ice	Analysis: PFAS Standard Suite	Analysis: HOLD
0315_QC201_20230411		1	11/04/2023			X	X	X	
0315_QC202_20230411		2	11/04/2023		X		X	X	
0315_QC203_20230412		1	12/04/2023			X	X	X	
0315_QC204_20230412		2	12/04/2023		X		X	X	
0315_QC205_20230413		2	13/04/2023		X		X	X	

DATE: 20/4/23
TIME: 3:45 pm
...HER:
...TURE
YES NO

9.1 + 1.3
10.4
982794
20/4

Sampler: I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler name: (print and signature)

Date 4/11/2022

[redacted]	Date 20/04	Time 3:00pm	Received by (Courier/Lab): (print and signature)	Date	Time
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time
Relinquished by: (print and signature)	Date	Time	Received by: (print and signature)	Date	Time

Please supply results electronically in spreadsheet and ESDAT files.

Turn around time: (24 hour/48 hour/3 days/5 days) Please circle

[redacted]

From: [redacted]
Sent: Friday, 21 April 2023 10:36 AM
To: [redacted]
_EnviroSampleVic
Subject: RE: Sample Pickup - 20/04/2023
Attachments: Eurofins Sample Receipt Advice - Report 982807 : Site NSW_0906_PFASOMP; Eurofins Sample Receipt Advice - Report 982794 : Site NSW_0315_PFASOMP; Eurofins Sample Receipt Advice - Report 982766 : Site NSW_0906PFASOMP

Follow Up Flag: Follow up
Flag Status: Completed

[redacted]

Can you please ensure that all the results for the attached work orders are sent to the following email addresses?

- [redacted]

Cheers,

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Sample Receipt Advice

Company name:	Stantec Australia Pty Ltd (VIC)
Contact name:	[redacted]
Project name:	NSW_0315_PFASOMP
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Apr 20, 2023 5:46 PM
Eurofins reference	982794

Sample Information

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

Notes

Samples received by the laboratory after 5.30pm are deemed to have been received the following working day.

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]

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

eurofins

[redacted]

[redacted]

Company Name: Stantec Australia Pty Ltd (VIC)	**Order No.:**		**Received:** Apr 20, 2023 5:46 PM
Address: [redacted]	**Report #:** 982794		**Due:** May 1, 2023
	Phone:		**Priority:** 5 Day
	Fax:		**Contact Name:** [redacted]
Project Name: NSW_0315_PFASOMP			**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	0315_QC201_20230411	Apr 11, 2023		Soil	M23-Ap0044991	X	X
2	0315_QC202_20230411	Apr 11, 2023		Water	M23-Ap0044992		X
3	0315_QC203_20230412	Apr 12, 2023		Soil	M23-Ap0044993	X	X
4	0315_QC204_20230412	Apr 12, 2023		Water	M23-Ap0044994		X
5	0315_QC205_20230413	Apr 13, 2023		Water	M23-Ap0044995		X
Test Counts						2	5

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

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.

Stantec Australia Pty Ltd
[redacted]

Attention: [redacted]

Report	**982794-S**
Project name	NSW_0315_PFASOMP
Received Date	Apr 20, 2023

Client Sample ID			**0315_QC201_20230411**	**0315_QC203_20230412**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**M23-Ap0044991**	**M23-Ap0044993**
Date Sampled			**Apr 11, 2023**	**Apr 12, 2023**
Test/Reference	LOR	Unit		
Sample Properties				
% Moisture	1	%	22	32
Perfluoroalkyl carboxylic acids (PFCAs)				
Perfluorobutanoic acid (PFBA)N11	5	ug/kg	< 5	< 5
Perfluoropentanoic acid (PFPeA)N11	5	ug/kg	< 5	< 5
Perfluorohexanoic acid (PFHxA)N11	5	ug/kg	< 5	< 5
Perfluoroheptanoic acid (PFHpA)N11	5	ug/kg	< 5	< 5
Perfluorooctanoic acid (PFOA)N11	5	ug/kg	< 5	< 5
Perfluorononanoic acid (PFNA)N11	5	ug/kg	< 5	< 5
Perfluorodecanoic acid (PFDA)N11	5	ug/kg	< 5	< 5
Perfluoroundecanoic acid (PFUnDA)N11	5	ug/kg	< 5	< 5
Perfluorododecanoic acid (PFDoDA)N11	5	ug/kg	< 5	< 5
Perfluorotridecanoic acid (PFTrDA)N15	5	ug/kg	< 5	< 5
Perfluorotetradecanoic acid (PFTeDA)N11	5	ug/kg	< 5	< 5
13C4-PFBA (surr.)	1	%	116	108
13C5-PFPeA (surr.)	1	%	123	109
13C5-PFHxA (surr.)	1	%	131	113
13C4-PFHpA (surr.)	1	%	94	78
13C8-PFOA (surr.)	1	%	105	87
13C5-PFNA (surr.)	1	%	103	88
13C6-PFDA (surr.)	1	%	73	72
13C2-PFUnDA (surr.)	1	%	76	70
13C2-PFDoDA (surr.)	1	%	96	88
13C2-PFTeDA (surr.)	1	%	104	89
Perfluoroalkyl sulfonamido substances				
Perfluorooctane sulfonamide (FOSA)N11	5	ug/kg	< 5	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)N11	5	ug/kg	< 5	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)N11	5	ug/kg	< 5	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)N11	5	ug/kg	< 5	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)N11	5	ug/kg	< 5	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)N11	10	ug/kg	< 10	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)N11	10	ug/kg	< 10	< 10
13C8-FOSA (surr.)	1	%	82	81

Client Sample ID			0315_QC201_20230411	0315_QC203_20230412
Sample Matrix			Soil	Soil
Eurofins Sample No.			M23-Ap0044991	M23-Ap0044993
Date Sampled			Apr 11, 2023	Apr 12, 2023
Test/Reference	LOR	Unit		
Perfluoroalkyl sulfonamido substances				
D3-N-MeFOSA (surr.)	1	%	106	95
D5-N-EtFOSA (surr.)	1	%	101	91
D7-N-MeFOSE (surr.)	1	%	89	86
D9-N-EtFOSE (surr.)	1	%	88	84
D5-N-EtFOSAA (surr.)	1	%	124	119
D3-N-MeFOSAA (surr.)	1	%	121	126
Perfluoroalkyl sulfonic acids (PFSAs)				
Perfluorobutanesulfonic acid (PFBS)[N11]	5	ug/kg	< 5	< 5
Perfluorononanesulfonic acid (PFNS)[N15]	5	ug/kg	< 5	< 5
Perfluoropropanesulfonic acid (PFPrS)[N15]	5	ug/kg	< 5	< 5
Perfluoropentanesulfonic acid (PFPeS)[N15]	5	ug/kg	< 5	< 5
Perfluorohexanesulfonic acid (PFHxS)[N11]	5	ug/kg	< 5	< 5
Perfluoroheptanesulfonic acid (PFHpS)[N15]	5	ug/kg	< 5	< 5
Perfluorooctanesulfonic acid (PFOS)[N11]	5	ug/kg	< 5	[N09] 14
Perfluorodecanesulfonic acid (PFDS)[N15]	5	ug/kg	< 5	< 5
13C3-PFBS (surr.)	1	%	118	103
18O2-PFHxS (surr.)	1	%	104	103
13C8-PFOS (surr.)	1	%	85	79
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	5	ug/kg	< 5	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	10	ug/kg	< 10	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	5	ug/kg	< 5	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	5	ug/kg	< 5	< 5
13C2-4:2 FTSA (surr.)	1	%	136	135
13C2-6:2 FTSA (surr.)	1	%	108	85
13C2-8:2 FTSA (surr.)	1	%	152	125
13C2-10:2 FTSA (surr.)	1	%	124	119
PFASs Summations				
Sum (PFHxS + PFOS)*	5	ug/kg	< 5	14
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5	14
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5	14
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10	14
Sum of PFASs (n=30)*	50	ug/kg	< 50	< 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	Melbourne	Apr 20, 2023	14 Days
- Method: LTM-GEN-7080 Moisture			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Apr 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Apr 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Apr 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Apr 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Apr 20, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

[redacted]

Company Name:	Stantec Australia Pty Ltd (VIC)	**Order No.:**		**Received:**	Apr 20, 2023 5:46 PM
Address:	[redacted]	**Report #:**	982794	**Due:**	May 1, 2023
		Phone:		**Priority:**	5 Day
		Fax:		**Contact Name:**	[redacted]
Project Name:	NSW_0315_PFASOMP			**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	0315_QC201_20230411	Apr 11, 2023		Soil	M23-Ap0044991	X	X
2	0315_QC202_20230411	Apr 11, 2023		Water	M23-Ap0044992		X
3	0315_QC203_20230412	Apr 12, 2023		Soil	M23-Ap0044993	X	X
4	0315_QC204_20230412	Apr 12, 2023		Water	M23-Ap0044994		X
5	0315_QC205_20230413	Apr 13, 2023		Water	M23-Ap0044995		X
Test Counts						2	5

Environment Testing

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**μg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

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

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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 (PFTrDA)	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 (PFSAs)							
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 FTSAs)							
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)	%	74			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	71			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	69			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	79			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	75			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	75			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	77			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	92			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	79			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	59			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	73			50-150	Pass	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	60			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	79			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	53			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	75			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	75			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	80			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	66			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	67			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	105			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	67			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	78			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	82			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	137			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	75			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	124			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	65			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	73			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	74			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	70			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-Ap0046842	NCP	%	71			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Ap0046842	NCP	%	69			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Ap0046842	NCP	%	66			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Ap0046842	NCP	%	74			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M23-Ap0046842	NCP	%	80			50-150	Pass	
Perfluorononanoic acid (PFNA)	M23-Ap0046842	NCP	%	72			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M23-Ap0046842	NCP	%	70			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Ap0046842	NCP	%	94			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Ap0046842	NCP	%	76			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-Ap0046842	NCP	%	60			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Ap0046842	NCP	%	81			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M23-Ap0046842	NCP	%	60			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Ap0046842	NCP	%	78			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Ap0046842	NCP	%	52			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Ap0046842	NCP	%	74			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Ap0046842	NCP	%	74			50-150	Pass	

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Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Ap0046842	NCP	%	79			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Ap0046842	NCP	%	70			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M23-Ap0046842	NCP	%	65			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Ap0046842	NCP	%	105			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Ap0046842	NCP	%	65			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Ap0046842	NCP	%	68			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Ap0042989	NCP	%	85			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Ap0046842	NCP	%	147			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Ap0046842	NCP	%	62			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Ap0046842	NCP	%	137			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Ap0046842	NCP	%	61			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Ap0046842	NCP	%	64			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Ap0046842	NCP	%	74			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Ap0046842	NCP	%	74			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-Ap0045008	NCP	%	19	20	1.6	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Ap0044993	CP	ug/kg	< 10	< 10	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Ap0044993	CP	ug/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Ap0044993	CP	ug/kg	14	13	2.3	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Ap0044993	CP	ug/kg	< 10	< 10	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Ap0044993	CP	ug/kg	< 5	< 5	<1	30%	Pass	

Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

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

Authorised by:

[redacted] Analytical Services Manager
[redacted] Senior Analyst-PFAS

[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 or please click here.

Certificate of Analysis

Environment Testing

Stantec Australia Pty Ltd

[redacted]

NATA Accredited
Accreditation Number 1261
Site Number 1254

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: [redacted])

Report **982794-W**
Project name NSW_0315_PFASOMP
Received Date Apr 20, 2023

Client Sample ID			**0315_QC202_20230411**	**0315_QC204_20230412**	**0315_QC205_20230413**
Sample Matrix			**Water**	**Water**	**Water**
Eurofins Sample No.			**M23-Ap0044992**	**M23-Ap0044994**	**M23-Ap0044995**
Date Sampled			**Apr 11, 2023**	**Apr 12, 2023**	**Apr 13, 2023**
Test/Reference	LOR	Unit			
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorobutanoic acid (PFBA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA)[N11]	0.01	ug/L	< 0.01	0.02	< 0.01
Perfluorohexanoic acid (PFHxA)[N11]	0.01	ug/L	0.01	0.02	< 0.01
Perfluoroheptanoic acid (PFHpA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorooctanoic acid (PFOA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorononanoic acid (PFNA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	57	64	87
13C5-PFPeA (surr.)	1	%	111	112	122
13C5-PFHxA (surr.)	1	%	95	103	103
13C4-PFHpA (surr.)	1	%	114	109	105
13C8-PFOA (surr.)	1	%	121	111	102
13C5-PFNA (surr.)	1	%	119	118	117
13C6-PFDA (surr.)	1	%	110	104	108
13C2-PFUnDA (surr.)	1	%	117	74	110
13C2-PFDoDA (surr.)	1	%	130	74	103
13C2-PFTeDA (surr.)	1	%	131	58	93
Perfluoroalkyl sulfonamido substances					
Perfluorooctane sulfonamide (FOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	95	124	127
D3-N-MeFOSA (surr.)	1	%	92	73	68
D5-N-EtFOSA (surr.)	1	%	88	67	67

Client Sample ID			0315_QC202_20230411	0315_QC204_20230412	0315_QC205_20230413
Sample Matrix			**Water**	**Water**	**Water**
Eurofins Sample No.			**M23-Ap0044992**	**M23-Ap0044994**	**M23-Ap0044995**
Date Sampled			Apr 11, 2023	Apr 12, 2023	Apr 13, 2023
Test/Reference	LOR	Unit			
Perfluoroalkyl sulfonamido substances					
D7-N-MeFOSE (surr.)	1	%	128	76	111
D9-N-EtFOSE (surr.)	1	%	115	69	105
D5-N-EtFOSAA (surr.)	1	%	98	63	69
D3-N-MeFOSAA (surr.)	1	%	71	83	92
Perfluoroalkyl sulfonic acids (PFSAs)					
Perfluorobutanesulfonic acid (PFBS)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorononanesulfonic acid (PFNS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.01	ug/L	[N09]0.06	[N09]0.09	< 0.01
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS)[N11]	0.01	ug/L	[N09]0.22	[N09]0.23	< 0.01
Perfluorodecanesulfonic acid (PFDS)[N15]	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	110	112	106
18O2-PFHxS (surr.)	1	%	119	116	108
13C8-PFOS (surr.)	1	%	95	103	106
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.05	ug/L	< 0.05	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.01	ug/L	< 0.01	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	77	88	98
13C2-6:2 FTSA (surr.)	1	%	118	126	89
13C2-8:2 FTSA (surr.)	1	%	64	80	57
13C2-10:2 FTSA (surr.)	1	%	73	55	87
PFASs Summations					
Sum (PFHxS + PFOS)*	0.01	ug/L	0.28	0.32	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.22	0.23	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.28	0.32	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.29	0.36	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	0.29	0.36	< 0.1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Apr 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Apr 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Apr 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Apr 21, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Apr 20, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

[redacted]

[redacted]

Company Name:	Stantec Australia Pty Ltd (VIC)	**Order No.:**	**Received:**	Apr 20, 2023 5:46 PM
Address:	[redacted]	**Report #:** 982794	**Due:**	May 1, 2023
		Phone:	**Priority:**	5 Day
		Fax:	**Contact Name:**	[redacted])
Project Name:	NSW_0315_PFASOMP		**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	0315_QC201_20230411	Apr 11, 2023		Soil	M23-Ap0044991	X	X
2	0315_QC202_20230411	Apr 11, 2023		Water	M23-Ap0044992		X
3	0315_QC203_20230412	Apr 12, 2023		Soil	M23-Ap0044993	X	X
4	0315_QC204_20230412	Apr 12, 2023		Water	M23-Ap0044994		X
5	0315_QC205_20230413	Apr 13, 2023		Water	M23-Ap0044995		X
Test Counts						2	5

[redacted]

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**μg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	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 (PFSAs)							
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 FTSAs)							
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)	%	119			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	103			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	113			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	105			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	110			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	98			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	93			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	100			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	96			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	142			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	94			50-150	Pass	

eurofins Environment Testing

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	88			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	79			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	70			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	93			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	92			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	107			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	100			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	85			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	96			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	90			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	94			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	98			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	118			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	94			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	77			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	95			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	116			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	97			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	104			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M23-Ap0043529	NCP	%	100			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Ap0043529	NCP	%	100			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Ap0043529	NCP	%	116			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Ap0043529	NCP	%	105			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M23-Ap0043529	NCP	%	108			50-150	Pass	
Perfluorononanoic acid (PFNA)	M23-Ap0043529	NCP	%	104			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M23-Ap0043529	NCP	%	92			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Ap0043529	NCP	%	114			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Ap0043529	NCP	%	103			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Ap0043529	NCP	%	106			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M23-Ap0043529	NCP	%	95			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Ap0043529	NCP	%	103			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Ap0043529	NCP	%	91			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Ap0043529	NCP	%	103			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Ap0043529	NCP	%	100			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-Ap0043529	NCP	%	102			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Ap0043529	NCP	%	99			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M23-Ap0043529	NCP	%	90			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Ap0043529	NCP	%	111			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Ap0043529	NCP	%	93			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Ap0043529	NCP	%	94			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Ap0043529	NCP	%	99			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Ap0043529	NCP	%	111			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Ap0043529	NCP	%	94			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Ap0043529	NCP	%	94			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Ap0043529	NCP	%	99			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Ap0043529	NCP	%	112			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Ap0043529	NCP	%	92			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Ap0043529	NCP	%	116			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Ap0043528	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Ap0043528	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

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

Authorised by:

[redacted] Analytical Services Manager

[redacted] Senior Analyst-PFAS

[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 or please click here.

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

CHAIN OF CUSTODY

COC#: 50562 ALS Laboratory: [redacted]

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: [redacted]

ORDER NO:

PROJECT MANAGER: [redacted] CONTACT PH: [redacted] SAMPLER MOBILE: [redacted]

PRIMARY SAMPLER: [redacted] QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS000 6

EMAIL REPORTS TO: [redacted]

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	SW (PFAS Full(std Level)) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0315_SW680_20230413		13/04/2023 08:48 PM	WATER	ALS: 2 Non ALS: 0	No	X		

Environmental Division
Melbourne
Work Order Reference
EM2306924

Telephone + 61-3-8549 9600

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2306924**		
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
E-mail	: [redacted]	E-mail	[redacted]
Telephone	: ----	Telephone	: [redacted]
Facsimile	: ----	Facsimile	: [redacted]
Project	: NSW_0315_PFASOMP	Page	: 1 of 2
Order number	: -	Quote number	: EM2022MWHAUS0006 (SY/139/19_Kapooka)
C-O-C number	: 50562	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: [redacted]		
Sampler	: [redacted]		

Dates

Date Samples Received	: 20-Apr-2023 19:21	Issue Date	: 21-Apr-2023
Client Requested Due Date	: 28-Apr-2023	Scheduled Reporting Date	: **26-Apr-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 8	Temperature	: 7.6°C
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 direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **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.

EM2306924-001 : 13-Apr-2023 20:48 : 0315_SW680_ 20230413

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)
EM2306924-001	13-Apr-2023 20:48	0315_SW680_ 20230413	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ADDRESS

- A4 - AU Tax Invoice (INV) Email [redacted]

[redacted]

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

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT) Email [redacted]

[redacted]

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

CERTIFICATE OF ANALYSIS

Work Order	: **EM2306924**	Page	: 1 of 5
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023 19:21
Order number	: -	Date Analysis Commenced	: 22-Apr-2023
C-O-C number	: 50562	Issue Date	: 24-Apr-2023 14:07
Sampler	: [redacted]		
Site	: [redacted]		
Quote number	: SY/139/19_Kapooka		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	2IC Organic Chemist	[redacted]

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: Poor matrix spike recovery for sample EM2306760-021 due to sample matrix interference.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW680_ 20230413	----	----	----	----
			Sampling date / time	13-Apr-2023 20:48	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2306924-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	**0.03**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.10**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW680_ 20230413	----	----	----	----
			Sampling date / time	13-Apr-2023 20:48	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	EM2306924-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.13**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.13**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.13**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**91.3**	----	----	----	----
13C8-PFOA	----	0.02	%	**95.1**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SURFACE WATER**

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

QUALITY CONTROL REPORT

Work Order	: **EM2306924**	Page	: 1 of 6
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023
Order number	: -	Date Analysis Commenced	: 22-Apr-2023
C-O-C number	: 50562	Issue Date	: 24-Apr-2023
Sampler	: [redacted]		
Site	: [redacted]		
Quote number	: SY/139/19_Kapooka		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	2IC Organic Chemist	[redacted]

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5007118)									
EM2306760-021	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: 5007118)									
EM2306760-021	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: 5007118)									
EM2306760-021	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 sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5007118) - continued									
EM2306760-021	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: 5007118)									
EM2306760-021	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: 5007118)									
EM2306760-021	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**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5007118)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	105	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	108	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	92.3	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	115	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	98.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	90.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5007118)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	98.9	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	91.1	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	97.5	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	93.7	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	95.1	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	96.4	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	99.2	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	94.4	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	83.7	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	107	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5007118)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	99.3	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	117	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	108	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	102	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	100.0	70.0	130
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	99.9	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5007118)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5007118) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	113	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	98.6	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	107	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	75.0	70.0	130
EP231P: PFAS Sums (QCLot: 5007118)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5007118)							
EM2306760-021	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	102	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	109	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	94.2	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	112	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	99.4	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	93.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5007118)							
EM2306760-021	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	96.3	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	95.7	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	101	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	93.7	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	91.9	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	96.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	97.3	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	103	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	95.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	81.7	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	105	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5007118)							

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: 5007118) - continued							
EM2306760-021	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	100	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	116	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	110	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	98.9	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	99.0	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	108	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5007118)							
EM2306760-021	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	101	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	101	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	92.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	# 57.8	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2306924**	Page	: 1 of 4
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: [redacted]
Site	: [redacted]	Issue Date	: [redacted]
Sampler	: [redacted]	No. of samples received	: 1
Order number	: -	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **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							
EP231D: (n:2) Fluorotelomer Sulfonic Acids	EM2306760--021	Anonymous	**10:2 Fluorotelomer sulfonic acid (10:2 FTS)**	120226-60-0	57.8 %	70.0-130%	**Recovery less than lower data quality objective**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
	1				
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	15	6.67	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0315_SW680_ 20230413	**13-Apr-2023**	**22-Apr-2023**	10-Oct-2023	✓	**24-Apr-2023**	10-Oct-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0315_SW680_ 20230413	**13-Apr-2023**	**22-Apr-2023**	10-Oct-2023	✓	**24-Apr-2023**	10-Oct-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0315_SW680_ 20230413	**13-Apr-2023**	**22-Apr-2023**	10-Oct-2023	✓	**24-Apr-2023**	10-Oct-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0315_SW680_ 20230413	**13-Apr-2023**	**22-Apr-2023**	10-Oct-2023	✓	**24-Apr-2023**	10-Oct-2023	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0315_SW680_ 20230413	**13-Apr-2023**	**22-Apr-2023**	10-Oct-2023	✓	**24-Apr-2023**	10-Oct-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	**6.67**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

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

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

CHAIN OF CUSTODY

COC#: **50563** *ALS Laboratory:* EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: [redacted]

ORDER NO:

PROJECT MANAGER: [redacted] CONTACT PH: [redacted] SAMPLER MOBILE: [redacted]

PRIMARY SAMPLER: [redacted] QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

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	GW (PFAS Full/Std Level) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0315_MW625_ 20230413		13/04/2023 08:53 PM	WATER	ALS: 2 Non ALS: 0	No	X		

Environmental Division
Melbourne
Work Order Reference
EM2306925

Telephone: +61-3-8549 9600

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2306925**		
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	[redacted]	Contact	: [redacted]
Address	: [redacted], [redacted]	Address	: [redacted]
E-mail	[redacted]	E-mail	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Facsimile	: ----	Facsimile	[redacted]
Project	: NSW_0315_PFASOMP	Page	: 1 of 2
Order number	: -	Quote number	: EM2022MWHAUS0006 (SY/139/19_Kapooka)
C-O-C number	: 50563	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: [redacted]		
Sampler	: [redacted]		

Dates

Date Samples Received	: 20-Apr-2023 19:21	Issue Date	: 22-Apr-2023
Client Requested Due Date	: 28-Apr-2023	Scheduled Reporting Date	: **26-Apr-2023**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 8	Temperature	: 7.6°C - 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 direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **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.

EM2306925-001 : 13-Apr-2023 20:53 : 0315_MW625_ 20230413

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)
EM2306925-001	13-Apr-2023 20:53	0315_MW625_ 20230413	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ADDRESS

- A4 - AU Tax Invoice (INV) Email sapinvoices@stantec.com

[redacted]

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

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT) Email [redacted]

[redacted]

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2306925**	Page	: 1 of 4
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023
Site	: [redacted]	Issue Date	: 26-Apr-2023
Sampler	: [redacted]	No. of samples received	: 1
Order number	: -	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	14	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0315_MW625_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) 0315_MW625_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0315_MW625_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) 0315_MW625_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) 0315_MW625_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	14	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	14	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

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

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

QUALITY CONTROL REPORT

Work Order	: **EM2306925**	Page	: 1 of 4
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023
Order number	: -	Date Analysis Commenced	: 24-Apr-2023
C-O-C number	: 50563	Issue Date	: 26-Apr-2023
Sampler	: [redacted]		
Site	: [redacted]		
Quote number	: SY/139/19_Kapooka		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	2IC Organic Chemist	[redacted]

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

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

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5009076)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	94.9	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	108	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	90.9	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	109	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	90.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	88.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5009076)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	93.2	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	88.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	99.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	90.7	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	88.8	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	90.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.9	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	86.9	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	75.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	93.5	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5009076)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	90.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	79.3	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.3	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	87.9	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	89.0	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	90.9	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	99.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5009076)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5009076) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	94.0	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	90.7	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	92.4	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	103	70.0	130
EP231P: PFAS Sums (QCLot: 5009076)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

CERTIFICATE OF ANALYSIS

Work Order	: **EM2306925**	Page	: 1 of 5
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023 19:21
Order number	: -	Date Analysis Commenced	: 24-Apr-2023
C-O-C number	: 50563	Issue Date	: 26-Apr-2023 14:17
Sampler	: [redacted]		
Site	: [redacted]		
Quote number	: SY/139/19_Kapooka		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	2IC Organic Chemist	[redacted]

General Comments

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

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

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

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

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

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

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

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

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW625_ 20230413	----	----	----	----
			Sampling date / time	13-Apr-2023 20:53	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2306925-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW625_ 20230413	----	----	----	----
			Sampling date / time	13-Apr-2023 20:53	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	EM2306925-001	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**102**	----	----	----	----
13C8-PFOA	----	0.02	%	**102**	----	----	----	----

Work Order : EM2306925
Client : STANTEC AUSTRALIA PTY LTD
Project : NSW_0315_PFASOMP

Surrogate Control Limits

Sub-Matrix: **GROUNDWATER**

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

CHAIN OF CUSTODY

COC#: 50564 *ALS Laboratory:* EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: [redacted]

ORDER NO:

PROJECT MANAGER: [redacted]
PRIMARY SAMPLER:

CONTACT PH: [redacted] SAMPLER MOBILE: [redacted]

QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

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	GW (PFAS Full/Std Level) WATER	SED (PFAS Full/Std Level) SOIL	SW (PFAS Full/Std Level) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0315_MW601_20230413		13/04/2023 08:47 PM	WATER	ALS: 2 Non ALS: 0	No	X				
002	0315_MW624_20230413		13/04/2023 08:46 PM	WATER	ALS: 2 Non ALS: 0	No	X				
003	0315_SW614_20230416		16/04/2023 10:50 AM	WATER	ALS: 2 Non ALS: 0	No			X		
004	0315_SD614_20230412_0.00-0.10		12/04/2023 06:22 PM	SOIL	ALS: 1 Non ALS: 0	No		X			
005	0315_SD677_20230412_0.00-0.10		12/04/2023 06:21 PM	SOIL	ALS: 1 Non ALS: 0	No		X			

Environmental Division
Melbourne
Work Order Reference
EM2306926

Thursday, April 20, 2023 9:19:39 AM

CHAIN OF CUSTODY

COC#: 50564 ALS Laboratory: EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: [redacted]

ORDER NO:

PROJECT MANAGER: [redacted]

PRIMARY SAMPLER:

CONTACT PH: [redacted] SAMPLER MOBILE: [redacted]

QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

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	0315_MW601_ 20230413	HDPE (no PTFE)	20 mL	00350522050409	Grey	No	
001	0315_MW601_ 20230413	HDPE (no PTFE)	20 mL	00350522050425	Grey	No	
002	0315_MW624_20230413	HDPE (no PTFE)	20 mL	00350522010863	Grey	No	
002	0315_MW624_20230413	HDPE (no PTFE)	20 mL	00350522010932	Grey	No	
003	0315_SW614_20230416	HDPE (no PTFE)	20 mL	00350522011720	Grey	No	
003	0315_SW614_20230416	HDPE (no PTFE)	20 mL	00350522011681	Grey	No	
004	0315_SD614_20230412_0.	HDPE Soil Jar	200 mL	00621122018704	Grey	No	
005	0315_SD677_20230412_0.	HDPE Soil Jar	200 mL	00621122018730	Grey	No	

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

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2306926**		
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Facsimile	: ----	Facsimile	: [redacted]
Project	: NSW_0315_PFASOMP	Page	: 1 of 3
Order number	: -	Quote number	: EM2022MWHAUS0006 (SY/139/19_Kapooka)
C-O-C number	: 50564	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: [redacted]		
Sampler	: [redacted]		

Dates

Date Samples Received	: 20-Apr-2023 19:21	Issue Date	: 26-Apr-2023
Client Requested Due Date	: 28-Apr-2023	Scheduled Reporting Date	: **26-Apr-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 8	Temperature	: 7.6°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 5 / 5

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **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.

EM2306926-001 : 13-Apr-2023 20:47 : 0315_MW601_ 20230413

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)
EM2306926-004	12-Apr-2023 18:22	0315_SD614_20230412	✓	✓
EM2306926-005	12-Apr-2023 18:21	0315_SD677_20230412	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	WATER - EP231X PFAS - Full Suite (28 analytes)
EM2306926-001	13-Apr-2023 20:47	0315_MW601_ 20230413	✓
EM2306926-002	13-Apr-2023 20:46	0315_MW624_20230413	✓
EM2306926-003	16-Apr-2023 10:50	0315_SW614_20230416	✓

Proactive Holding Time Report

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

Requested Deliverables

ACCOUNTS ADDRESS

- A4 - AU Tax Invoice (INV)	Email	[redacted]

[redacted]

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

DERP LAB REPORTS

- EDI Format - ESDAT (ESDAT)	Email	[redacted]

[redacted]

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2306926**	Page	: 1 of 5
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023
Site	: [redacted]	Issue Date	: 26-Apr-2023
Sampler	: [redacted]	No. of samples received	: 5
Order number	: -	No. of samples analysed	: 5

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	12	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	14	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055)								
0315_SD614_20230412,	0315_SD677_20230412	**12-Apr-2023**	**----**	----	----	**24-Apr-2023**	26-Apr-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0315_SD614_20230412,	0315_SD677_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X)								
0315_SD614_20230412,	0315_SD677_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X)								
0315_SD614_20230412,	0315_SD677_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X)								
0315_SD614_20230412,	0315_SD677_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) 0315_SD614_20230412,	0315_SD677_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0315_MW601_ 20230413,	0315_MW624_20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW614_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0315_MW601_ 20230413,	0315_MW624_20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW614_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) 0315_MW601_ 20230413,	0315_MW624_20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW614_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0315_MW601_ 20230413,	0315_MW624_20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW614_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0315_MW601_ 20230413,	0315_MW624_20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_SW614_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	12	**0.00**	**5.00**	✗	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	14	**0.00**	**10.00**	✗	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	14	**0.00**	**5.00**	✗	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

QUALITY CONTROL REPORT

Work Order	: **EM2306926**	Page	: 1 of 7
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023
Order number	: -	Date Analysis Commenced	: 24-Apr-2023
C-O-C number	: 50564	Issue Date	: 26-Apr-2023
Sampler	: [redacted]		
Site	: [redacted]		
Quote number	: SY/139/19_Kapooka		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

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]	Non-Metals Team Leader	[redacted]
[redacted]	2IC Organic Chemist	[redacted]

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5007965)									
EM2306926-004	0315_SD614_20230412	EA055: Moisture Content	----	0.1	%	20.4	19.7	3.8	0% - 20%
EM2306946-028	Anonymous	EA055: Moisture Content	----	0.1	%	49.6	42.6	15.1	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5007735)									
EM2306926-004	0315_SD614_20230412	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	0.0003	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	0.0090	0.0099	10.2	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EM2306946-028	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	0.0036	0.0030	16.2	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0003	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0246	0.0219	11.7	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0009	0.0009	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5007735)									
EM2306926-004	0315_SD614_20230412	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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5007735) - continued									
EM2306926-004	0315_SD614_20230412	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
EM2306946-028	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0003	0.0003	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0008	0.0008	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	0.0003	0.0003	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	0.0004	0.0002	41.9	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0005	0.0003	39.5	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	0.0003	0.0003	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: 5007735)									
EM2306926-004	0315_SD614_20230412	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
EM2306946-028	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	0.0002	0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5007735)									
EM2306926-004	0315_SD614_20230412	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
EM2306946-028	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: 5007735)									
EM2306926-004	0315_SD614_20230412	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0092	0.0102	10.3	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0092	0.0102	10.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0092	0.0102	10.3	0% - 20%
EM2306946-028	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0330	0.0286	14.3	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0282	0.0249	12.4	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0298	0.0263	12.5	0% - 20%

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5007735)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	88.7	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	94.4	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	92.4	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	95.2	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	89.4	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	87.1	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5007735)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	101	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.7	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.8	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.3	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.2	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.0	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.8	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.1	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	83.7	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5007735)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	81.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.2	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	86.5	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	76.9	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	95.9	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.7	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	77.3	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5007735)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5007735) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	91.9	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00119 mg/kg	91.6	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	82.9	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00121 mg/kg	86.9	70.0	130
EP231P: PFAS Sums (QCLot: 5007735)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5009076)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	94.9	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	108	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	90.9	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	109	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	90.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	88.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5009076)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	93.2	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	88.0	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	99.6	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	90.7	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	88.8	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	90.0	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.9	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	86.9	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	75.4	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	93.5	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5009076)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	90.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	79.3	68.0	141

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5009076) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	78.3	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	87.9	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	89.0	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	90.9	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	99.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5009076)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	94.0	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	90.7	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	92.4	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	103	70.0	130
EP231P: PFAS Sums (QCLot: 5009076)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

CERTIFICATE OF ANALYSIS

Work Order	: **EM2306926**	Page	: 1 of 9
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023 19:21
Order number	: -	Date Analysis Commenced	: 24-Apr-2023
C-O-C number	: 50564	Issue Date	: 26-Apr-2023 19:11
Sampler	: [redacted]		
Site	: [redacted]		
Quote number	: SY/139/19_Kapooka		
No. of samples received	: 5		
No. of samples analysed	: 5		

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]	Non-Metals Team Leader	[redacted]
[redacted]	2IC Organic Chemist	[redacted]

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.
- EP231X: Poor matrix spike recovery for sample EM2306926-005 due to sample matrix interference.
- EP231X: Sample EM2306926-002 positive for 6:2 FTS result has been confirmed by direct injection method using second container.
- EP231X: Sample EM2306926-003 positive PFOS results have been confirmed by direct injection method using second container.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW601_20230413	0315_MW624_20230413	----	----	----
			Sampling date / time	13-Apr-2023 20:47	13-Apr-2023 20:46	----	----	----
Compound	CAS Number	LOR	Unit	EM2306926-001	EM2306926-002	--------	--------	--------
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	**0.02**	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	**0.04**	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	**0.36**	<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	**0.21**	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	**0.03**	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW601_20230413	0315_MW624_20230413	----	----	----
			Sampling date / time	13-Apr-2023 20:47	13-Apr-2023 20:46	----	----	----
Compound	CAS Number	LOR	Unit	EM2306926-001	EM2306926-002	--------	--------	--------
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	**0.23**	----	----	----
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	**0.68**	**0.23**	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.57**	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.62**	**0.23**	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**87.2**	**90.4**	----	----	----
13C8-PFOA	----	0.02	%	**89.6**	**96.5**	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0315_SD614_20230412	0315_SD677_20230412	----	----	----
			Sampling date / time	12-Apr-2023 18:22	12-Apr-2023 18:21	----	----	----
Compound	CAS Number	LOR	Unit	EM2306926-004	EM2306926-005	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**20.4**	**35.3**	----	----	----
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	**0.0090**	**0.0066**	----	----	----
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	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0315_SD614_20230412	0315_SD677_20230412	----	----	----
			Sampling date / time	12-Apr-2023 18:22	12-Apr-2023 18:21	----	----	----
Compound	CAS Number	LOR	Unit	EM2306926-004	EM2306926-005	--------	--------	--------
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0092**	**0.0066**	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0092**	**0.0066**	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0092**	**0.0066**	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**94.9**	**110**	----	----	----
13C8-PFOA	----	0.0002	%	**95.9**	**95.5**	----	----	----

Analytical Results

Sub-Matrix: SURFACE WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	0315_SW614_20230416	----	----	----	----
			Sampling date / time	16-Apr-2023 10:50	----	----	----	----
				EM2306926-003	--------	--------	--------	--------
				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	**0.07**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW614_20230416	----	----	----	----
			Sampling date / time	16-Apr-2023 10:50	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2306926-003	--------	--------	--------	--------
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.07**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.07**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.07**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**98.7**	----	----	----	----
13C8-PFOA	----	0.02	%	**101**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **GROUNDWATER**

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

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP231S: PFAS Surrogate			
13C4-PFOS	----	68	136
13C8-PFOA	----	69	133

Sub-Matrix: **SURFACE WATER**

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

CHAIN OF CUSTODY

COC#: 50561 ALS Laboratory: EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: Blamey Barracks Base

ORDER NO:

PROJECT MANAGER: [redacted] CONTACT PH: [redacted] SAMPLER MOBILE: [redacted]

PRIMARY SAMPLER: [redacted] QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

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	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	GW (PFAS Full/Std Level) WATER	SED (PFAS Full/Std Level) SOIL	SW (PFAS Full/Std Level) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	0315_MW008_20230412		12/04/2023 10:42 AM	WATER	ALS: 2 Non ALS: 0	No		X				
002	0315_MW103_20230413		13/04/2023 08:52 PM	WATER	ALS: 2 Non ALS: 0	No		X				
003	0315_MW104_20230415		15/04/2023 08:21 AM	WATER	ALS: 2 Non ALS: 0	No		X				
004	0315_MW107_20230413		13/04/2023 08:43 PM	WATER	ALS: 6 Non ALS: 0	No		X			Internal lab qc	
005	0315_MW109_20230413		13/04/2023 10:42 AM	WATER	ALS: 2 Non ALS: 0	No		X				
006	0315_MW110_20230413		13/04/2023 10:42 AM	WATER	ALS: 2 Non ALS: 0	No		X				
007	0315_SW103_20230412		12/04/2023 03:24 PM	WATER	ALS: 2 Non ALS: 0	No				X		
008	0315_SW106_20230412		12/04/2023 06:25 PM	WATER	ALS: 2 Non ALS: 0	No				X		
009	0315_SW107_20230412		12/04/2023 06:25 PM	WATER	ALS: 2 Non ALS: 0	No				X		

Environmental Division
Melbourne
Work Order Reference
EM2306946

CHAIN OF CUSTODY

COC#: 50561 ALS Laboratory: EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: Blamey Barracks Base

ORDER NO:

PROJECT MANAGER: [redacted]

PRIMARY SAMPLER: [redacted]

CONTACT PH: [redacted]

SAMPLER MOBILE: [redacted]

QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

EMAIL INVOICES TO: [redacted]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

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

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	GW (PFAS Full/Std Level) WATER	SED (PFAS Full/Std Level) SOIL	SW (PFAS Full/Std Level) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	0315_SW108_20230413		13/04/2023 08:50 PM	WATER	ALS: 2 Non ALS: 0	No				X		
011	0315_SW111_20230413		13/04/2023 08:48 PM	WATER	ALS: 2 Non ALS: 0	No				X		
012	0315_SW118_20230412		12/04/2023 06:27 PM	WATER	ALS: 2 Non ALS: 0	No				X		
013	0315_SW121_20230411		11/04/2023 05:25 PM	WATER	ALS: 2 Non ALS: 0	No				X		
014	0315_SW127_20230412		12/04/2023 11:54 AM	WATER	ALS: 6 Non ALS: 0	No				X	Lab internal qc	
015	0315_SW136_20230412		12/04/2023 03:44 PM	WATER	ALS: 6 Non ALS: 0	No				X	Lab internal qc	
016	0315_SW140_20230412		12/04/2023 06:26 PM	WATER	ALS: 2 Non ALS: 0	No				X		
017	0315_SW144_20230412		12/04/2023 06:24 PM	WATER	ALS: 2 Non ALS: 0	No				X		
018	0315_SW148_20230412		12/04/2023 06:24 PM	WATER	ALS: 2 Non ALS: 0	No				X		

Thursday, April 20, 2023 9:19:36 AM

CHAIN OF CUSTODY

COC#: 50561 ALS Laboratory: EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: Blamey Barracks Base

ORDER NO:

PROJECT MANAGER: [redacted]

PRIMARY SAMPLER:

CONTACT PH: [redacted]

SAMPLER MOBILE: [redacted]

QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

EMAIL INVOICES TO: [redacted]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

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

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	GW (PFAS Full/Std Level) WATER	SED (PFAS Full/Std Level) SOIL	SW (PFAS Full/Std Level) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	0315_SW149_20230412		12/04/2023 06:23 PM	WATER	ALS: 2 Non ALS: 0	No				X		
020	0315_SD103_20230412_0.00-0.10		12/04/2023 03:21 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
021	0315_SD106_20230412_0.00-0.10		12/04/2023 06:19 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
022	0315_SD107_20230412_0.00-0.10		12/04/2023 06:20 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
023	0315_SD108_20230413_0.00-0.10		13/04/2023 08:54 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
024	0315_SD111_20230413_0.00-0.10		13/04/2023 08:54 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
025	0315_SD118_20230412_0.00-0.10		12/04/2023 06:22 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
026	0315_SD121_20230411_0.00-0.10		11/04/2023 05:21 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
027	0315_SD127_20230412_0.00-0.10		12/04/2023 11:55 AM	SOIL	ALS: 3 Non ALS: 0	No			X		Internal lab qc	

CHAIN OF CUSTODY

(ALS) COC#: 50561   *ALS Laboratory:* EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: Blamey Barracks Base

ORDER NO:

PROJECT MANAGER: [redacted]

PRIMARY SAMPLER: [redacted]

CONTACT PH: [redacted]

SAMPLER MOBILE: [redacted]

QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

EMAIL INVOICES TO: [redacted]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

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

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS							ANALYSIS REQUIRED					
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	GW (PFAS Full/Std Level) WATER	SED (PFAS Full/Std Level) SOIL	SW (PFAS Full/Std Level) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
028	0315_SD136_20230412_0.00-0.10		12/04/2023 03:45 PM	SOIL	ALS: 3 Non ALS: 0	No			X		Internal lab qc	
029	0315_QC101_20230411		11/04/2023 05:21 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
030	0315_QC102_20230411		11/04/2023 05:23 PM	WATER	ALS: 2 Non ALS: 0	No				X		
031	0315_QC103_20230412		12/04/2023 03:22 PM	SOIL	ALS: 1 Non ALS: 0	No			X			
032	0315_QC104_20230412		12/04/2023 03:25 PM	WATER	ALS: 2 Non ALS: 0	No				X		
033	0315_WWDRUM_20230413		13/04/2023 09:13 AM	WATER	ALS: 2 Non ALS: 0	No				X		
034	0315_MW008_20230413		13/04/2023 11:18 AM	WATER	ALS: 2 Non ALS: 0	No					Place on hold	
035	0315_QC105_20230413		13/04/2023 08:51 PM	WATER	ALS: 2 Non ALS: 0	No		X				
036	0315_QC503_20230413		14/04/2023 06:23 PM	WATER	ALS: 2 Non ALS: 0	No				X		

CHAIN OF CUSTODY

ALS COC#: 50561 ALS Laboratory: EM Melbourne

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD
PROJECT: NSW_0315_PFASOMP
SITE: Blamey Barracks Base
ORDER NO:
PROJECT MANAGER: [redacted]
PRIMARY SAMPLER: [redacted]
CONTACT PH: [redacted]
SAMPLER MOBILE: [redacted]
QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006
EMAIL REPORTS TO: [redacted]
EMAIL INVOICES TO: [redacted]

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

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

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

SAMPLE DETAILS							ANALYSIS REQUIRED					
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	GW (PFAS Full/Std Level) WATER	SED (PFAS Full/Std Level) SOIL	SW (PFAS Full/Std Level) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
037	0315_QC504_20230413		14/04/2023 06:24 PM	WATER	ALS: 2 Non ALS: 0	No				X		
038	0315_QC304_20230413		14/04/2023 06:26 PM	WATER	ALS: 2 Non ALS: 0	No				X		
039	0315_QC305_20230413		14/04/2023 06:33 PM	WATER	ALS: 2 Non ALS: 0	No	-				Place on hold	
040	0315_QC306_20230415		15/04/2023 05:37 PM	WATER	ALS: 2 Non ALS: 0	No				X		
041	0315_QC307_20230416		16/04/2023 01:25 PM	WATER	ALS: 2 Non ALS: 0	No				X		
042	0315_QC301_20230411		16/04/2023 01:30 PM	WATER	ALS: 2 Non ALS: 0	No				X		
043	0315_QC302_20230412		16/04/2023 01:31 PM	WATER	ALS: 2 Non ALS: 0	No				X		
044	0315_QC303_20230412		16/04/2023 01:32 PM	WATER	ALS: 2 Non ALS: 0	No	-				Place on hold	
045	0906_QC502_2023412		12/04/2023 05:55 PM	WATER	ALS: 2 Non ALS: 0	No				X		

CHAIN OF CUSTODY

COC#: 50561 ALS Laboratory: EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: Blamey Barracks Base

ORDER NO:

PROJECT MANAGER: [redacted]

PRIMARY SAMPLER: [redacted]

CONTACT PH: [redacted]

SAMPLER MOBILE: [redacted]

QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

EMAIL INVOICES TO: [redacted]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

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

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS							ANALYSIS REQUIRED					
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	GW (PFAS Full/Std Level) WATER	SED (PFAS Full/Std Level) SOIL	SW (PFAS Full/Std Level) WATER	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
046	0906_QC501_2023412		12/04/2023 05:56 PM	WATER	ALS: 2 Non ALS: 0	No				X		

CHAIN OF CUSTODY

COC#: 50561 ALS Laboratory: EM Melbourne

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD
PROJECT: NSW_0315_PFASOMP
SITE: Blamey Barracks Base
ORDER NO:
PROJECT MANAGER: [redacted]
PRIMARY SAMPLER: [redacted]
CONTACT PH: [redacted]
SAMPLER MOBILE: [redacted]
QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006
EMAIL REPORTS TO: [redacted]
EMAIL INVOICES TO: [redacted]

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

TURNAROUND REQUIREMENTS : 5 Days
Biohazard info:

LABORATORY USE ONLY (Circle)

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

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	0315_MW008_20230412	HDPE (no PTFE)	20 mL	00350522011837	Grey	No	
001	0315_MW008_20230412	HDPE (no PTFE)	20 mL	00350522011675	Grey	No	
002	0315_MW103_20230413	HDPE (no PTFE)	20 mL	00350522010847	Grey	No	
002	0315_MW103_20230413	HDPE (no PTFE)	20 mL	00350522010972	Grey	No	
003	0315_MW104_20230415	HDPE (no PTFE)	20 mL	00350522011686	Grey	No	
003	0315_MW104_20230415	HDPE (no PTFE)	20 mL	00350522011850	Grey	No	
004	0315_MW107_20230413	HDPE (no PTFE)	20 mL	00350522010834	Grey	No	
004	0315_MW107_20230413	HDPE (no PTFE)	20 mL	00350522010936	Grey	No	
004	0315_MW107_20230413	HDPE (no PTFE)	20 mL	00350522010852	Grey	No	
004	0315_MW107_20230413	HDPE (no PTFE)	20 mL	00350522010766	Grey	No	
004	0315_MW107_20230413	HDPE (no PTFE)	20 mL	00350522010958	Grey	No	
004	0315_MW107_20230413	HDPE (no PTFE)	20 mL	00350522010785	Grey	No	
005	0315_MW109_20230413	HDPE (no PTFE)	20 mL	00350522011689	Grey	No	
005	0315_MW109_20230413	HDPE (no PTFE)	20 mL	00350522011877	Grey	No	
006	0315_MW110_20230413	HDPE (no PTFE)	20 mL	00350522011654	Grey	No	
006	0315_MW110_20230413	HDPE (no PTFE)	20 mL	00350522011887	Grey	No	
007	0315_SW103_20230412	HDPE (no PTFE)	20 mL	00350522011874	Grey	No	
007	0315_SW103_20230412	HDPE (no PTFE)	20 mL	00350522011926	Grey	No	
008	0315_SW106_20230412	HDPE (no PTFE)	20 mL	00350522011770	Grey	No	
008	0315_SW106_20230412	HDPE (no PTFE)	20 mL	00350522011674	Grey	No	
009	0315_SW107_20230412	HDPE (no PTFE)	20 mL	00350522010963	Grey	No	
009	0315_SW107_20230412	HDPE (no PTFE)	20 mL	00350522010761	Grey	No	
010	0315_SW108_ 20230413	HDPE (no PTFE)	20 mL	00350522010794	Grey	No	
010	0315_SW108_ 20230413	HDPE (no PTFE)	20 mL	00350522010864	Grey	No	
011	0315_SW111_ 20230413	HDPE (no PTFE)	20 mL	00350522010984	Grey	No	
011	0315_SW111_ 20230413	HDPE (no PTFE)	20 mL	00350522010827	Grey	No	

CHAIN OF CUSTODY

ALS COC#: 50561 ALS Laboratory: EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: Blamey Barracks Base

ORDER NO:

PROJECT MANAGER: [redacted]

PRIMARY SAMPLER: [redacted]

CONTACT PH: [redacted]

SAMPLER MOBILE: [redacted]

QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

EMAIL INVOICES TO: [redacted]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

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

Random Sample Temperature on Receipt: °C

Other comments:

012	0315_SW118_20230412	HDPE (no PTFE)	20 mL	00350522011003	Grey	No	
012	0315_SW118_20230412	HDPE (no PTFE)	20 mL	00350522010801	Grey	No	
013	0315_SW121_20230411	HDPE (no PTFE)	20 mL	00350522011872	Grey	No	
013	0315_SW121_20230411	HDPE (no PTFE)	20 mL	00350522011696	Grey	No	
014	0315_SW127_20230412	HDPE (no PTFE)	20 mL	00350522011647	Grey	No	
014	0315_SW127_20230412	HDPE (no PTFE)	20 mL	00350522011889	Grey	No	
014	0315_SW127_20230412	HDPE (no PTFE)	20 mL	00350522011881	Grey	No	
014	0315_SW127_20230412	HDPE (no PTFE)	20 mL	00350522011839	Grey	No	
014	0315_SW127_20230412	HDPE (no PTFE)	20 mL	00350522011809	Grey	No	
014	0315_SW127_20230412	HDPE (no PTFE)	20 mL	00350522011685	Grey	No	
015	0315_SW136_20230412	HDPE (no PTFE)	20 mL	00350522011896	Grey	No	
015	0315_SW136_20230412	HDPE (no PTFE)	20 mL	00350522011710	Grey	No	
015	0315_SW136_20230412	HDPE (no PTFE)	20 mL	00350522011732	Grey	No	
015	0315_SW136_20230412	HDPE (no PTFE)	20 mL	00350522011929	Grey	No	
015	0315_SW136_20230412	HDPE (no PTFE)	20 mL	00350522011723	Grey	No	
015	0315_SW136_20230412	HDPE (no PTFE)	20 mL	00350522011886	Grey	No	
016	0315_SW140_20230412	HDPE (no PTFE)	20 mL	00350522010870	Grey	No	
016	0315_SW140_20230412	HDPE (no PTFE)	20 mL	00350522010899	Grey	No	
017	0315_SW144_20230412	HDPE (no PTFE)	20 mL	00350522010982	Grey	No	
017	0315_SW144_20230412	HDPE (no PTFE)	20 mL	00350522011020	Grey	No	
018	0315_SW148_20230412	HDPE (no PTFE)	20 mL	00350522010990	Grey	No	
018	0315_SW148_20230412	HDPE (no PTFE)	20 mL	00350522010902	Grey	No	
019	0315_SW149_20230412	HDPE (no PTFE)	20 mL	00350522011035	Grey	No	
019	0315_SW149_20230412	HDPE (no PTFE)	20 mL	00350522010745	Grey	No	
020	0315_SD103_20230412_0.	HDPE Soil Jar	200 mL	00621122018678	Grey	No	
021	0315_SD106_20230412_0.	HDPE Soil Jar	200 mL	00621122018732	Grey	No	
022	0315_SD107_20230412_0.	HDPE Soil Jar	200 mL	00621122018718	Grey	No	

Thursday, April 20, 2023 9:19:36 AM

CHAIN OF CUSTODY

ALS COC#: 50561 ALS Laboratory: EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD

PROJECT: NSW_0315_PFASOMP

SITE: Blamey Barracks Base

ORDER NO:

PROJECT MANAGER: [redacted]

PRIMARY SAMPLER: [redacted]

CONTACT PH: [redacted]

SAMPLER MOBILE: [redacted]

QUOTE NO: SY/138/19_Kapooka / EM2022MWHAUS0006

EMAIL REPORTS TO: [redacted]

EMAIL INVOICES TO: [redacted]

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

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

023	0315_SD108_	HDPE Soil Jar	200 mL	00621122018721	Grey	No	
024	0315_SD111_	HDPE Soil Jar	200 mL	00621122018701	Grey	No	
025	0315_SD118_20230412_0	HDPE Soil Jar	200 mL	00621122018655	Grey	No	
026	0315_SD121_20230411_0	HDPE Soil Jar	200 mL	00621122018683	Grey	No	
027	0315_SD127_20230412_0	HDPE Soil Jar	200 mL	00621122018745	Grey	No	
027	0315_SD127_20230412_0	HDPE Soil Jar	200 mL	00621122018654	Grey	No	
027	0315_SD127_20230412_0	HDPE Soil Jar	200 mL	00621122018694	Grey	No	
028	0315_SD136_20230412_0	HDPE Soil Jar	200 mL	00621122018731	Grey	No	
028	0315_SD136_20230412_0	HDPE Soil Jar	200 mL	00620719027108	Grey	No	
028	0315_SD136_20230412_0	HDPE Soil Jar	200 mL	00621122018679	Grey	No	
029	0315_QC101_20230411	HDPE Soil Jar	200 mL	00621122018729	Grey	No	
030	0315_QC102_20230411	HDPE (no PTFE)	20 mL	00350522011875	Grey	No	
030	0315_QC102_20230411	HDPE (no PTFE)	20 mL	00350522011656	Grey	No	
031	0315_QC103_20230412	HDPE Soil Jar – N.R.	200 mL	00621122018677	Grey	No	
032	0315_QC104_20230412	HDPE (no PTFE)	20 mL	00350522011838	Grey	No	
032	0315_QC104_20230412	HDPE (no PTFE)	20 mL	00350522011869	Grey	No	
033	0315_WWDRUM_2023041	HDPE (no PTFE)	20 mL	00350522011695	Grey	No	
033	0315_WWDRUM_2023041	HDPE (no PTFE)	20 mL	00350522011700	Grey	No	
034	0315_MW008_20230413	HDPE (no PTFE)	20 mL	00350522011711	Grey	No	
034	0315_MW008_20230413	HDPE (no PTFE)	20 mL	00350522011689	Grey	No	
035	0315_QC105_20230413	HDPE (no PTFE)	20 mL	00350522010878	Grey	No	
035	0315_QC105_20230413	HDPE (no PTFE)	20 mL	00350522010747	Grey	No	
036	0315_QC503_20230413	HDPE (no PTFE)	20 mL	00350522010391	Grey	No	
036	0315_QC503_20230413	HDPE (no PTFE)	20 mL	00350522010304	Grey	No	
037	0315_QC504_20230413	HDPE (no PTFE)	20 mL	00350522011033	Grey	No	
037	0315_QC504_20230413	HDPE (no PTFE)	20 mL	00350522031078	Grey	No	
038	0315_QC304_20230413	HDPE (no PTFE)	20 mL	00350522010754	Grey	No	

Thursday, April 20, 2023 9:19:36 AM

CHAIN OF CUSTODY

ALS COC#: 50561 ALS Laboratory: EM Melbourne

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

CLIENT: MWHAUS - STANTEC AUSTRALIA PTY LTD
PROJECT: NSW_0315_PFASOMP
SITE: Blamey Barracks Base
ORDER NO:
PROJECT MANAGER: [redacted]
PRIMARY SAMPLER:
CONTACT PH: [redacted] SAMPLER MOBILE: [redacted]
QUOTE NO: SY/139/19_Kapooka / EM2022MWHAUS0006
EMAIL REPORTS TO: [redacted]
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:

038	0315_QC304_20230413	HDPE (no PTFE)	20 mL	00350522010809	Grey	No	
039	0315_QC305_20230413	HDPE (no PTFE)	20 mL	00350522010909	Grey	No	
039	0315_QC305_20230413	HDPE (no PTFE)	20 mL	00350522010873	Grey	No	
040	0315_QC306_20230415	HDPE (no PTFE)	20 mL	00350522010839	Grey	No	
040	0315_QC306_20230415	HDPE (no PTFE)	20 mL	00352101038885	Grey	No	
041	0315_QC307_20230416	HDPE (no PTFE)	20 mL	00350522011894	Grey	No	
041	0315_QC307_20230416	HDPE (no PTFE)	20 mL	00350522011737	Grey	No	
042	0315_QC301_20230411	HDPE (no PTFE)	20 mL	00350522010901	Grey	No	
042	0315_QC301_20230411	HDPE (no PTFE)	20 mL	00350522010930	Grey	No	
043	0315_QC302_20230412	HDPE (no PTFE)	20 mL	00350522010772	Grey	No	
043	0315_QC302_20230412	HDPE (no PTFE)	20 mL	00350522010999	Grey	No	
044	0315_QC303_20230412	HDPE (no PTFE)	20 mL	00350522010921	Grey	No	
044	0315_QC303_20230412	HDPE (no PTFE)	20 mL	00350522010822	Grey	No	
045	0906_QC502_2023412	HDPE (no PTFE)	20 mL	00350522010363	Grey	No	
045	0906_QC502_2023412	HDPE (no PTFE)	20 mL	00350522010312	Grey	No	
046	0906_QC501_2023412	HDPE (no PTFE)	20 mL	00350522010344	Grey	No	
046	0906_QC501_2023412	HDPE (no PTFE)	20 mL	00350522010968	Grey	No	

Total Bottle Count: ALS: 97, Non ALS: 0

Environmental Division
Melbourne
Work Order Reference
EM2306946

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **EM2306946**		
Amendment	: **1**		
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
E-mail	: [redacted]	E-mail	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Facsimile	: ----	Facsimile	: [redacted]
Project	: NSW_0315_PFASOMP	Page	: 1 of 4
Order number	: -	Quote number	: EM2022MWHAUS0006 (SY/139/19_Kapooka)
C-O-C number	: 50561	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Blamey Barracks Base		
Sampler	: [redacted]		

Dates

Date Samples Received	: 20-Apr-2023 19:21	Issue Date	: 06-May-2023
Client Requested Due Date	: 09-May-2023	Scheduled Reporting Date	: **09-May-2023**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 8	Temperature	: 7.6°C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 47 / 43

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 direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **Analytical work for this work order will be conducted at ALS Springvale.**
- **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.

EM2306946-010	: 13-Apr-2023 20:50	: 0315_SW108_ 20230413
EM2306946-011	: 13-Apr-2023 20:48	: 0315_SW111_ 20230413
EM2306946-023	: 13-Apr-2023 20:54	: 0315_SD108_ 20230413
EM2306946-024	: 13-Apr-2023 20:54	: 0315_SD111_ 20230413
EM2306946-033	: 13-Apr-2023 09:13	: 0315_WWDRUM_20230413

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)
EM2306946-020	12-Apr-2023 15:21	0315_SD103_20230412	✓	✓
EM2306946-021	12-Apr-2023 18:19	0315_SD106_20230412	✓	✓
EM2306946-022	12-Apr-2023 18:20	0315_SD107_20230412	✓	✓
EM2306946-023	13-Apr-2023 20:54	0315_SD108_ 20230413	✓	✓
EM2306946-024	13-Apr-2023 20:54	0315_SD111_ 20230413	✓	✓
EM2306946-025	12-Apr-2023 18:22	0315_SD118_20230412	✓	✓
EM2306946-026	11-Apr-2023 17:21	0315_SD121_20230411	✓	✓
EM2306946-027	12-Apr-2023 11:55	0315_SD127_20230412	✓	✓
EM2306946-028	12-Apr-2023 15:45	0315_SD136_20230412	✓	✓
EM2306946-029	11-Apr-2023 17:21	0315_QC101_20230411	✓	✓
EM2306946-031	12-Apr-2023 15:22	0315_QC103_20230412	✓	✓

Matrix: **WATER**

Laboratory sample ID	*Sampling date / time*	*Sample ID*	(On Hold) WATER No analysis requested	WATER - EP231X PFAS - Full Suite (28 analytes)
EM2306946-001	12-Apr-2023 10:42	0315_MW008_20230412		✓
EM2306946-002	13-Apr-2023 20:52	0315_MW103_20230413		✓
EM2306946-003	15-Apr-2023 08:21	0315_MW104_20230415		✓
EM2306946-004	13-Apr-2023 20:43	0315_MW107_20230413		✓
EM2306946-005	13-Apr-2023 10:42	0315_MW109_20230413		✓
EM2306946-006	13-Apr-2023 10:42	0315_MW110_20230413		✓
EM2306946-007	12-Apr-2023 15:24	0315_SW103_20230412		✓

			(On Hold) WATER No analysis requested	WATER - EP231X PFAS - Full Suite (28 analytes)
EM2306946-008	12-Apr-2023 18:25	0315_SW106_20230412		✓
EM2306946-009	12-Apr-2023 18:25	0315_SW107_20230412		✓
EM2306946-010	13-Apr-2023 20:50	0315_SW108_ 20230413		✓
EM2306946-011	13-Apr-2023 20:48	0315_SW111_ 20230413		✓
EM2306946-012	12-Apr-2023 18:27	0315_SW118_20230412		✓
EM2306946-013	11-Apr-2023 17:25	0315_SW121_20230411		✓
EM2306946-014	12-Apr-2023 11:54	0315_SW127_20230412		✓
EM2306946-015	12-Apr-2023 15:44	0315_SW136_20230412		✓
EM2306946-016	12-Apr-2023 18:26	0315_SW140_20230412		✓
EM2306946-017	12-Apr-2023 18:24	0315_SW144_20230412		✓
EM2306946-018	12-Apr-2023 18:24	0315_SW148_20230412		✓
EM2306946-019	12-Apr-2023 18:23	0315_SW149_20230412		✓
EM2306946-030	11-Apr-2023 17:23	0315_QC102_20230411		✓
EM2306946-032	12-Apr-2023 15:25	0315_QC104_20230412		✓
EM2306946-033	13-Apr-2023 09:13	0315_WWDRUM_20230413		✓
EM2306946-034	13-Apr-2023 11:18	0315_MW008_20230413	✓	
EM2306946-035	13-Apr-2023 20:51	0315_QC105_20230413		✓
EM2306946-036	13-Apr-2023 18:23	0315_QC503_20230413		✓
EM2306946-037	13-Apr-2023 18:24	0315_QC504_20230413		✓
EM2306946-038	13-Apr-2023 18:26	0315_QC304_20230413		✓
EM2306946-039	13-Apr-2023 18:33	0315_QC305_20230413	✓	
EM2306946-040	15-Apr-2023 17:37	0315_QC306_20230415		✓
EM2306946-041	16-Apr-2023 13:25	0315_QC307_20230416		✓
EM2306946-042	11-Apr-2023 13:30	0315_QC301_20230411		✓
EM2306946-043	12-Apr-2023 13:31	0315_QC302_20230412		✓
EM2306946-044	12-Apr-2023 13:32	0315_QC303_20230412	✓	
EM2306946-045	12-Apr-2023 17:55	0315_QC502_20230412		✓
EM2306946-046	12-Apr-2023 17:56	0315_QC501_20230412		✓
EM2306946-047	06-May-2023 00:00	EXTRA SAMPLE	✓	

Proactive Holding Time Report

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

Requested Deliverables

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

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2306946**	Page	: 1 of 10
Amendment	: **1**		
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023
Site	: Blamey Barracks Base	Issue Date	: 09-May-2023
Sampler	: [redacted]	No. of samples received	: 47
Order number	: -	No. of samples analysed	: 43

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
	0				
Matrix Spikes (MS)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Quality Control Sample Type Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
	3				
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	3	32	9.38	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: **SOIL**

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

Method *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055) 0315_SD121_20230411, 0315_QC101_20230411	**11-Apr-2023**	----	----	----	**24-Apr-2023**	25-Apr-2023	✓
HDPE Soil Jar (EA055) 0315_SD103_20230412, 0315_SD106_20230412, 0315_SD107_20230412, 0315_SD118_20230412, 0315_SD127_20230412, 0315_SD136_20230412, 0315_QC103_20230412	**12-Apr-2023**	----	----	----	**24-Apr-2023**	26-Apr-2023	✓
HDPE Soil Jar (EA055) 0315_SD108_ 20230413, 0315_SD111_ 20230413	**13-Apr-2023**	----	----	----	**24-Apr-2023**	27-Apr-2023	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) 0315_SD121_20230411,	0315_QC101_20230411	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD103_20230412, 0315_SD107_20230412, 0315_SD127_20230412,	0315_SD106_20230412, 0315_SD118_20230412, 0315_SD136_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_QC103_20230412		**12-Apr-2023**	**26-Apr-2023**	09-Oct-2023	✓	**09-May-2023**	05-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD108_ 20230413,	0315_SD111_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) 0315_SD121_20230411,	0315_QC101_20230411	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD103_20230412, 0315_SD107_20230412, 0315_SD127_20230412,	0315_SD106_20230412, 0315_SD118_20230412, 0315_SD136_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_QC103_20230412		**12-Apr-2023**	**26-Apr-2023**	09-Oct-2023	✓	**09-May-2023**	05-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD108_ 20230413,	0315_SD111_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) 0315_SD121_20230411,	0315_QC101_20230411	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD103_20230412, 0315_SD107_20230412, 0315_SD127_20230412,	0315_SD106_20230412, 0315_SD118_20230412, 0315_SD136_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_QC103_20230412		**12-Apr-2023**	**26-Apr-2023**	09-Oct-2023	✓	**09-May-2023**	05-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD108_ 20230413,	0315_SD111_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) 0315_SD121_20230411,	0315_QC101_20230411	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD103_20230412, 0315_SD107_20230412, 0315_SD127_20230412,	0315_SD106_20230412, 0315_SD118_20230412, 0315_SD136_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_QC103_20230412		**12-Apr-2023**	**26-Apr-2023**	09-Oct-2023	✓	**09-May-2023**	05-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD108_ 20230413,	0315_SD111_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) 0315_SD121_20230411,	0315_QC101_20230411	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD103_20230412, 0315_SD107_20230412, 0315_SD127_20230412,	0315_SD106_20230412, 0315_SD118_20230412, 0315_SD136_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_QC103_20230412		**12-Apr-2023**	**26-Apr-2023**	09-Oct-2023	✓	**09-May-2023**	05-Jun-2023	✓
HDPE Soil Jar (EP231X) 0315_SD108_ 20230413,	0315_SD111_ 20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	03-Jun-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) 0315_SW121_20230411, 0315_QC301_20230411	0315_QC102_20230411,	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	08-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW008_20230412, 0315_SW106_20230412, 0315_SW118_20230412, 0315_SW136_20230412, 0315_SW144_20230412, 0315_SW149_20230412, 0315_QC302_20230412, 0315_QC501_20230412	0315_SW103_20230412, 0315_SW107_20230412, 0315_SW127_20230412, 0315_SW140_20230412, 0315_SW148_20230412, 0315_QC104_20230412, 0315_QC502_20230412,	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	09-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW103_20230413, 0315_MW109_20230413, 0315_SW108_ 20230413, 0315_WWDRUM_20230413, 0315_QC503_20230413, 0315_QC304_20230413	0315_MW107_20230413, 0315_MW110_20230413, 0315_SW111_ 20230413, 0315_QC105_20230413, 0315_QC504_20230413,	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW104_20230415,	0315_QC306_20230415	**15-Apr-2023**	**24-Apr-2023**	12-Oct-2023	✓	**26-Apr-2023**	12-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_QC307_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓

Matrix: **WATER**

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

Method Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) 0315_SW121_20230411, 0315_QC301_20230411	0315_QC102_20230411,	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	08-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW008_20230412, 0315_SW106_20230412, 0315_SW118_20230412, 0315_SW136_20230412, 0315_SW144_20230412, 0315_SW149_20230412, 0315_QC302_20230412, 0315_QC501_20230412	0315_SW103_20230412, 0315_SW107_20230412, 0315_SW127_20230412, 0315_SW140_20230412, 0315_SW148_20230412, 0315_QC104_20230412, 0315_QC502_20230412,	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	09-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW103_20230413, 0315_MW109_20230413, 0315_SW108_ 20230413, 0315_WWDRUM_20230413, 0315_QC503_20230413, 0315_QC304_20230413	0315_MW107_20230413, 0315_MW110_20230413, 0315_SW111_ 20230413, 0315_QC105_20230413, 0315_QC504_20230413,	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW104_20230415,	0315_QC306_20230415	**15-Apr-2023**	**24-Apr-2023**	12-Oct-2023	✓	**26-Apr-2023**	12-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_QC307_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓

Matrix: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / *Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) 0315_SW121_20230411, 0315_QC102_20230411, 0315_QC301_20230411	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	08-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW008_20230412, 0315_SW103_20230412, 0315_SW106_20230412, 0315_SW107_20230412, 0315_SW118_20230412, 0315_SW127_20230412, 0315_SW136_20230412, 0315_SW140_20230412, 0315_SW144_20230412, 0315_SW148_20230412, 0315_SW149_20230412, 0315_QC104_20230412, 0315_QC302_20230412, 0315_QC502_20230412, 0315_QC501_20230412	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	09-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW103_20230413, 0315_MW107_20230413, 0315_MW109_20230413, 0315_MW110_20230413, 0315_SW108_ 20230413, 0315_SW111_ 20230413, 0315_WWDRUM_20230413, 0315_QC105_20230413, 0315_QC503_20230413, 0315_QC504_20230413, 0315_QC304_20230413	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW104_20230415, 0315_QC306_20230415	**15-Apr-2023**	**24-Apr-2023**	12-Oct-2023	✓	**26-Apr-2023**	12-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_QC307_20230416	**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓

Matrix: **WATER**

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

Method / *Container / Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation*			*Analysis*		
			Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
0315_SW121_20230411,	0315_QC102_20230411,	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	08-Oct-2023	✓
0315_QC301_20230411								
HDPE (no PTFE) (EP231X)								
0315_MW008_20230412,	0315_SW103_20230412,	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	09-Oct-2023	✓
0315_SW106_20230412,	0315_SW107_20230412,							
0315_SW118_20230412,	0315_SW127_20230412,							
0315_SW136_20230412,	0315_SW140_20230412,							
0315_SW144_20230412,	0315_SW148_20230412,							
0315_SW149_20230412,	0315_QC104_20230412,							
0315_QC302_20230412,	0315_QC502_20230412,							
0315_QC501_20230412								
HDPE (no PTFE) (EP231X)								
0315_MW103_20230413,	0315_MW107_20230413,	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
0315_MW109_20230413,	0315_MW110_20230413,							
0315_SW108_ 20230413,	0315_SW111_ 20230413,							
0315_WWDRUM_20230413,	0315_QC105_20230413,							
0315_QC503_20230413,	0315_QC504_20230413,							
0315_QC304_20230413								
HDPE (no PTFE) (EP231X)								
0315_MW104_20230415,	0315_QC306_20230415	**15-Apr-2023**	**24-Apr-2023**	12-Oct-2023	✓	**26-Apr-2023**	12-Oct-2023	✓
HDPE (no PTFE) (EP231X)								
0315_QC307_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) 0315_SW121_20230411, 0315_QC301_20230411	0315_QC102_20230411,	**11-Apr-2023**	**24-Apr-2023**	08-Oct-2023	✓	**26-Apr-2023**	08-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW008_20230412, 0315_SW106_20230412, 0315_SW118_20230412, 0315_SW136_20230412, 0315_SW144_20230412, 0315_SW149_20230412, 0315_QC302_20230412, 0315_QC501_20230412	0315_SW103_20230412, 0315_SW107_20230412, 0315_SW127_20230412, 0315_SW140_20230412, 0315_SW148_20230412, 0315_QC104_20230412, 0315_QC502_20230412,	**12-Apr-2023**	**24-Apr-2023**	09-Oct-2023	✓	**26-Apr-2023**	09-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW103_20230413, 0315_MW109_20230413, 0315_SW108_ 20230413, 0315_WWDRUM_20230413, 0315_QC503_20230413, 0315_QC304_20230413	0315_MW107_20230413, 0315_MW110_20230413, 0315_SW111_ 20230413, 0315_QC105_20230413, 0315_QC504_20230413,	**13-Apr-2023**	**24-Apr-2023**	10-Oct-2023	✓	**26-Apr-2023**	10-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_MW104_20230415,	0315_QC306_20230415	**15-Apr-2023**	**24-Apr-2023**	12-Oct-2023	✓	**26-Apr-2023**	12-Oct-2023	✓
HDPE (no PTFE) (EP231X) 0315_QC307_20230416		**16-Apr-2023**	**24-Apr-2023**	13-Oct-2023	✓	**26-Apr-2023**	13-Oct-2023	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **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	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	13	**23.08**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	13	**15.38**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	13	**15.38**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	13	**0.00**	**5.00**	✗	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	32	**9.38**	**10.00**	✗	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	32	**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 5.3, table B-15 requirements.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

QUALITY CONTROL REPORT

Work Order	: **EM2306946**		Page	: 1 of 16
Amendment	: **1**			
Client	: **STANTEC AUSTRALIA PTY LTD**		Laboratory	: Environmental Division Melbourne
Contact	: [redacted]		Contact	: [redacted]
Address	: [redacted]		Address	: [redacted]
Telephone	: ----		Telephone	: [redacted]
Project	: NSW_0315_PFASOMP		Date Samples Received	: 20-Apr-2023
Order number	: -		Date Analysis Commenced	: 24-Apr-2023
C-O-C number	: 50561		Issue Date	: 09-May-2023
Sampler	: [redacted]			
Site	: Blamey Barracks Base			
Quote number	: SY/139/19_Kapooka			
No. of samples received	: 47			
No. of samples analysed	: 43			

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
[redacted]	Non-Metals Team Leader	[redacted]
[redacted]	2IC Organic Chemist	[redacted]
[redacted]	Senior Organic Chemist	[redacted]

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5007965)									
EM2306926-004	Anonymous	EA055: Moisture Content	----	0.1	%	20.4	19.7	3.8	0% - 20%
EM2306946-028	0315_SD136_20230412	EA055: Moisture Content	----	0.1	%	49.6	42.6	15.1	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5007735)									
EM2306926-004	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	0.0003	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	0.0090	0.0099	10.2	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EM2306946-028	0315_SD136_20230412	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	0.0036	0.0030	16.2	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0003	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0246	0.0219	11.7	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0009	0.0009	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5008323)									
EM2306946-031	0315_QC103_20230412	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	0.0004	0.0004	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	0.0089	0.0075	16.9	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0005	0.0004	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5007735)									

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5007735) - continued									
EM2306926-004	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 (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
EM2306946-028	0315_SD136_20230412	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0003	0.0003	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0008	0.0008	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	0.0003	0.0003	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	0.0004	0.0002	41.9	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0005	0.0003	39.5	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	0.0003	0.0003	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: 5008323)									
EM2306946-031	0315_QC103_20230412	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	0.0003	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: 5007735)									
EM2306926-004	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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5007735) - continued									
EM2306926-004	Anonymous	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
EM2306946-028	0315_SD136_20230412	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: 5008323)									
EM2306946-031	0315_QC103_20230412	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: 5007735)									
EM2306926-004	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

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5007735) - continued									
EM2306926-004	Anonymous	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
EM2306946-028	0315_SD136_20230412	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: 5008323)									
EM2306946-031	0315_QC103_20230412	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: 5007735)									
EM2306926-004	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0092	0.0102	10.3	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0092	0.0102	10.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0092	0.0102	10.3	0% - 20%
EM2306946-028	0315_SD136_20230412	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0330	0.0286	14.3	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0282	0.0249	12.4	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0298	0.0263	12.5	0% - 20%
EP231P: PFAS Sums (QC Lot: 5008323)									
EM2306946-031	0315_QC103_20230412	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0105	0.0087	18.8	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0093	0.0079	16.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0095	0.0079	18.4	0% - 20%

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5007682)									
EM2306946-004	0315_MW107_20230413	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.08	0.08	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.01	0.01	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5007682) - continued									
EM2306946-004	0315_MW107_20230413	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.03	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
EM2306946-014	0315_SW127_20230412	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: 5009079)									
EM2306946-015	0315_SW136_20230412	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: 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: 5007682)									
EM2306946-004	0315_MW107_20230413	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
EM2306946-014	0315_SW127_20230412	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5009079)									
EM2306946-015	0315_SW136_20230412	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: 5007682)									
EM2306946-004	0315_MW107_20230413	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
EM2306946-014	0315_SW127_20230412	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: 5009079)									
EM2306946-015	0315_SW136_20230412	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
				Laboratory Duplicate (DUP) Report					
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5009079) - continued									
EM2306946-015	0315_SW136_20230412	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: 5007682)									
EM2306946-004	0315_MW107_20230413	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
EM2306946-014	0315_SW127_20230412	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: 5009079)									
EM2306946-015	0315_SW136_20230412	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: 5007682)									
EM2306946-004	0315_MW107_20230413	EP231X: Sum of PFAS	----	0.01	µg/L	0.13	0.12	8.0	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 (%)
EP231P: PFAS Sums (QC Lot: 5007682) - continued									
EM2306946-004	0315_MW107_20230413	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.09	0.09	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.13	0.12	8.0	0% - 50%
EM2306946-014	0315_SW127_20230412	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: 5009079)									
EM2306946-015	0315_SW136_20230412	EP231X: Sum of PFAS	----	0.01	µg/L	0.06	0.06	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.06	0.06	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.06	0.06	0.0	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5007735)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	88.7	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	94.4	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	92.4	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	95.2	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	89.4	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	87.1	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5008323)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	96.1	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	101	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	97.2	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	95.8	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	103	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	104	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5007735)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	101	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.7	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.8	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.3	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.2	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.0	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.8	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.1	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	83.7	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5008323)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	103	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	107	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.6	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.9	71.0	131

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5008323) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.6	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.2	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.4	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.8	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.8	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.5	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	93.6	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5007735)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	81.2	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.2	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	86.5	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	76.9	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	95.9	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.7	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	77.3	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5008323)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.5	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	102	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	104	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	94.5	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	99.0	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	107	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5007735)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	91.9	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00119 mg/kg	91.6	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	82.9	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00121 mg/kg	86.9	70.0	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5008323)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	93.8	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00119 mg/kg	98.7	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	0.00121 mg/kg	106	70.0	130
EP231P: PFAS Sums (QCLot: 5007735)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231P: PFAS Sums (QCLot: 5008323)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5007682)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	99.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	106	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	90.2	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	90.7	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	89.4	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5009079)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	96.7	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	102	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 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	107	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	92.9	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	87.4	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5007682)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.3	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	94.0	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**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5007682) - continued								
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	93.4	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.5	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	92.4	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	95.3	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.1	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	95.5	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	78.2	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	105	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5009079)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	95.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	92.8	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	94.1	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	90.6	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	94.0	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	99.2	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	96.6	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	89.3	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	76.8	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	95.3	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5007682)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	93.1	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	108	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	98.9	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	100	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	98.4	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: 5009079)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	93.9	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	99.4	68.0	141

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5009079) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	91.4	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	94.6	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	92.9	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	95.1	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	92.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5007682)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	102	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	96.6	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	93.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	126	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5009079)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	98.3	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 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	119	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	129	70.0	130
EP231P: PFAS Sums (QCLot: 5007682)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----
EP231P: PFAS Sums (QCLot: 5009079)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5007682)							
EM2306946-004	0315_MW107_20230413	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	95.0	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	109	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	90.9	68.0	131
		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	87.2	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	75.2	53.0	142
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5009079)							
EM2306946-015	0315_SW136_20230412	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	102	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	100	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	87.6	68.0	131
		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	73.5	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	75.8	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5007682)							
EM2306946-004	0315_MW107_20230413	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	87.2	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	85.4	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	98.8	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	88.5	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	90.5	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	94.0	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	91.7	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	93.7	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	84.6	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	70.3	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	86.7	71.0	132
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5009079)							
EM2306946-015	0315_SW136_20230412	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	88.4	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	84.6	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	97.4	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	89.3	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	91.2	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	90.7	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	88.1	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	92.6	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	86.1	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	70.3	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	88.0	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5007682)							

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%) Low	Acceptable Limits (%) High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5007682) - continued							
EM2306946-004	0315_MW107_20230413	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	85.9	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	88.5	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	71.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	87.9	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	92.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	88.1	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	81.1	61.0	135
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5009079)							
EM2306946-015	0315_SW136_20230412	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	91.4	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	88.2	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	80.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	86.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	92.8	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	86.0	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	101	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5007682)							
EM2306946-004	0315_MW107_20230413	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	99.1	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	95.9	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	87.3	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	86.0	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5009079)							
EM2306946-015	0315_SW136_20230412	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	90.4	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	94.6	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	96.7	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	90.5	70.0	130

CERTIFICATE OF ANALYSIS

Work Order	: **EM2306946**	Page	: 1 of 25
Amendment	: **1**		
Client	: **STANTEC AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: [redacted]	Contact	: [redacted]
Address	: [redacted]	Address	: [redacted]
Telephone	: ----	Telephone	: [redacted]
Project	: NSW_0315_PFASOMP	Date Samples Received	: 20-Apr-2023 19:21
Order number	: -	Date Analysis Commenced	: 24-Apr-2023
C-O-C number	: 50561	Issue Date	: 09-May-2023 18:27
Sampler	: [redacted]		
Site	: Blamey Barracks Base		
Quote number	: SY/139/19_Kapooka		
No. of samples received	: 47		
No. of samples analysed	: 43		

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]	Non-Metals Team Leader	[redacted]
[redacted]	2IC Organic Chemist	[redacted]
[redacted]	Senior Organic Chemist	[redacted]

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.

- Amendment (06/05/2023): This report has been amended following the request to add missing sample; 031 to EM2306946 and analyse for PFAS (EP231X). All analysis results are as per the previous report.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231X: Samples EM2306946-008, 009, 010, 011, 012, 016, 017, 018 positive results have been confirmed by direct injection method using second container.
- 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 ini ial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW008_20230412	0315_MW103_20230413	0315_MW104_20230415	0315_MW107_20230413	0315_MW109_20230413
			Sampling date / time	12-Apr-2023 10:42	13-Apr-2023 20:52	15-Apr-2023 08:21	13-Apr-2023 20:43	13-Apr-2023 10:42
Compound	CAS Number	LOR	Unit	EM2306946-001	EM2306946-002	EM2306946-003	EM2306946-004	EM2306946-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	**0.03**	<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	**0.09**	<0.01	<0.01	**0.08**	<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	**0.02**	<0.01	<0.01	**0.01**	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	**0.01**	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW008_20230412	0315_MW103_20230413	0315_MW104_20230415	0315_MW107_20230413	0315_MW109_20230413
			Sampling date / time	12-Apr-2023 10:42	13-Apr-2023 20:52	15-Apr-2023 08:21	13-Apr-2023 20:43	13-Apr-2023 10:42
Compound	CAS Number	LOR	Unit	EM2306946-001	EM2306946-002	EM2306946-003	EM2306946-004	EM2306946-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.11**	<0.01	<0.01	**0.13**	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.11**	<0.01	<0.01	**0.09**	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.11**	<0.01	<0.01	**0.13**	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**90.6**	**89.8**	**101**	**89.0**	**92.2**
13C8-PFOA	----	0.02	%	**99.8**	**96.9**	**96.6**	**95.7**	**95.4**

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW110_20230413	0315_QC105_20230413	----	----	----
			Sampling date / time	13-Apr-2023 10:42	13-Apr-2023 20:51	----	----	----
Compound	CAS Number	LOR	Unit	EM2306946-006	EM2306946-035	----	----	----
				Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)			Sample ID	0315_MW110_20230413	0315_QC105_20230413	----	----	----
			Sampling date / time	13-Apr-2023 10:42	13-Apr-2023 20:51	----	----	----
Compound	CAS Number	LOR	Unit	EM2306946-006	EM2306946-035	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	91.4	92.6	----	----	----
13C8-PFOA	----	0.02	%	97.0	96.8	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0315_SD103_20230412	0315_SD106_20230412	0315_SD107_20230412	0315_SD108_20230413	0315_SD111_20230413
			Sampling date / time	12-Apr-2023 15:21	12-Apr-2023 18:19	12-Apr-2023 18:20	13-Apr-2023 20:54	13-Apr-2023 20:54
Compound	CAS Number	LOR	Unit	EM2306946-020	EM2306946-021	EM2306946-022	EM2306946-023	EM2306946-024
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	38.6	46.6	30.2	28.8	27.6
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	0.0007	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	0.0130	0.0053	0.0033	0.0005	0.0008
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0006	<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	0.0003	<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	0.0003	<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	0.0004	<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
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0315_SD103_20230412	0315_SD106_20230412	0315_SD107_20230412	0315_SD108_20230413	0315_SD111_20230413
			Sampling date / time	12-Apr-2023 15:21	12-Apr-2023 18:19	12-Apr-2023 18:20	13-Apr-2023 20:54	13-Apr-2023 20:54
Compound	CAS Number	LOR	Unit	EM2306946-020	EM2306946-021	EM2306946-022	EM2306946-023	EM2306946-024
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0159**	**0.0055**	**0.0033**	**0.0005**	**0.0008**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0137**	**0.0055**	**0.0033**	**0.0005**	**0.0008**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0144**	**0.0055**	**0.0033**	**0.0005**	**0.0008**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**81.2**	**97.1**	**96.7**	**92.2**	**99.8**
13C8-PFOA	----	0.0002	%	**94.8**	**88.0**	**99.3**	**91.1**	**97.1**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0315_SD118_20230412	0315_SD121_20230411	0315_SD127_20230412	0315_SD136_20230412	0315_QC101_20230411
			Sampling date / time	12-Apr-2023 18:22	11-Apr-2023 17:21	12-Apr-2023 11:55	12-Apr-2023 15:45	11-Apr-2023 17:21
Compound	CAS Number	LOR	Unit	EM2306946-025	EM2306946-026	EM2306946-027	EM2306946-028	EM2306946-029
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	21.0	23.6	26.0	49.6	32.7
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	0.0036	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0058	0.0017	<0.0002	0.0246	0.0039
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0009	<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	0.0003	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0008	<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	0.0003	<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	0.0004	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0005	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0004	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0315_SD118_20230412	0315_SD121_20230411	0315_SD127_20230412	0315_SD136_20230412	0315_QC101_20230411
			Sampling date / time	12-Apr-2023 18:22	11-Apr-2023 17:21	12-Apr-2023 11:55	12-Apr-2023 15:45	11-Apr-2023 17:21
Compound	CAS Number	LOR	Unit	EM2306946-025	EM2306946-026	EM2306946-027	EM2306946-028	EM2306946-029
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0058**	**0.0017**	<0.0002	**0.0330**	**0.0039**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0058**	**0.0017**	<0.0002	**0.0282**	**0.0039**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0058**	**0.0017**	<0.0002	**0.0298**	**0.0039**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**103**	**106**	**98.8**	**90.5**	**104**
13C8-PFOA	----	0.0002	%	**97.0**	**98.4**	**97.2**	**96.7**	**94.8**

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0315_QC103_20230412	----	----	----	----
			Sampling date / time	12-Apr-2023 15:22	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2306946-031	-----	-----	-----	-----
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	1.0	----	----	----	----
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	0.0004	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0089	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0005	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	----	----	----	----
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	0.0003	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	0315_QC103_20230412	----	----	----	----
			Sampling date / time	12-Apr-2023 15:22	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2306946-031	-----	-----	-----	-----
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0105**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0093**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0095**	----	----	----	----

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW103_20230412	0315_SW106_20230412	0315_SW107_20230412	0315_SW108_20230413	0315_SW111_20230413
			Sampling date / time	12-Apr-2023 15:24	12-Apr-2023 18:25	12-Apr-2023 18:25	13-Apr-2023 20:50	13-Apr-2023 20:48
Compound	CAS Number	LOR	Unit	EM2306946-007	EM2306946-008	EM2306946-009	EM2306946-010	EM2306946-011
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	**0.08**	**0.02**	**0.07**	**0.02**	**0.03**
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	**0.16**	**0.02**	**0.13**	**0.01**	**0.01**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	**0.02**	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW103_20230412	0315_SW106_20230412	0315_SW107_20230412	0315_SW108_20230413	0315_SW111_20230413
			Sampling date / time	12-Apr-2023 15:24	12-Apr-2023 18:25	12-Apr-2023 18:25	13-Apr-2023 20:50	13-Apr-2023 20:48
Compound	CAS Number	LOR	Unit	EM2306946-007	EM2306946-008	EM2306946-009	EM2306946-010	EM2306946-011
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	**0.17**	<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	**0.24**	**0.04**	**0.37**	**0.05**	**0.04**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.24**	**0.04**	**0.20**	**0.03**	**0.04**
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.24**	**0.04**	**0.37**	**0.05**	**0.04**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**95.5**	**96.5**	**89.9**	**87.4**	**93.5**
13C8-PFOA	----	0.02	%	**94.1**	**99.7**	**97.2**	**93.5**	**96.8**

Analytical Results

Sub-Matrix: SURFACE WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	0315_SW118_20230412	0315_SW121_20230411	0315_SW127_20230412	0315_SW136_20230412	0315_SW140_20230412
Sampling date / time				12-Apr-2023 18:27	11-Apr-2023 17:25	12-Apr-2023 11:54	12-Apr-2023 15:44	12-Apr-2023 18:26
				EM2306946-012	EM2306946-013	EM2306946-014	EM2306946-015	EM2306946-016
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	**0.02**	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	**0.06**	<0.01	**0.02**	**0.02**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.02**	**0.17**	<0.01	**0.04**	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)

Compound	CAS Number	LOR	Unit	0315_SW118_20230412	0315_SW121_20230411	0315_SW127_20230412	0315_SW136_20230412	0315_SW140_20230412
			Sampling date / time	12-Apr-2023 18:27	11-Apr-2023 17:25	12-Apr-2023 11:54	12-Apr-2023 15:44	12-Apr-2023 18:26
				EM2306946-012	EM2306946-013	EM2306946-014	EM2306946-015	EM2306946-016
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	**0.09**	<0.05	<0.05	<0.05	**0.05**
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.11**	**0.25**	<0.01	**0.06**	**0.07**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.02**	**0.23**	<0.01	**0.06**	**0.02**
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.11**	**0.25**	<0.01	**0.06**	**0.07**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**95.0**	**101**	**91.7**	**93.9**	**85.8**
13C8-PFOA	----	0.02	%	**94.1**	**97.9**	**95.8**	**99.0**	**96.7**

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)			Sample ID	0315_SW144_20230412	0315_SW148_20230412	0315_SW149_20230412	0315_QC102_20230411	0315_QC104_20230412
			Sampling date / time	12-Apr-2023 18:24	12-Apr-2023 18:24	12-Apr-2023 18:23	11-Apr-2023 17:23	12-Apr-2023 15:25
Compound	CAS Number	LOR	Unit	EM2306946-017	EM2306946-018	EM2306946-019	EM2306946-030	EM2306946-032
				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	**0.06**	**0.08**
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	**0.02**	**0.01**	<0.01	**0.16**	**0.16**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)

Compound	CAS Number	LOR	Unit	0315_SW144_20230412	0315_SW148_20230412	0315_SW149_20230412	0315_QC102_20230411	0315_QC104_20230412
			Sampling date / time	12-Apr-2023 18:24	12-Apr-2023 18:24	12-Apr-2023 18:23	11-Apr-2023 17:23	12-Apr-2023 15:25
				EM2306946-017	EM2306946-018	EM2306946-019	EM2306946-030	EM2306946-032
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	**0.11**	**0.13**	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**0.13**	**0.14**	<0.01	**0.22**	**0.24**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**0.02**	**0.01**	<0.01	**0.22**	**0.24**
Sum of PFAS (WA DER List)	----	0.01	µg/L	**0.13**	**0.14**	<0.01	**0.22**	**0.24**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**95.3**	**92.4**	**92.7**	**95.2**	**94.8**
13C8-PFOA	----	0.02	%	**95.9**	**97.7**	**95.5**	**95.8**	**100**

Analytical Results

Sub-Matrix: WASTEWATER (Matrix: WATER)			Sample ID	0315_WWDRUM_2023 0413	----	----	----	----
			Sampling date / time	13-Apr-2023 09:13	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2306946-033	-----------	-----------	-----------	-----------
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	**0.15**	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	**0.14**	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	**0.70**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	**0.05**	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	**0.82**	----	----	----	----
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	**0.06**	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	**0.28**	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	**0.03**	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	**0.04**	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: WASTEWATER (Matrix: WATER)			Sample ID	0315_WWDRUM_2023 0413	----	----	----	----
			Sampling date / time	13-Apr-2023 09:13	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2306946-033	-----	-----	-----	-----
				Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	**2.27**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	**1.52**	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	**2.08**	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**91.9**	----	----	----	----
13C8-PFOA	----	0.02	%	**96.2**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0315_QC503_20230413	0315_QC504_20230413	0315_QC304_20230413	0315_QC306_20230415	0315_QC307_20230416
			Sampling date / time	13-Apr-2023 18:23	13-Apr-2023 18:24	13-Apr-2023 18:26	15-Apr-2023 17:37	16-Apr-2023 13:25
Compound	CAS Number	LOR	Unit	EM2306946-036	EM2306946-037	EM2306946-038	EM2306946-040	EM2306946-041
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0315_QC503_20230413	0315_QC504_20230413	0315_QC304_20230413	0315_QC306_20230415	0315_QC307_20230416
			Sampling date / time	13-Apr-2023 18:23	13-Apr-2023 18:24	13-Apr-2023 18:26	15-Apr-2023 17:37	16-Apr-2023 13:25
Compound	CAS Number	LOR	Unit	EM2306946-036	EM2306946-037	EM2306946-038	EM2306946-040	EM2306946-041
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	95.5	88.5	93.7	91.5	93.8
13C8-PFOA	----	0.02	%	94.6	95.9	95.4	95.1	97.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0315_QC301_20230411	0315_QC302_20230412	0315_QC502_20230412	0315_QC501_20230412	----
			Sampling date / time	11-Apr-2023 13:30	12-Apr-2023 13:31	12-Apr-2023 17:55	12-Apr-2023 17:56	----
Compound	CAS Number	LOR	Unit	EM2306946-042	EM2306946-043	EM2306946-045	EM2306946-046	-----
				Result	Result	Result	Result	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	0315_QC301_20230411	0315_QC302_20230412	0315_QC502_20230412	0315_QC501_20230412	----
			Sampling date / time	11-Apr-2023 13:30	12-Apr-2023 13:31	12-Apr-2023 17:55	12-Apr-2023 17:56	----
Compound	CAS Number	LOR	Unit	EM2306946-042	EM2306946-043	EM2306946-045	EM2306946-046	--------
				Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	**89.7**	**91.8**	**80.7**	**92.9**	----
13C8-PFOA	----	0.02	%	**94.7**	**98.5**	**91.5**	**91.8**	----

Surrogate Control Limits

Sub-Matrix: **GROUNDWATER**

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

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	68	136
13C8-PFOA	----	69	133

Sub-Matrix: **SURFACE WATER**

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

Sub-Matrix: **WASTEWATER**

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

Sub-Matrix: **WATER**

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

APPENDIX

D

FIELD RECORDS & CALIBRATION CERTIFICATES

Cardno

now

Stantec

Bore ID	Property	Easting	Northing	Monitoring Date	Bore Depth (m)	Top of casing (mAHD)	Top of Screen (mBTOC)	Bottom of Screen (mBTOC)	SWL (mbTOC)[1]	RL (mAHD)	Water Colour	Turbidity
MW008	On-site	524926.6	6114754.4	12/04/2023	12.56	-	-	-	5.228	-	Clear	Low
MW103	On-site	526845.6	6110958.8	13/04/2023	53.35	225.8	49	52	23.067	202.73	Clear	Low
MW104	On-site	526597.8	6111277.7	15/04/2023	53.90	231.87	38	53	33.756	198.11	Clear	High
MW107	On-site	526628.4	6111282.8	13/04/2023	15.3	230.54	12.5	15.5	10.836	-	Clear	Low
MW109	On-site	525096.0	6114455.5	13/04/2023	35.41	193.62	24.4	33.4	21.738	171.88	Clear	Low
MW110	On-site	525327.6	6114785.0	13/04/2023	22.33	180.29	17.4	20.9	8.385	171.91	Clear	Low
MW601	Off-site	527164.1	6112666.0	13/04/2023	17.07	205.3	10	16	5.140	200.16	Cloudy	Low
MW624	Off-site	527138.1	6112814.3	13/04/2023	54.25	205.92	29	51	8.231	197.69	Clear	Low
MW625	Off-site	524517.0	6114881.7	13/04/2023	22.33	174.572	15.5	21.5	3.789	170.78	Brown	Medium

1. A consolidated gauging round was completed on 12 April 2023.
2. As measured from the top of the Hydrasleeve.

Bore ID	Property	Easting	Northing	Monitoring Date	Other Observations on Bore/Site	Hydrasleeve Deployment Depth (mBTOC)[2]	Duplicate Samples	Bore ID	Temp (C^0)	DO (mg/L)	EC (ms/Cm)	TDS (mg/L)	pH	Eh (mV)
MW008	On-site	524926.6	6114754.4	12/04/2023	Sampled using low flow.	N/A	-	MW008	16.8	1.74	1.27	826.7	7.09	116.3
MW103	On-site	526845.6	6110958.8	13/04/2023	No odour.	50.5	0315_QC105_20230413 & 0315_QC205_20230413	MW103	18.2	1.49	2.13	1386.2	6.44	99.8
MW104	On-site	526597.8	6111277.7	15/04/2023	Considerable volume of reddish brown suspended solids within bottom half of hydrasleeve, excluded as much as practicable from sampling matrix. No odour.	45.6	-	MW104	17.3	2.50	4.76	3096.9	6.44	147.3
MW107	On-site	526628.4	6111282.8	13/04/2023	No odour.	14.5	Internal Lab QC Taken	MW107	17.1	2.55	1.74	1133.1	7.18	-31.6
MW109	On-site	525096.0	6114455.5	13/04/2023	Minor brown suspended solids at bottom tenth of hydrasleeve, no odour or colouration.	28.2	-	MW109	20.1	7.39	0.01	9.7	7.04	178.9
MW110	On-site	525327.6	6114785.0	13/04/2023	Very minor brown suspended solids present within hydrasleeve, exluded as much as practicable from sampling matrix.	17.1	-	MW110	18.0	2.63	1.19	774.3	6.77	92.8
MW601	Off-site	527164.1	6112666.0	13/04/2023	No odour.	12.1	-	MW601	18.1	2.95	0.66	427.2	7.28	85.7
MW624	Off-site	527138.1	6112814.3	13/04/2023	Strong sulphur odour, ants in well.	45.2	-	MW624	18.1	0.94	4.43	2878.7	6.92	-68.6
MW625	Off-site	524517.0	6114881.7	13/04/2023	Considerable volume of reddish brown suspended solids within bottom half of hydrasleeve, excluded as much as practicable from sampling matrix. No odour. Ants down well.	17.7	-	MW625	19.4	1.4	1.64	1065.8	6.40	-63.8

1. A consolidated gauging round was completed on 12 April 2023.
2. As measured from the top of the Hydrasleeve.

Sample ID	Property	Easting	Northing	Monitoring Date	Sample Depth (m)	Water Body Depth	Flow Rate (Qualitative)	Flow Rate (m/s)	Water Colour	Turbidity	Channel Width (m)	Water Body Condition	Other Observations	Duplicate Samples	Temp (C^0)	DO (mg/L)	EC (Specific) (US/Cm)	TDS (mg/L)	pH	Eh (mV)
SW103	On-Base	526271.4	6110348.6	15/04/2023	0.2	0.3	Low	0.05	Brown	Medium	0.3	Overland stormwater channel	No sheen, no odour, high volume of grasses within waterway, tadpoles observed swimming.	0315_QC104_20230412 & 0315_QC204_20230412	14.6	6.52	89.60	46.7	7.1	-12
SW106	On-Base	526717.6	6109926.1	12/04/2023	0.1	0.2	Stagnant	-	Cloudy	Medium	Overgrown with reeds. Unable to assess channel width.	Creek bed	Stagnant water, no flow, high amount of vegetation (reeds).		12.8	3.97	459.80	229.2	6.7	130.5
SW107	On-Base	526752.7	6110464.8	12/04/2023	0.2	0.5	Low	0.05	Cloudy	Medium	NA	Overland stormwater channel - concrete overflow	No odour.	-	14.3	4.49	99.00	51.2	6.97	73.8
SW108	On-Base	526719.2	6110895.1	13/04/2023	0.2	3	Stagnant	-	Clear	Low	NA	Wastewater Treatment Pland Pond	Stagnant water, no flow, slight green algae tinge, slight sewage odour.	-	16.4	5.26	893.00	485.1	9.00	48.4
SW111	On-Base	526686.5	6111169.2	13/04/2023	0.2	3	Stagnant	-	Clear	Low	NA	Wastewater Treatment Pland Pond	Stagnant water, no flow, slight sewage odour, algae on surface, no sheen.	-	15.8	5.47	478.50	256.4	7.74	79
SW118	On-Base	526946.5	6110587.0	12/04/2023	0.2	0.3	Stagnant	-	Cloudy	Low	1	Overland drainage channel	Stagnant water, no flow, no odour.	-	15.8	4.76	33.90	18.2	6.72	93.7
SW121	On-Base	527077.5	6111316.7	11/04/2023	0.2	3	Low	0.05	Brown	High	1	Overland drainage channel	No sheen, no odour, minimal water bugs, high amount of vegetation.	0315_QC102_20230411 & 0315_QC202_20230411	15.1	5.36	76.50	40.3	6.71	161.9
SW127	On-Base	524610.6	6108182.2	15/04/2023	0.3	0.7	Stagnant	-	Brown	Medium	NA	Pond	Stagnant water, no flow, no sheen, no odour, no nuisance organisms, no vegetation.	Internal Lab QC Taken	13.4	4.14	76.20	38.6	7.45	58.1
SW136	On-Base	526132.2	6110304.8	15/04/2023	0.15	0.2	Medium	0.5	Cloudy	Medium	1	Overland stormwater channel	No odour, no sheen, sampled in fast flowing section, slows considerably 5m downstream, high volume of vegetation (grass), no microorganisms observed.	Internal Lab QC Taken	14.7	7.09	95.90	50.1	6.94	-9.4
SW140	On-Base	526449.8	6109549.2	12/04/2023	0.2	0.8	Stagnant	-	Clear	Low	NA	Sewage channel	Reeds in drain, water still, no odour.	-	18	3.29	617.00	347.4	7.58	53.4
SW144	On-Base	526185.0	6110390.0	12/04/2023	0.1	0.1	High	0.5	Cloudy	Medium	NA	Sewage channel	Sewage odour.	-	18.9	1.21	991.00	569.1	8.29	-129.5
SW148	On-Base	526404.5	6110931.5	12/04/2023	0.1	0.1	High	1	Cloudy	Medium	NA	Sewage channel	Sewage odour, toilet paper, other floating organic items.	-	19.8	1.04	1396.00	817.3	8.84	-169.6
SW149	On-Base	526455.0	6111012.0	12/04/2023	0.1	0.1	Low	0.1	Cloudy	Turbidity	NA	Sewage channel	Slow drip from sewer pipe, sewage odour.	-	16.7	8.51	436.90	239.0	8.1	54
SW614	Off-Base	527151.5	6112749.5	17/04/2023	0.1	0.2	Stagnant	-	Brown	Medium	Minimal water present, ponding only.	Overland drainage channel	Stagnant water, no flow, sampled during rainfall event.	-	15.3	5.43	95.20	50.4	7.57	110.6
SW677	Off-Base	526647.3	6114308.7									Dry.								
SW680	Off-Base	527151.3	6111982.0	13/04/2023	0.2	2	Stagnant	-	Cloudy	Low	NA	Pond	Stagnant water, no flow, no odour, no foam, no sheen, no organisms.	-	15.1	2.64	198.50	104.6	7.2	77.8

Location ID	Property	Easting	Northing	Monitoring Date	Observations	Duplicate Samples
SD103	On-base	526271.4	6110348.6	12/04/2023	Dark brown gravelly sandy Clay, moist, moderate plasticity, no odour, no staining, sampled at 0.3m using core sampler.	0315_QC103_20230412 & 0315_QC203_20230412
SD106	On-base	526717.6	6109926.1	12/04/2023	Brown silty Clay, wet, low to moderate plasticity, rootlets, no odour, no staining, sampled at 0.3m using core sampler.	-
SD107	On-base	526752.7	6110464.8	12/04/2023	Dark brown silty Clay, medium to high plasticity, large gravels, no odour, soft, moist, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-
SD108	On-base	526719.2	6110895.1	13/04/2023	Brown black silty Clay, organic matter, roots, wet, medium to high plasticity, fine sand grains, no odour, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-
SD111	On-base	526686.5	6111169.2	13/04/2023	Brown silty Clay, mottled orange, low plasticity, minor gravels, no odour, wet, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-
SD118	On-base	526946.5	6110587.0	12/04/2023	Orange brown silty Clay, wet, medium to high plasticity. Large gravels, no odour, organic root matter, soft, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-
SD121	On-base	527077.5	6111316.7	11/04/2023	Pale brown silty Clay, moderate to high plasticity, wet, no odour, no staining, sampled at 0.3m using core sampler.	0315_QC101_20230411 & 0315_QC201_20230411
SD127	On-base	524610.6	6108182.2	12/04/2023	Gray silty Clay, mottled brown, wet, moderate to high plasticity, no odour no staining, minor vegetation present (black plant roots), sampled at 0.3m using core sampler.	Internal Lab QC Taken
SD136	On-base	526133.0	6110304.1	12/04/2023	Gray silty Clay, mottled brown, wet, moderate to high plasticity, no odour no staining, minor vegetation present (black plant roots), sampled at 0.3m using core sampler.	Internal Lab QC Taken
SD614	Off-base	527151.5	6112749.5	12/04/2023	Brown silty Clay, mottled red, organic matter, moist, soft, medium plasticity, no odour, sampled at 0.3m using core sampler.	-
SD677	Off-base	526647.3	6114308.7	12/04/2023	Brown silty Clay, small gravels, organic matter, medium to high plasticity, no odour, sampled at 0.3m using hand trowel as access point was deemed to be unsafe for core sampler use.	-

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F3.04 – Groundwater Sampling Field Record

Site / Project: PFAS Investigation and Management Plan	Client: Department of Defence	Sampled By: MB
Job No: DEF19008	Bore ID: MW008	Date: 12/04/2023
Bore / Site Details		
Bore Condition: Good Is it Locked: No	If not locked, explanation?	Type of Protection Cap / Cover:
Bore Depth (bTOC): 13.5	Inner casing/ screen type & diameter:	Screen interval (bgl):
SWL (bTOC): 5.228	Pump Depth: 8.5	SWL Date/Time: 12/04/2023 9:33 AM
Other Observations on Bore/ Site:		
Bore Purge Data		
Purge method: Low Flow	Bore Volume (L):	Purge Date: 12/04/2023
Purge rate (L/min): 0.5	Total Purge volume (L):	LNAPL / PSH Thickness (mm):

Purge Field Physicochemical Measurements:

	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8	Reading 9	Reading 10	Reading 11	Reading 12
Start Time:	10:22	10:27	10:32	10:37	10:42	10:47	10:52	10:57				
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)	2.06	1.88	1.84	1.78	1.74							
EC (µS/Cm) ±3%	1,506	1,608	1,506	1,508	1,508							
pH ±0.1	7.18	7.18	7.12	7.1	7.09							
Eh (mV) ±10mV	115.1	116.1	116.5	116.4	116.3							
Temp (°C)	16.7	16.8	16.8	16.8	16.8							
SWL (m) after	5.229	5.229	5.228	5.225	5.226							
Cum. Volume (L)	0	2.5	5	7.5	10							
Water Colour	Clear	Clear	Clear	Clear	Clear							
Turbidity ±10%												
Other Observations / Notes												

Sample Container & Preservation Data									
Number of sample container: (Include QC samples)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Container Volume									
Container Type									
Filtration									
Preservation									
Number of sample container: (Include QC samples)	10	11	12	13	14	15	16		
Container Volume									
Container Type									
Filtration									
Preservation									
Sample Number (for Lab ID): 0315_MW008_20230412									
QC Dup Sample No.:									

Bore Damage Images	Bore Images
	 Image Description: ________________________________

Image Description:

	 Image Description: ________________

F3.01 Equipment Calibration Report
YSI ProPlus Water Quality Meter

This YSI ProPlus Water Quality Meter has been performance checked as per the manufacturer's guidelines[1].

Unit Type: YSI ProPlus
Serial Number: 19H102165

The unit has been checked for and comprises of the following items:

Item	Present	Damaged or Absent?
Carry case	✓	☐
Attached sensors (x4)	✓	☐
Spare Batteries	✓	☐
Connector Cable	✓	☐
Instruction Manual	✓	☐

The following tests and operational checks have been conducted on the unit:

Item	Test Completed	Test Passed
WQM unit electrodes cleaned and checked	✓	✓
Operations check (screen functions)	✓	✓
Temperature check	✓	✓

Calibration:

Sensor	Cal. Solution	Value	Reading
pH	pH: Buffer Solution 4.00	4.00	3.98
pH	pH: Buffer Solution 7.00	7.00	7.02
pH	pH: Buffer Solution 10.00	10.00	
Redox	Standard ORP solution	251 mV @ 15 °c	251 mV @ 15 °c
O_2	Ambient Air for 100% Dissolved Oxygen	100%	100%
O_2	Sodium Sulphite for 0% Dissolved Oxygen	0%	0%
Conductivity	Standard Conductivity Solution	12880 µS/cm @ 25 °c	12880 µS @ 25

[redacted]

Date: 12/4/23

[1] YSI Professional Plus – Calibration Tips; Rev A, December 2010.

Unit Type: YSI ProPlus
Serial Number:

Job Number: DEF19008

Date of Bump Test	Ambient Air Oxygen Calibration	Zero % Oxygen Solution Calibration	Standard Concentrations	Bump Test Reading	Bump Test Readings Accepted?	Test by (Name)	(Signature)
13/4	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y/N pH 7.00 Y/N ~~pH 10.00~~ 12890 Y/N EC: ___ µS/cm @ 25°C Y/N Redox: 251 mV @ 11.5°C Y/N	pH 4.00: 4.11 pH 7.00: 7.07 ~~pH 10.00~~ EC: 12886 @ 25 Redox: 250.5	Y/N Y/N Y/N Y/N Y/N	[redacted]	[redacted]
14/4	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y/N pH 7.00 Y/N pH 10.00 12890 Y/N EC: ___ µS/cm @ 25°C Y/N Redox: 251 mV @ 11.5°C Y/N	pH 4.00: 4.16 pH 7.00: 7.01 pH 10.00: EC: 12699 Redox: 248.5	Y/N - recal Y/N Y/N Y/N Y/N	[redacted]	[redacted]
15/4	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y/N pH 7.00 Y/N pH 10.00 12890 Y/N EC: ___ µS/cm @ 25°C Y/N Redox: 251 mV @ 11.4 Y/N	pH 4.00: 4.00 pH 7.00: 6.94 ~~pH 10.00:~~ EC: 12551 Redox: 247.8	Y/N Y/N ~~Y/N~~ Y/N Y/N	[redacted]	[redacted]
17/4	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y/N pH 7.00 Y/N pH 10.00 Y/N EC: ___ µS/cm @ ___ °C Y/N Redox: " mV @ " °C Y/N	pH 4.00: 4.09 pH 7.00: 7.02 ~~pH 10.00:~~ EC: 12673 Redox: 247.5	Y/N Y/N ~~Y/N~~ Y/N Y/N	[redacted]	[redacted]
18/4	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y/N pH 7.00 Y/N pH 10.00 Y/N EC: " µS/cm @ " °C Y/N Redox: " mV @ " °C Y/N	pH 4.00: 3.97 pH 7.00: 6.96 pH 10.00: ~~4.99~~ 9.89 EC: 12820 Redox: 250.3	Y/N Y/N Y/N Y/N Y/N	[redacted]	[redacted]
19/4	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y/N pH 7.00 Y/N pH 10.00 Y/N EC: ___ µS/cm @ ___ °C Y/N Redox: ___ mV @ ___ °C Y/N	pH 4.00: 4.01 pH 7.00: 6.96 pH 10.00: 9.90 EC: 12709 Redox: 248.1	Y/N Y/N Y/N Y/N Y/N	[redacted]	[redacted]
	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y/N pH 7.00 Y/N pH 10.00 Y/N EC: ___ µS/cm @ ___ °C Y/N Redox: ___ mV @ ___ °C Y/N	pH 4.00: pH 7.00: pH 10.00: EC: Redox:	Y/N Y/N Y/N Y/N Y/N		
	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y/N pH 7.00 Y/N pH 10.00 Y/N EC: ___ µS/cm @ ___ °C Y/N Redox: ___ mV @ ___ °C Y/N	pH 4.00: pH 7.00: pH 10.00: EC: Redox:	Y/N Y/N Y/N Y/N Y/N		

F3.01 Equipment Calibration Report
YSI ProPlus Water Quality Meter

This YSI ProPlus Water Quality Meter has been performance checked as per the manufacturer's guidelines[1].

Unit Type: YSI ~~ProPlus~~ QU9110
Serial Number: 19H102165

The unit has been checked for and comprises of the following items:

Item	Present	Damaged or Absent?
Carry case	✓	
Attached sensors (x4)	✓	
Spare Batteries	✓	
Connector Cable	✓	
Instruction Manual	✓	

The following tests and operational checks have been conducted on the unit:

Item	Test Completed	Test Passed
WQM unit electrodes cleaned and checked	✓	✓
Operations check (screen functions)	✓	✓
Temperature check	✓	✓

Calibration:

Sensor	Cal. Solution	Value	Reading
pH	pH: Buffer Solution 4.00	4.00	4.00
pH	pH: Buffer Solution 7.00	7.00	7.00
pH	pH: Buffer Solution 10.00	10.00	10.06
Redox	Standard ORP solution	2434 mV @ 18 °c	2434 mV @ 18 °c
O_2	Ambient Air for 100% Dissolved Oxygen	100%	100
O_2	Sodium Sulphite for 0% Dissolved Oxygen	0%	0
Conductivity	Standard Conductivity Solution	1143 µS/cm @ 19 °c	~~mV~~ @ °c US/cm

Checked/ Calibrated by: [redacted]

Signed: [redacted]

Date: 11/04/23

[1] YSI Professional Plus – Calibration Tips: Rev A, December 2010.

Unit Type: YSI ProPlus
Serial Number:

Job Number: DEF19008

Date of Bump Test	Ambient Air Oxygen Calibration	Zero % Oxygen Solution Calibration	Standard Concentrations	Bump Test Reading	Bump Test Readings Accepted?	Test by (Name)	(Signature)
12/04/2023	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y / N pH 7.00 Y / N pH 10.00 12880 Y / N EC: __µS/cm @ 25 °C Y / N Redox: 262 mV @ 10 °c Y / N	pH 4.00: 4.16 pH 7.00: 7.00 pH 10.00: 9.82 EC: 12882 Redox: 261.3	Y / N Recal Y / N Y / N Recal Y / N Y / N	[redacted]	[redacted]
13/04/2023	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y / N pH 7.00 Y / N pH 10.00 Y / N EC: 〃 µS/cm @ 〃 °C Y / N Redox: 262 mV @ 10 °c Y / N	pH 4.00: 4.19 pH 7.00: 7.02 pH 10.00: 9.98 EC: 12879 Redox: 261.9	Y / N Recal Y / N Y / N Y / N Y / N	[redacted]	[redacted]
14/04/2023	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y / N pH 7.00 Y / N pH 10.00 Y / N EC: 〃 µS/cm @ 〃 °C Y / N Redox: 262 mV @ 10 °c Y / N	pH 4.00: 4.03 pH 7.00: 7.06 pH 10.00: 9.88 EC: 12680 Redox: 258.7	Y / N Y / N Y / N Recal Y / N Y / N Recal	[redacted]	[redacted]
15/04/2023	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y / N pH 7.00 Y / N pH 10.00 Y / N EC: 〃 µS/cm @ 〃 °C Y / N Redox: 262 mV @ 10 °c Y / N	pH 4.00: 4.29 pH 7.00: 7.00 pH 10.00: 9.90 EC: 12885 Redox: 259.1	Y / N Recal Y / N Y / N Y / N Y / N	[redacted]	[redacted]
16/04/2023	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y / N pH 7.00 Y / N pH 10.00 Y / N EC: 〃 µS/cm @ 〃 °C Y / N Redox: 251 mV @ 15 °c Y / N	pH 4.00: 4.02 pH 7.00: 7.02 pH 10.00: 9.84 EC: 12875 Redox: 254.3	Y / N Y / N Y / N Recal Y / N Y / N Recal	[redacted]	[redacted]
17/04/2023	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y / N pH 7.00 Y / N pH 10.00 Y / N EC: 〃 µS/cm @ 〃 °C Y / N Redox: 264 mV @ 8 °c Y / N	pH 4.00: 4.34 pH 7.00: 7.00 pH 10.00: 9.80 EC: 12880 Redox: 262	Y / N Recal Y / N Y / N Recal Y / N Y / N	[redacted]	[redacted]
	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y / N pH 7.00 Y / N pH 10.00 Y / N EC: __µS/cm @ __°C Y / N Redox: ___ mV @ __°c Y / N	pH 4.00: pH 7.00: pH 10.00: EC: Redox:	Y / N Y / N Y / N Y / N Y / N		
	100% Saturation? Y N	0% Calibration? Y N	pH 4.00 Y / N pH 7.00 Y / N pH 10.00 Y / N EC: __µS/cm @ __°C Y / N Redox: ___ mV @ __°c Y / N	pH 4.00: pH 7.00: pH 10.00: EC: Redox:	Y / N Y / N Y / N Y / N Y / N		

APPENDIX

E

DATA QUALITY REVIEW

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Data Quality Review
Blamey Barracks, Kapooka, NSW

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.

Cardno undertook a review of its QA/QC as part of the data validation exercise. The findings are summarised below.

QA/QC Aspects	Evidence and Evaluation
QA Documentation	
Sampling and Analysis Quality Plan and Data Quality Objectives	Cardno was engaged by Department of Defence (the client) to carry out the PFAS Ongoing Monitoring Plan (OMP) at Blamey Barracks Kapooka, Kapooka, NSW, 2661 (the site). The monitoring event was conducted from 11 April 2023 until 16 April 2023, and was in general accordance with the scope and limitations presented in Cardno's Sampling and Analysis Quality Plan (SAQP) of 27 March 2023 (Our Ref: OMP002.6.5_Kapooka_SAQP_Rev4). The assessment was carried out in general compliance with the following: ▪ 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. ▪ Department of Defence (2019), Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring. ▪ Department of Defence, Department of Energy, 2018, Quality System Manual Schedule B15. ▪ Department of Defence (2021), Defence Contamination Management Manual (DCMM), Annex L – Data Management, August 2018, Amended June 2021. ▪ NSW EPA (2002), The NSW State Groundwater Dependant Ecosystems Policy, April 2002. ▪ NSW EPA (2004), Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales, Publication 1669.2, March 2004 ▪ NSW EPA (2016), Designing Sampling Programs for Sites Potentially Contaminated by PFAS. ▪ NSW EPA (2014), Waste Classification Guidelines – Part 1: Classification of Waste, November 2014. ▪ EPA Victoria (2009), Industrial Waste Resources Guidelines, Sampling and Analysis of Waters, Wastewaters, Soils and Wastes, Publication 701. ▪ Heads of Environmental Protection Authority's Australia and New Zealand (HEPA) (2020), PFAS National Environmental Management Plan (NEMP) Version 2.0, January 2020.

<table>
<tr><th>QA/QC Aspects</th><th>Evidence and Evaluation</th></tr>
<tr><td></td><td>National Environment Protection Council (NEPC), 1999, National Environmental Protection (Assessment of Site Contamination) Measure (as amended 2013) (ASC NEPM).
National Health and Medical Research Council (NHMRC) (2019), Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water, August 2019.
USEPA (2006), Guidance for the Data Quality Objectives Process (EPA QA/G-4).
A quality control program was implemented during the investigation and the quality assurance procedures used have been reiterated in the report.
The investigation was carried out in accordance with the Safe Work method Statements (SWMS) and Health, Safety and Environmental Management Plan (HSEMP) for the site. Detailed work plans were also provided for each phase of investigation and are outlined in the SAQP.
The Data Quality Objectives were expressed in terms of the purpose of the assessment and the relevant assessment criteria.</td></tr>
<tr><td>Data Validation Report</td><td>This review constitutes a data validation review. This was supported by an Esdat generated “QAQC Checker” excel report, summarised in Tables B4 and B5, Appendix B.</td></tr>
<tr><td colspan="2">Data Representativeness</td></tr>
<tr><td>Holding Times</td><td>Groundwater, surface water and sediment sample analysis holding times were in conformance with EPA Publication IWRG701 2009 ’Sampling and Analysis of Waters, Wastewaters, Soils and Wastes.</td></tr>
<tr><td>Background Samples</td><td>No background samples were collected as part of this assessment.</td></tr>
<tr><td>Equipment Decontamination</td><td>The decontamination methodology conducted during this investigation is documented in the body of the report, and was in general conformance with the SAQP.
All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent (Liquinonx), then double rinsed with clean water before the sample collection.</td></tr>
<tr><td colspan="2">Data Precision and Accuracy</td></tr>
<tr><td>QC Testing –
Blind Replicates
(Primary Lab)</td><td>Groundwater
Acceptance Criteria: RPD < 30%
Groundwater Samples Analysed: 9
Blind Replicate Samples Analysed: 1
Blind Replicate Analyte Pairs: 28 (excludes ‘analytes’ that are a summation of other analytes)
Number of Analyte Pairs Exceeding Criteria: 0
Percentage of Analyte Pairs Exceeding Criteria: 0%
There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B4, Appendix B.
Surface water
Acceptance Criteria: RPD < 30 %
Surface water Samples Analysed: 15
Blind Replicate Samples Analysed: 2
Blind Replicate Analyte Pairs: 56 (excludes ‘analytes’ that are a summation of other analytes)
Number of Analyte Pairs Exceeding Criteria: 0
Percentage of Analyte Pairs Exceeding Criteria: 0%
There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B4, Appendix B.
Sediment</td></tr>
</table>

QA/QC Aspects	Evidence and Evaluation
	▪ Acceptance Criteria: RPD < 30 % ▪ Soil Samples Analysed: 11 ▪ Blind Replicate Samples Analysed: 2 ▪ Blind Replicate Analyte Pairs: 56 (excludes 'analytes' that are a summation of other analytes) ▪ Number of Analyte Pairs Exceeding Criteria: 5 ▪ Percentage of Analyte Pairs Exceeding Criteria: 8.9% The RPD exceedances observed are considered to be minor and is due to low reported concentrations of analytes close to the LOR and the heterogeneous nature of the sediment. RPD results are presented in Table B5, Appendix B.
QC Testing – Field Splits (Secondary Lab)	***Groundwater*** ▪ Acceptance Criteria: RPD < 30% ▪ Groundwater Samples Analysed: 9 ▪ Field Split Samples Analysed: 1 ▪ Field Split Analyte Pairs: 28 (excludes 'analytes' that are a summation of other analytes) ▪ Number of Analyte Pairs Exceeding Criteria: 0 ▪ Percentage of Analyte Pairs Exceeding Criteria: 0% There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B4, Appendix B. ***Surface water*** ▪ Acceptance Criteria: RPD < 30 % ▪ Surface water Samples Analysed: 15 ▪ Field Split Samples Analysed: 2 ▪ Field Split Analyte Pairs: 56 (excludes 'analytes' that are a summation of other analytes) ▪ Number of Analyte Pairs Exceeding Criteria: 2 ▪ Percentage of Analyte Pairs Exceeding Criteria: 3.6% The RPD exceedances associated with PFAS compounds are considered to be minor and likely attributed to low concentrations of analyte pairs. Analyte concentrations from the primary sample and their corresponding field split sample pairs were all within the same order of magnitude. The RPD exceedances may also be attributed to interlaboratory differences, which can be common and significant, based on a study done by the Queensland Department of Environment and Science and the Victorian Environment Protection Authority Vardy et al, 2018). Overall, these RPD exceedances are not considered to impact the results of the investigation. RPD results are presented in Table B4, Appendix B. ***Sediment*** ▪ Acceptance Criteria: RPD < 30 % ▪ Soil Samples Analysed: 11 ▪ Field Split Samples Analysed: 2 ▪ Field Split Analyte Pairs: 56 (excludes 'analytes' that are a summation of other analytes) ▪ Number of Analyte Pairs Exceeding Criteria: 0 ▪ Percentage of Analyte Pairs Exceeding Criteria: 0% There were no RPD exceedances observed for PFAS compounds. RPD results are presented in Table B5, Appendix B.
Trip Blanks	Four (4) trip blanks were collected and laboratory tested for PFAS. All analytes were reported below the limit of reporting (LOR). Trip blank results are presented in Table B6, Appendix B.

QA/QC Aspects	Evidence and Evaluation
Laboratory Internal QC	Evidence of the laboratories internal QC testing is present and complete. Both ALS (the primary laboratory) and Eurofins-mgt performed internal QC with adequate testing and mostly satisfactory results for matrix spikes, method blanks and laboratory duplicates.
Laboratory Method Detection Limit	Laboratory reports indicate the method detection limits were lower than the respective assessment criteria.
NATA endorsement of laboratory reports	Laboratory reports were stamped with the NATA endorsement stamp and signature. Laboratory reports are included in Appendix C of this report.
Calibration of Field Equipment	All field equipment used was calibrated by the equipment supplier. Additionally, daily bump tests were performed of the water quality meter throughout the monitoring event. Certificates are included in Appendix D of this report.
Decontamination and Equipment Blanks	All re-usable sampling equipment was thoroughly washed using PFAS & phosphate-free detergent, then double rinsed with clean water before the sample collection. Five (5) rinsate blank samples were tested for PFAS, of which all reported PFAS concentrations below the laboratory LOR. Results are shown in Table B6, Appendix B.
Data Comparability	
Full Review of Data	Once all results have been received, Cardno undertook a full review of the data for any anomalies in consideration of historical data at each location (where available), such as first-time detections or new exceedances of adopted criteria being reported at locations which have not had detections or exceedances previously. Where potentially anomalous data is identified or suspected, further confirmatory measures were undertaken such as re-extraction and reanalysis of the sample by the laboratory and/or additional data quality review. The samples from the following monitoring locations were re-extracted and re-analysed by the laboratory: SW106, SD103 and SD136. All originally reported results were confirmed through re-extraction and re-analysis.
Standard Procedures	Fieldwork procedures are detailed in the report and followed the work methods outlined in the SAQP.
Qualified Personnel	Staff involved in managing and reviewing the project and those involved in fieldwork are qualified personnel.
Volatile Losses	Volatile losses are not applicable to PFAS.
Sample Integrity	Field Chain of Custody forms are included in Appendix C of this report and demonstrate sample integrity.
Data Completeness	
Completeness of Test Program	The scope of work undertaken was generally consistent with that set out in the SAQP. Variations to the SAQP are detailed in the Factual Report.
Validity of Data Set	The data quality review indicates no significant systematic errors in the data collection process for surface water, groundwater or sediment and therefore, the data set used as the basis for the assessment is considered valid and complete.

APPENDIX

F

INFORMATION ABOUT ENVIRONMENTAL REPORTS

now

About Site Environmental Assessment Reports

1. Introduction

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

2. What is an ESA?

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

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

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

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

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

3. The ESA Process

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

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

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

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

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

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

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

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

4. Environmental Assessment Report

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

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

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

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

5. Limitations of Environmental Assessment Report

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

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

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

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

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

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

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

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

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

Cardno now Stantec

19 August 2022

APPENDIX

E

SAQP

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PFAS OMP Sampling and Analysis Quality Plan (SAQP)

Blamey Barracks Kapooka

DEF19008

Prepared for
Department of Defence

6 April 2023

Cardno

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Document Information

Prepared for	Department of Defence
Project Name	Blamey Barracks Kapooka
File Reference	OMP002.6.5_Kapooka_SAQP_Rev4.docx
Job Reference	DEF19008
Date	6 April 2023
Version Number	4
Effective Date	6/04/2023

Author(s):

[redacted]

Approved By:

[redacted]

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
00	17 September 2021	Internal Draft	[redacted]	
0	28 September 2021	Issued Draft		
1	13 October 2021	Revised Draft		
2	28 October 2021	Final		
3	25 October 2022	Revised Final		
4	6 April 2023	Revised Final		

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Appendices

Tables

1 Introduction

Cardno, now Stantec (Cardno), have been engaged by the Australian Department of Defence (”Defence” or ”Client”) to prepare a Sampling and Analysis Quality Plan (SAQP) as part of the Ongoing Monitoring Plan (OMP). The SAQP provides details on monitoring locations, sampling methodologies and quality control / quality assurance measures for the monitoring of per- and poly-fluoroalkyl substances (PFAS) in groundwater, surface water and sediment at and around the “Management Area”.

The OMP SAQP applies to Blamey Barracks Kapooka and surrounding areas that make up the “Management Area”, outlined in Figure 1, Appendix A. For the purposes of this report:

> “the On-Base Management Area” is defined as a portion of the Blamey Barracks Kapooka (“the Base” or “the Site”) including the eastern built up portion of the Base from the Former Quarry in the south to the Wastewater Treatment Plant (WTP) in the north. It extends as far west as the natural ridgeline that runs north-south through the middle of the Base and to the east to include the Kapooka Creek flow pathway;

> “the Off-Base Management Area” includes the Kapooka Creek flow pathway on public land and all private properties which have some portion of the flow pathway passing through them. This area stretches from the Base, north all the way to the Murrumbidgee River;

> “the Management Area” is defined as comprising the On-Base Management Area, and the Off-Base Management Area, as shown on Figure 1, Appendix A.

> The “Monitoring Area” is defined as the Base and the surrounding Off-Base areas that collectively encompasses the network of OMP monitoring locations (Figure 3, Appendix A).

The Site is located on Commonwealth Land and is regulated under Commonwealth environmental legislation.

The OMP outlines the rationale and scope for monitoring the concentrations and extent of PFAS in groundwater, surface water and sediment originating from the Management Area for an initial 2-year monitoring period (initial implementation period). The initial implementation period consists of biannual sampling events. Findings from the monitoring will be used to assess any changes to the nature and extent of PFAS impact within the environment, where there is an identified potentially elevated risk to a receptor, or a potential future risk to a receptor.

1.1 Scope & Objectives

The objective of the SAQP is to present the specific monitoring locations, sampling methodologies and quality assurance / quality control (QA/QC) measures for the monitoring of the concentrations and extent of PFAS in groundwater, surface water and sediment at and around the Site under the OMP. These findings will inform risk management decisions by Defence and the Victorian Government to protect human health and the environment.

The objectives of the ongoing monitoring program as set out in the OMP are to:

> Implement a program of surface water, groundwater and sediment monitoring to continue to assess changes in risk from PFAS within the environment, focusing on where there is an identified potential risk requiring management under the PFAS Management Area Plan (PMAP); and

> Assess the seasonal effects of PFAS concentrations in surface water, groundwater and sediment, including, during or immediately following extreme or high rainfall events.

The scope of the monitoring specified in the OMP includes:

> Evaluating any changes in risk from PFAS in groundwater, surface water and sediment associated with Site sources of PFAS derived from aqueous film forming foam (AFFF).

> Measuring the seasonal effects of PFAS concentrations in surface water, groundwater and sediment, including, during or immediately following extreme or high rainfall events.

> Monitoring the migration of PFAS in groundwater, surface water and sediment from the Site.

> Evaluating the nature and extent of PFAS impact in surface water, groundwater and sediment.

> Providing confirmation of the current understanding of risk.

> Providing supporting data for assessment of management actions, where relevant.

1.2 Previous Reports

The following key reports prepared in relation to the Blamey Barracks Kapooka PFAS Investigation have been used as a basis to develop this SAQP:

> Golder Associates (2017), Preliminary Site Investigation for PFAS Blamey Barracks Kapooka (0315) (1669283_001_R_Rev1). Golder Associates.

> Cardno (2017), Base Engineering Assessment Program. Part 5 Wastewater and Part 6 Storm Water, Kapooka Military Area Property ID: 0315 (No. 360517/100/5 and 360517/100/6). Cardno.

> Jacobs (2019), Blamey Barracks Comprehensive PFAS Investigation – Detailed Site Investigation (No. IS253200-040-NP-RPT-0002 Rev4). Jacobs Group (Australia) Pty Ltd.

> Jacobs (2021a), Blamey Barracks Comprehensive PFAS Investigation – Human Health and Ecological Risk Assessment (No. IS253200-040-NP-RPT-0006 Rev4 (23rd June 2021).

> Jacobs (2021b) PFAS Ongoing Monitoring Plan (OMP) - Blamey Barracks Kapooka, June 2021.

> Jacobs (2021c) PFAS Management Area Plan (PMAP) – Blamey Barracks Kapooka, June 2021.

1.3 Responsible Parties

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

Table 1-1 Responsible Parties

Role	Responsibilities
Department of Defence – Directorate of PFAS Remediation	▪ Implement this OMP. ▪ Engage suitably qualified environmental consultants/contractors to carry out the works specified in the OMP.
Blamey Barracks Kapooka – Base Manager and Environment and Sustainability Manager	▪ Review and approve all necessary permits required for implementation of the works outlined in the OMP.
Environmental Consultant	▪ Obtain necessary permits from Blamey Barracks Kapooka to implement the works outlined in the OMP. ▪ Liaise with local council or water authority to arrange sampling of the Off-Base waterways, as required. ▪ Undertake the monitoring activities outlined in this SAQP. ▪ Produce a monitoring report that summarises the data and findings of each monitoring event and is consistent with the requirements of this SAQP. ▪ Produce an Annual Interpretive Report (AIR) including recommendations for any potential changes in the location and frequency of sampling which may be incorporated in the revision of the OMP. ▪ Upload analytical data from each monitoring event to the relevant Defence ESdat database.
Department of Defence and Environmental Consultant (lead)	▪ Liaise with the Off-Base private property owners/relevant authorities to arrange private property access to conduct sampling and ascertain external party requirements that Defence might be able to assist with.
PMAP Lead Consultant	▪ Undertake PMAP and OMP Review.

1.4 Relevant Guidelines

This SAQP has been prepared in general accordance with the current ‘industry standards’ for a site investigation for the purpose, objectives and scope identified in this report. These standards are set out in:

- 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 (withdrawn as pending revision, referred to for ‘state of knowledge’).
- Department of Defence (2021c), Contamination Management Manual, August 2019.
- Department of Defence (2019b), Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring.
- Department of Defence, Department of Energy (2019), Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3, 2019.
- Environment Protection Authority (EPA) VIC (2000), Groundwater Sampling Guidelines, Publication 669, April 2000.
- EPA NSW (2002), The NSW State Groundwater Dependant Ecosystems Policy, April 2002
- EPA NSW (2004), Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales, Publication 1669.2, March 2004
- EPA NSW (2014), Waste Classification Guidelines – Part 1: Classification of Waste, November 2014
- EPA NSW (2016a), Designing Sampling Programs for Sites Potentially Contaminated by PFAS.
- EPA NSW (2016b), Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste
- Heads of Environmental Protection Authority’s Australia and New Zealand (HEPA) (2020), PFAS National Environmental Management Plan (NEMP) Version 2.0, January 2020.
- National Environment Protection Council (NEPC) (1999), National Environmental Protection (Assessment of Site Contamination) Measure (as amended 2013) (ASC NEPM).
- National Health and Medical Research Council (NHMRC) (2019), Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water, August 2019.
- USEPA (2006), 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).

1.5 Standards of Assessment and Limitations

This SAQP has been prepared in general accordance with the current industry standards for an assessment of this type for the purpose, objectives and scope identified in this report. The SAQP is considered a living document and will be updated as additional monitoring data becomes available.

This SAQP is not any of the following:

- An Environmental Audit Report as defined under the Contaminated Land Management Act 1997.
- A Geotechnical Assessment.
- A Detailed Site Investigation (DSI).
- A Detailed Hydrogeological Assessment.
- A Remediation Action Plan (RAP) report.
- A Site Management Plan (SMP).

2 Site Setting

2.1 Site Description

A detailed description of the Base is provided in the OMP (Jacobs, 2021b), and is summarised below.

The Base is located approximately 5.0 km to the west of Wagga Wagga and 160 km west of Canberra. The Base is bound between the Sturt Highway to the north and the Olympic Highway to the east and south. Churches Plain Road runs along the western boundary.

The Base is owned by the Commonwealth of Australia and comprises an area of approximately 1,990 hectares. The Army Recruit Training Centre (ARTC) is located on the Base, providing training to 3,500 Army regular and 2,000 Army Reserve recruits annually (KBR, 2013), in addition to providing specialist training for the Army and other battalions. Recruits are housed on the Base at Blamey Barracks, which comprises a range of functions and amenities. The Base includes approximately 220 buildings and accommodation for up to 1,800 staff (Golder, 2017). A private lease has been held for stock agistment across grassed areas of the Base for the purposes of fire vegetation management for approximately 20 years. The Base comprises the following areas (as shown in Figure 1, Appendix A):

> Range Complex, which includes ranges and campsites.
> Field Training Areas, primarily used for movement exercises.
> Cantonment, including accommodation and administrative facilities, the Wastewater Treatment Plant (WTP) and Fire Station.
> Disused features, which include the Former Quarry, former informal Fire Training Areas and Fire Training Pad, Former Commandant's House, Former Incinerator, and Buried Waste Areas.

2.1.1 Management Area Description

The OMP includes sampling and analysis not only from the Base, but also from the Off-Base locations situated on public land. The Base and these surrounding areas which collectively encompass the network of OMP monitoring locations, is referred to as the "Monitoring Area", which is defined as the Base and the surrounding Off-Base areas that collectively encompass the network of OMP monitoring locations.

The 'On-Base Management Area' is defined as a portion of the Blamey Barracks Kapooka ("the Base" or "the Site") including the eastern built-up portion of the Base from the Former Quarry in the south to the WTP in the north. It extends as far west as the natural ridgeline that runs north-south through the middle of the Base and to the east to include the Kapooka Creek flow pathway.

The 'Off-Base Management Area' includes the Kapooka Creek flow pathway on public land and all private properties which have some portion of the flow pathway passing through them. This area stretches from the Base, north all the way to the Murrumbidgee River.

The 'Management Area' is defined as comprising the On-Base Management Area, and the Off-Base Management Area. The Management Area boundaries are presented on Figure 1, Appendix A.

2.1.2 Site Definition and Planning

For the purposes of this SAQP report, "the Base" is defined as comprising Blamey Barracks Kapooka. A detailed description of the Base is provided in the OMP (Jacobs, 2021b). The Base location is presented on Figure 1, Appendix A.

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

Table 2-1 Site Identification Details

Details	Description
Site Address	Blamey Barracks, Kapooka, NSW, 2661
Land Description	Blamey Barracks Kapooka
Owner	Department of Defence
Title Details	▪ Lots 1, 2, 6, 7, 9 & 10 in Deposited Plan (DP) 113507 (6.12 hectare [ha]) ▪ Lots 3, 8, 9, 10, 11 & 12 DP 205379 (153.72 ha) ▪ Lots 1, 2, 3, 4, 5, 6 & 8 DP 262372 (104.98 ha) ▪ Lot 1 DP 389778 (72.86 ha) ▪ Lots 1 & 2 DP 534820 (1279.25 ha) ▪ Lots 1 & 2 DP 627836 (18.26 ha) ▪ Lots 1 & 2 DP 725226 (16.99 ha) ▪ Lots 1, 2, 3 & 4 DP 725227 (42.97 ha) ▪ Lots 58, 59, 64, 65, 66, 85, 87, 88, 89, 90, 91, 92, 93, 113 & 163 DP 754567 (288.80 ha)

Details	Description
	▪ Lot 1 DP 851602 (0.28 ha)
Planning Zone / Land use	Commonwealth Land Special Use, SP2 – Infrastructure (Defence)
Local Government Authority (LGA)	Wagga Wagga City Council
Source: Jacobs, June 2021, Blamey Barracks Kapooka PFAS Ongoing Monitoring Plan (Jacobs, 2021b)	

2.1.3 Surrounding Land Uses and Zoning

Land surrounding the Base is zoned 'Primary Production (RU1)', 'General Residential (R5)', 'Conservation (E2)' and 'Public Recreation (RE1)' in the Wagga Wagga City Council municipality. The surrounding land uses are outlined in Table 2-2.

Table 2-2 Surrounding Land Uses

Direction	Land Use
North	▪ RU1 – Primary Production, around the Base and north of the Sturt Highway, consisting of cleared grassland with intermittent houses and farm dams, with primary agricultural activities identified as cattle, sheep and grain farming. ▪ R5 – Large Lot Residential, including San Isidore which is immediately adjacent to the north-eastern boundary of the Base. In addition to large, rural residential properties, it also contains a rural fire station, sporting field and church. ▪ RE1 – Public Recreation, at Pomingalarna Reserve to the north of Sturt Highway, north-east of the Base.
West	▪ RU1 – Primary Production, west of the Base towards Yarragundry, primarily consisting of cleared grassland with intermittent houses and farm dams, with primary agricultural activities identified as cattle, sheep and grain farming.
East	▪ E2 – Conservation, a strip which aligns with forested areas on the ridge to the east of the Base, between the Base and the City of Wagga Wagga. ▪ R1 – General Residential, approximately 3.6km from the eastern boundary of the Base, where the westernmost suburbs of the City of Wagga Wagga are located.
South	▪ Former quarry

2.1.4 Environmental Setting

Key details defining the site are summarised in Table 2-3. See Figure 1, Appendix A for key features.

Table 2-3 Key Site Details

Setting	Description (Adapted from Jacobs, 2021c)
Climate	Climate indicators have been recorded at nearby Wagga Wagga Aeronautical Meteorological Office (AMO) (072150) since 1941. Mean maximum temperatures range from 20.1°C in July to 37.9°C in January. Mean annual rainfall at this station in this period is 574.3 mm, with rain falling relatively evenly across the months of the year. The minimum mean monthly rainfall occurs in February with 39.7 mm, and the maximum in October with 56.8 mm. The prevailing wind direction in the morning (9am) is from the east while in the afternoon (3pm) the prevailing winds are from the west and, to a lesser extent, the south-west[1]. The Bureau of Meteorology (BoM) Kapooka (Defence) station (074272) has been operational since September 2017. Mean annual temperatures ranged from 22.1 to 24.6°C. The annual mean rainfall is 546.7mm, with increased rainfall from October to January. The prevailing wind direction in the morning (9 am) is from the east while in the afternoon (3 pm) the prevailing winds are from the west[2].
Topography	The regional topography comprises ridges and minor tablelands stepping down westwards and breaking into detached hills with intervening alluvial valley floors. Locally, a ridgeline intersects the Base through the middle from south to north, comprising rocky outcrops, small hills and valleys. Elevations across the Base range from 190 m AHD at the northern extent to 370 m AHD at the peak towards the centre. To the east of the ridge, developed areas including the Barracks drop from approximately 270 m AHD to 230 m AHD from west to east.
Geology	Geology at the Base and surrounding areas consists of four main units including basement Ordovician aged metamorphic and sedimentary rock and Silurian aged Collingullie Granite. These basement lithologies are overlain by colluvial soils On-Base and to the south and alluvial sands

Setting	Description (Adapted from Jacobs, 2021c)
	and gravels interbedded with clay layers in the north associated with historical meanders of the Murrumbidgee River (Jacobs, 2021c).
Acid Sulfate Soil	A review of the Acid Sulfate Soils (ASS) risk mapping, available on the CCMA[2] Soil Health online database indicates that the most southerly section of the site is classified as having a high probability of ASS occurrence and the rest of the site having a low probability of occurrence.
Hydrology	Watershed from rain is controlled by the central north-south trending ridgeline On-Base. To the east of the ridge, surface water drains from west to east in localised channels and feed into Kapooka Creek. Kapooka Creek is ephemeral and begins in the south-eastern portion of the Base as an unlined channel and runs in a northerly direction towards the Murrumbidgee River. Flow in the creek only occurs during heavy rain fall. Through San Isidore, Kapooka Creek transitions to a series of dams and low-lying areas. North of the Sturt Highway (near where the geology transitions from colluvial soils to alluvial deposits associated with the Murrumbidgee River), Kapooka Creek fans out and becomes discontinuous. Further to the east of Kapooka Creek is another north to south trending ridge line that forms the eastern extent of the valley in which the eastern portion of the Base and San Isidore sit. Surface water from areas to the west of the central north-south trending ridge On-Base, including the Former Quarry and Former Commandants House, drain west towards Sandy Creek. Sandy Creek is also ephemeral and comprises a flow channel with intermittent farm dams. During heavy rain fall, Sandy Creek flows northwards and drains into the Murrumbidgee River approximately 7.5 km downstream (i.e. to the west) of Kapooka Creek. The Murrumbidgee River is a major river in the area flowing year-round from east to west and is approximately 80 m in width.
Hydrogeology	Hydrogeological units at the Base and surrounding areas can be grouped into the following: ▪ Perched water On-Base surrounding the Wastewater Treatment Plant hosted in clay with some silt. Findings in the DSI indicate this perched water isn't laterally continuous and is likely related to the adjacent Wastewater Treatment Plant ponds. ▪ Perched water identified in MW601 along the Kapooka Creek flow path Off-Base. Water in MW601 is hosted in colluvial soils at 13.0 mBGL associated with Kapooka Creek. Below this is a consistent clay layer from 25.0 to 30.0 mBGL, which is sufficiently continuous to act as an aquiclude preventing migration of PFAS impacted perched water from Kapooka Creek downwards into regional groundwater. ▪ Regional groundwater is hosted in fractured rock aquifers to the south of the Management Area and On-Base. Groundwater wells in this unit are hosted in granite, shale and siltstone. Regional groundwater is hosted in alluvial deposits in the north of the Management Area, where the geology transitions to interbedded alluvial sandy gravels and clays associated with the Murrumbidgee River.
Environmental Sensitive Areas	The sensitive receptors to the area include (but are not limited to): ▪ Mammals including the Eastern Bentwing-bat (Miniopterus schreibersii oceanensis), and the Squirrel Glider in the Wagga Wagga Local Government Area (Petaurus norfolcensis, endangered population) ▪ Birds including the Grey-crowned Babbler eastern subspecies (Pmatostomus temporalis temporalis), the Rainbow Bee-eater, the Magpie Goose, and the White-bellied Sea-Eagle ▪ Reptiles including the Southern Bell Frog (Litoria raniformis), and Sloane's Froglet (Crinia sloanei) ▪ Semi-aquatic & aquatic biota including Murray Cod (Maccullochella peelii) & Trout Cod (Maccullochella macquariensis) ▪ Grass, trees & other vegetation including the Lower Murray River aquatic ecological community, Grey Box (Eucalyptus microcarpa), Grassy Woodlands and Derived Native Grasslands of south-eastern Australia

Notes:
1. Bureau of Meteorology, 072150, 1941 to 2022 (BoM, 2023) http://www.bom.gov.au, accessed (21/03/2023)
2. Bureau of Meteorology, 072150, 2017 to 2022 (BoM, 2023) http://www.bom.gov.au, accessed (21/03/2023)

Further information can be found in the DSI report (Jacobs, 2019).

2.2 Conceptual Site Model

The Conceptual Site Model (CSM) for the Site is provided in Appendix C of the PMAP (Jacobs, 2021c) to identify major/minor sources, migration pathways, exposure routes and receptors (current and future).

The CSM was based on numerous PFAS investigations, including:

- AECOM (2018a). *Stage 2 Detailed Site Investigation Report*, Prepared for the Department of Defence, 2018.
- AECOM (2018b). *Preliminary PFAS Assessment*, Kapooka, Prepared for Caltex Australia Petroleum Pty Ltd, 2018.
- Golder (2017). *Preliminary Site Investigation for PFAS Blamey Barracks Kapooka,* Prepared for the Department of Defence, 2017.

2.2.1 Source Areas

The Site has been the subject of numerous PFAS investigations, as detailed in section 1.2.

Historical use of firefighting foam products occurred at the Base until approximately 2008. The majority of primary source areas relate to storage or testing of firefighting foam equipment, including the Fire Station (RMV0059), Fire Training Pad, Fire Training Areas (RMV0050-3, RMV0122, RMV0058), the Parade Ground and the Former Quarry (RMV0117). Primary source areas also include several areas related to waste disposal including the Enhanced Land Force (ELF) Stockpiles and Buried Waste Areas (RMV0054). Two other primary source areas relate to singular or less frequent discharges of firefighting foam products including use for a waterslide at annual Christmas parties from 1995 and 2003, and in response to a fire at the Former Commandant's House in 2006.

Secondary source areas are related to waste treatment and discharge of treated effluent, including the Wastewater Treatment Plant (WTP) (RMV0051) and grassy areas On-Base irrigated with treated effluent (Reused Effluent Irrigation Areas).

Primary and secondary source areas are shown in Figure 2, Appendix A.

2.2.2 Migration Pathway

Migration of PFAS from source areas occurs via several pathways. The most significant pathways for PFAS migration from source areas On-Base include:

- PFAS leaching from impacted soil into surface water runoff which flows into Kapooka Creek.
- Accumulation of impacted surface water and sediment in drainage channels, sewer infrastructure, and dams On-Base.
- Irrigation with treated effluent from the WTP in grassed areas On-Base.
- Surface water migration into perched water surrounding the WTP and along Kapooka Creek.
- Direct exposure of receptors to PFAS impacted soils and surface water in On-Base source areas and Off-Base along Kapooka Creek.
- Use of PFAS impacted surface water along Kapooka Creek for watering of gardens and home grown produce (for home consumption).
- Surface water flow towards and discharge into Murrumbidgee River during heavy rain events.
- Bioaccumulation in higher order species from consumption of low order species which inhabit PFAS impacted environments (e.g. dams along Kapooka Creek).

2.2.3 Receptors

Receptors that exist in the Management Area, as identified in the DSI and HHERA, include:

On-Base:

- Defence personnel and contractors.
- Maintenance and construction workers.
- Livestock with access to PFAS impacted water.
- Wild flora and fauna.

Off-Base:

- Residents and recreational users of land and dam water along the Kapooka Creek flow pathway.
- Maintenance and construction workers within the Kapooka Creek flow pathway.

> Livestock with access to the Kapooka Creek flow pathway.

> Wild flora and fauna with access to the Kapooka Creek flow pathway and the Murrumbidgee River.

3 Data Quality Objectives

This SAQP has been developed based on a set of Data Quality Objectives (DQO) in reference to the DQO presented in the OMP (Jacobs, 2021b), and based on guidance presented in the US Environmental Protection Agency (EPA, 2006), and NEPM 2013 (Schedule B2). The DQO process comprises the following seven steps:

> Step 1: State the problem

> Step 2: Identify the Decision

> Step 3: Identify the Information Inputs

> Step 4: Define the Boundaries of the Study

> Step 5: Develop the Analytical Approach

> Step 6: Specify Performance or Acceptance Criteria

> Step 7: Develop the Plan for Obtaining the Data

The DQO are detailed in Table 3-1.

Table 3-1 Data Quality Objectives

Data Quality Step	Description
Step 1: State the Problem	Historic use of PFAS containing fire-fighting foams On-Base in response to incidents (i.e. fires) and in training has caused PFAS contamination of soil. Contaminated soil source areas are contributing to PFAS discharge in groundwater and surface water along surface drainage pathways Off-Base, primarily into Kapooka Creek. These discharges have led to potentially elevated risks to human health and the environment. Ongoing monitoring is needed to assess the effectiveness of these actions, to provide data for future risk management and to inform management decisions by Defence and relevant NSW government agencies. **Primary Source Areas** Areas where PFAS was detected in soil or groundwater exceeding the adopted assessment levels include areas associated with waste disposal including the ELF Stockpiles and Buried Waste Areas; areas which relate to the use or testing of firefighting foam equipment, including the Fire Station, Fire Training Pad, Former Fire Training Areas, the Parade Ground and the Former Quarry; and two other primary source areas which relate to singular or less frequent discharges of firefighting foam, including the waterslide at the site of annual Christmas parties from 1995 and 2003, and in response to a fire at the Former Commandant's House in 2006. **Secondary Source Areas** Secondary source areas are related to waste treatment and the discharge of treated effluent, including the WTP and Reused Effluent Irrigation Areas.
Step 2: Identify the Decision	The goals of the ongoing monitoring program are: ▪ To further refine the understanding of PFAS variability and distribution within the Management Area over time. ▪ Monitor for changes in the levels of PFAS in the Management Area in response to management actions and other conditions (such as rainfall). ▪ Provide an early warning of potential future migration of PFAS into groundwater beyond the current known extents. ▪ Collect additional data beyond the DSI and HHERA to help inform future management actions. ▪ Allow for identification of potential cases where PFAS levels in the Management Area change over time to the point where they trigger a need to review the HHERA. These changes can be both increases and decreases in PFAS levels.

Data Quality Step	Description
Step 3: Identify the Information Inputs	▪ The information inputs are: Existing data relevant to PFAS in soil, waters and biota obtained through the DSI, HHERA and other environmental investigations (including the preliminary site investigation). ▪ Understanding of surface water and groundwater flow pathways identified in the DSI and HHERA. ▪ Locations and types of human and environmental receptors as defined in the DSI and HHERA. ▪ New data collected as part of the OMP.
Step 4: Define the Boundaries of the Study	A Study Area was defined in the DSI. Based on outcomes from the HHERA, this has been further refined into a Management Area for use in the SAQP, OMP, and the PMAP. The Management Area is described in Section 2.1.1 and shown in Figure 1, Appendix A. The boundaries of the Study Area include: ▪ Surface water and sediment sampling will focus on areas of PFAS discharge away from source areas on the eastern side of the Base into Kapooka Creek. Kapooka Creek and its' tributaries are ephemeral, meaning surface water may not be present and available at the time of sampling. In the absence of water at these locations, sediment sampling is also proposed to help provide continuity and ability to assess variability in the absence of water. ▪ Sampling of surface water and sediment is not proposed in the Murrumbidgee River. However, if the detected levels of PFAS increase in Kapooka Creek, this may trigger a need for sampling in the Murrumbidgee River. This will be monitored through the PMAP review process. ▪ Sampling in Sandy Creek is not proposed as no detections of PFAS above the LOR were reporting in the DSI. In addition, there is no unacceptable level of risk identified in Sandy Creek from the HHERA. ▪ The Former Commandants House in the north of the Base both had detections of PFAS above LOR in the DSI. However, these were localised and not leading to migration of PFAS into Sandy Creek. This source area has a low potential contribution to risk (as identified in the PMAP). Hence, sampling of surface water and sediment at this location is not proposed as part of the OMP. ▪ PFAS was detected above the LOR in surface water and sediment samples in the small pond adjacent to the Former Quarry. Like the Former Commandants House, these detections were localised and not leading to migration of PFAS into Sandy Creek. However, the detection of PFAS in surface water was above the 95% ecological screening criteria, Hence, sampling of surface water and sediment at this location as part of the OMP is included to assess for potential variation and monitor changes to PFAS migrating in surface water and sediment away from this source area. ▪ PFAS was detected in perched water and groundwater in a limited number of areas in the DSI and HHERA. Bores within these areas (the Former Commandants House, the Wastewater Treatment Plant and the Kapooka Creek pathway Off-Base) will be monitored to test for any potential future migration of PFAS in or into groundwater. ▪ PFAS was detected in sewer and within the Wastewater Treatment Plant ponds On-Base during the DSI. Detections of PFAS in some of the sewer samples is attributed to adjacent PFAS source areas. Hence, these locations and some of the WTP ponds will be monitored to assess for PFAS variability over time. ▪ An initial time period of two years with monitoring events once every six months has been proposed. After this time, a review of all data can be undertaken to refine the OMP if necessary. Continued monitoring after this two-year period may still be required.
Step 5: Develop the Analytical Approach	The purpose of this step is to identify the parameters of interest, specify action levels and combine the outputs of previous DQO steps to develop a series of options if certain trigger events occur. The contaminants of interest for this investigation are PFAS and so all samples will be analysed for an extended PFAS suite (as per Appendix B). 1. The key decision rules of the OMP are: Has the analytical data collected as part of the monitoring program met the Data Quality Indicators (DQI) outlined in Table 3-2? If yes, then the data can be used to answer the decision rule below and the principal study questions developed in Step 2. If no, then an assessment of the need to collect additional data will be required.

Data Quality Step	Description
	2. Does the data indicate a change to level of risk defined in the DSI and HHERA? If yes, then further risk assessment will need to be carried out. This may lead to a need to revise the PMAP. If no, then continue monitoring as per the OMP. 3. Does the data conform with the most up to date CSM? If yes, then continue monitoring as per the OMP. If no, then further risk assessment will need to be carried out. This may lead to a need to revise the PMAP. 4. Is the data meeting the DQO as outlined in the OMP? If yes, then continue monitoring as per the OMP. If not, then a revision of the OMP should be undertaken. 5. Has the proposed time period of the OMP been achieved? If yes, review the available information and determine if continued monitoring is required. If yes, continue monitoring as per the OMP. Trigger levels to assist in the above decision rules are detailed in the OMP (Jacobs, 2021b).
Step 6: Specify Performance or Acceptance Criteria	Investigation criteria set out in the DSI and HHERA will be adopted for use to determine if the OMP data collected indicates a change in the level of PFAS within the test media. The potential for significant decision errors will be minimised by completing a robust QA/QC program in accordance with National Environmental Protection Measure (NEPM) (NEPC, 2013) and PFAS NEMP (HEPA, 2020) guideline requirements. Standard operating procedures will be closely followed in the field to ensure accurate and representative data acquisition. DQI will be applied to assess usability of data prior to making decisions, based on precision, accuracy, representativeness, comparability and completeness. The acceptable limit on decision error is 95% compliance with the applied DQI (see Table 3-1). If any of the DQI are not met, further assessment will be necessary to evaluate the significance of the non-conformance and implement corrective actions.
Step 7: Develop the Plan for Obtaining the Data	The scope of the OMP has been made in consideration of historical activities at the Site, historical investigations and findings (i.e. DSI, groundwater assessments) in the context of developing responses to the principal study questions outlined in Step 2 of the DQO process. The OMP scope for the first 2 years of monitoring is outlined in Section 4. Following the initial implementation period of 2 years (and review following each monitoring event), the available data will be reviewed and evaluated to determine if any changes to the scope of monitoring are required in order to meet the objectives to provide better understanding of PFAS concentration fluctuations and potential risks to receptors. As additional information is gathered during the course of this investigation/monitoring, it may be beneficial for the proposed scope of works to be altered from the initial design. Changes to the proposed monitoring may be made based on risk profile reviews and updated CSM, in consultation with the Client and PMAP Lead Consultant. Other measures adopted to optimise the collection of data to meet the DQO include: ▪ the use of NATA-accredited laboratories for PFAS analysis to ensure laboratory limit of reporting (LOR) are suitable to meet the relevant adopted assessment levels (where possible). ▪ the use of field scientist(s) with relevant experience to ensure all field and laboratory QA/QC protocols are adhered to by the field team. ▪ the adoption of field and analytical techniques that are in accordance with current industry standards, including the PFAS NEMP (HEPA, 2020), and ASC NEPM (NEPC, 2013).

An assessment of the Data Quality Indicators (DQI) relating to both field and laboratory procedures will be undertaken with appropriate documentation provided for each environmental element or media assessed. The DQI adopted for the OMP are summarised in Table 3-2.

Table 3-2 Data Quality Indicators

Data Quality Indicator	Detail
QA Documentation	Provision of appropriate work plans, DQI and DQO defined for the Site and all QA/QC aspects documented.

Data Quality Indicator	Detail
Bias	A measure of the potential distortion in an analysis which can result in errors in one direction (e.g. one laboratory consistently higher results or consistent poor spiked matrix recovery). Bias will be assessed with reference to the analysis of spiked matrix samples (NEPC, 1999b).
Representativeness	A qualitative measure of the confidence that data is representative of each medium present on the Site. Use of appropriate and documented sampling methods, sample handling, preservation and transport, and holding times.
Precision:	A quantitative measure of data variability or reproducibility, measured by the calculation of %RPD values for duplicate samples (i.e. measure of agreement). Precision in DQI can be measured as follows: ▪ Percentage of the mean of the measurement such as Relative Percent Difference (i.e. %RPD). The %RPD will be calculated for the field and secondary duplicate (i.e. inter and intra-laboratory analysis); and ▪ Use of similar analytical method and instrument (e.g. for inter-laboratory assessment). The %RPD will be considered as acceptable if the values are less than 30% (NEPC, 2013). Should there be a result that is greater than 30% difference, then a “review should be conducted of the cause (e.g. instrument calibration, appropriateness of method used)” (NEPC, 2013). Laboratory analysis of intra- and inter-laboratory samples (1 per 10 samples collected) to be collected.
Accuracy	A quantitative measure of the closeness of data to a ‘true value’, measured by the analysis of spike, blank and laboratory control samples (LCS). The LCS consists of a standard reference material or a matrix of known concentration. For the purpose of assessing accuracy it is required that at least one LCS for each process batch[1] be analysed (NEPC, 2013).
Comparability	A qualitative measure of the confidence that data may be considered to be equivalent for each sampling and analytical event. By use of standard procedures, comparable methods, qualified personnel and review of sample integrity. When all results have been received, Cardno will undertake a full review of the data for any anomalies in consideration of historical data at each location (where available), such as first-time detections or exceedances being reported at locations which have not had detections or exceedances previously. If potentially anomalous data is identified or suspected, further confirmatory measures will be undertaken such as re-extraction and reanalysis of the sample by the laboratory and/or additional data quality review.
Completeness	A measure of the amount of usable data (expressed as a percentage - %) from a data collection activity, based on completeness of test program, overall QA/QC completeness and validity of data set.

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

4 Ongoing Monitoring Program Sampling Location Rationale and Methodology

4.1 Monitoring Schedule

Matrix	Location	Interval	Monitored Parameters
Surface Water	Surface water on and off-Site	Biannual: Early autumn (March - April) and early spring (September - October)	Field: Water quality parameters[1] Laboratory: PFAS Suite

Matrix	Location	Interval	Monitored Parameters
Groundwater	Groundwater on and off-Site	Biannual: Early autumn (March - April) and early spring (September - October)	Field: Water quality parameters[1] Field: Water level Laboratory: PFAS Suite
Sediment	Sediment on and off-Site	Biannual: Early autumn (March - April) and early spring (September - October)	Field: Water quality parameters[1] Laboratory: PFAS Suite
Source: Jacobs 2021b **Notes** 1 Physical parameters include pH, electrical conductivity, DO, temperature and redox potential			

4.2 Groundwater Monitoring

4.2.1 Groundwater Monitoring Locations

The network of On-Base and Off-Base groundwater monitoring locations sampled as part of the DSI (Jacobs, 2019) and HHERA (Jacobs, 2021a) are summarised in Table 4-1. Existing monitoring wells included in the OMP, and justification, are summarised in Table 4-2 and shown in Figure 3, Appendix A. Well construction details are presented in Appendix C.

Table 4-1 Blamey Barracks Kapooka Groundwater Monitoring Network

Source Area Targeted	Location (On-Site/ Off-Site)	Monitoring Locations	Justification
Wastewater Treatment Plant	On-Base	MW103, MW104, MW107	MW103 and MW104 are adjacent to the WTP. MW104 is located on the northern boundary of the WTP. MW103 and MW104 are installed within the regional aquifer, and MW107 is installed within the perched water layer.
Former Commandants House	On-Base	MW008, MW109, MW110	MW008 near the Former Commandants House has had consistent detections of PFAS above laboratory LOR. MW109 and MW110 to be monitored to confirm extent of PFAS in groundwater associated with impacts detected at MW008.
	Off-Base	MW625	MW625 is located Off-Base and will be monitored to confirm extent of PFAS in groundwater associated with impacts detected at MW008 and potential for future migration down-gradient to the north-west.
Kapooka Creek flow pathway	Off-Base	MW601, MW624	MW601 installed in perched water associated with Kapooka Creek and has reported PFAS concentrations with an apparent increasing trend that needs to be assessed further. MW624, adjacent to Kapooka Creek, is screened in shale in the regional aquifer and has not reported PFAS above the laboratory LOR. Ongoing monitoring is required to monitor for the potential migration of PFAS from the perched water into the regional aquifer.

4.2.2 Groundwater Sampling Methodology

Groundwater monitoring will be undertaken as detailed in Table 4-2.

Table 4-2 Groundwater Monitoring Wells – Sampling Method

Activity	Details
Well Gauging	Standing Water Level (SWL) will be gauged using either an interface probe or a water level meter. All wells will be measured against a specified mark at the top of the well casing. A consolidated groundwater gauging event will be undertaken at the commencement of each monitoring event. All groundwater monitoring wells listed in Table 4-1 will be attempted to be gauged.
Groundwater Field Parameters	Groundwater field parameters will be recorded with a water quality meter before sample collection (with the sample in a clean jar) prior to deployment of the HydraSleeve®, or using extra sample water from within the HydraSleeve® decanted into clean jars if the HydraSleeve® is already deployed. With the exception of MW008, sampling will be completed via Hydrasleeve® technique. MW008 will be sampled by low-flow micropurge as specified in the OMP (Jacobs, 2021b), which states that "MW008 is not suitable for sampling with Hydrasleeve due to the approximate one-metre diameter of the well". Groundwater water quality field parameters will be monitored and recorded during groundwater removal (purging), prior to collecting groundwater samples for laboratory analysis. The following field parameters will be recorded using a water quality meter: ▪ pH. ▪ electrical conductivity (EC). ▪ oxidation reduction potential (ORP). ▪ Dissolved oxygen (DO). ▪ Temperature. Once field parameters have stabilised, measurement will be recorded on field data records. All field instruments (e.g. water quality meter) will be calibrated prior to field events and as required during monitoring to optimise the accuracy of the measurements taken. The water quality meter will be bump tested daily and re-calibrated as required.
Deployment of HydraSleeve®	HydraSleeves® will be deployed to the base of wells, or a minimum of 2.5m within the screen interval. A top weight will be utilised if water depth of screen requires compression of the HydraSleeve®. Used HydraSleeves® will be replaced with a new HydraSleeve® after sample collection at each location. Available well construction details, including screen intervals, are presented in Appendix C.
Retrieval of HydraSleeves® (Sample Collection)	HydraSleeve® sampling devices will be left in wells for a minimum of 4 hours when deployed with bottom weights only, to allow restabilisation of the well following the slight disturbance caused by sampler deployment. For wells with a shallow water column (nominally less than 2.5m in height, although depends on the length of the HydraSleeve®), HydraSleeve® sampling devices will be deployed with both top and bottom weights, and will be left in the well for a minimum of 24 hours. This is to allow the top weight time to compress the HydraSleeve into the bottom of the well and restabilisation of the well following the slight disturbance caused by sampler deployment. Samples will be collected via continuous pull method at a rate of approximately 30 cm per second, allowing the water to pass through the check value into the sample sleeve. Samples will be discharged immediately (to minimise changes in chemistry) via discharge tube.
Sample collection by low-flow Micropurge (MW008)	Groundwater sampling will commence once the water quality field parameters have stabilised, indicating that they represent natural groundwater in the aquifer. Samples will be collected directly into appropriately preserved laboratory supplied bottles and packed in chilled containers for delivery to the laboratory under Chain of Custody (COC) documentation. Disposable High-Density Polyethylene (HDPE) tubing will be utilised for sampling and will be taken off-site for disposal following completion of sampling.

Activity	Details
Sample collection by bailer	Where insufficient water is retrieved with the HydraSleeve®, samples will be collected using disposable bailers. Wells will be purged 3 bore volumes, or until dry, whichever is sooner, prior to sample collection.
Sample identification, preservation transport and holding times	Each sample will be labelled with the sample location, date, project identification number and sampler's initials. Sample labelling and naming will be in accordance with Annex L of the Defence Contamination Management Manual (DCMM). Samples will be collected directly in into appropriately preserved laboratory supplied bottles (Teflon-free) and packed in chilled containers for delivery to the laboratory under COC documentation. Sample containers, preservation procedures, sample storage requirements and holding times will be undertaken in accordance with the requirements set out in Australian Standard AS/NZS 5567.1:1998 and AS 4482.1.
Field Records	Field records will include the following information: ▪ Sampling time, date and name of the sampler. ▪ Weather conditions. ▪ Sample collection method. ▪ Depth of HydraSleeves® (where applicable) ▪ Sampling equipment decontamination procedures where non-disposable sampling equipment is utilised. ▪ Calibration records. ▪ Daily bump test records. All sampling documentation including field notes, reporting records, COC documentation, equipment calibration certificates and bump test records, and procedures will be retained within project files.
Well development	Where required, groundwater monitoring wells will be redeveloped using a decontaminated stainless-steel bailer to remove built-up silt or clear blockages/obstructions (e.g. from plant rootlets).
Decontamination	Used HydraSleeves® will be replaced with a new HydraSleeve® after sample collection at each location, thus removing the need for decontamination. All re-usable sampling equipment (such as the interface probe and micropurge pump) will be thoroughly washed using phosphate-free detergent (Liquinox), then double rinsed with clean water before the sample collection.
Laboratory Testing	All groundwater samples will be analysed for the full PFAS analytical suite (see Appendix B). The laboratory Limit of Reporting (LOR) for groundwater, PFAS – Full Suite - 28 Analytes, is 0.01-0.1 µg/L.
Laboratory Testing – Quality Control	Groundwater QC samples will be collected at the following frequencies: ▪ 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 should be sent to a secondary laboratory. ▪ Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. interface probe)]. ▪ Trip blank samples of 1 per shipment to be included in the chilled sample containers upon transport to the laboratory. All QC samples will be tested for a full PFAS analytical suite (see Appendix B).
Laboratory Accreditation	All groundwater analysis will be undertaken by laboratories accredited by the NATA. ▪ Primary analysis will be undertaken by ALS Global Laboratories. ▪ Secondary analysis will be undertaken by Eurofins.

4.3 Surface Water and Sediment Monitoring

4.3.1 Monitoring Locations

The proposed On-Base and Off-Base surface water, sediment and sewer monitoring locations are set out in the Figures 3 (Appendix A) and are summarised in Table 4-3. Sampling locations are grouped into areas and justification is provided for each sampling area.

Table 4-3 OMP Surface Water and Sediment Monitoring Locations and Frequency

Sampling Area	Location (on-Site/off-Site)	Monitoring locations	Justification (from the OMP; Jacobs, 2021b)
Overland drainage pathways On-Base	On-Base	SW/SD136 SW/SD103 SW/SD106 SW/SD107 SW/SD118	These sample locations are in surface water pathways on the eastern side of the Base that feed into Kapooka Creek. SW/SD136 and SW/SD103 are downstream near to the Fire Station and SW/SD107 is also downstream of the Fire Station and is located in a retention basin which has been considered for use as part of potential management actions in the PMAP. SW/SD106 is in the drainage pathway from treated effluent irrigation areas just prior to Kapooka Creek. SW/SD118 is near Kapooka Creek On-Base. These sampling locations provide an overview of the concentrations in surface water feeding into Kapooka Creek as a result of source areas on the eastern portion of the Base.
Kapooka Creek	On-Base	SW/SD121	Risks identified Off-Base in the HHERA are all associated with Kapooka Creek. The four proposed sampling locations include SW/SD121 in an On-Base dam just prior to Kapooka Creek flowing Off-Base into San Isidore, SW680 located Off-Base in a farm dam on private property, and two Off-Base locations on public land, approximately evenly spaced between the Base and the Murrumbidgee River. The two Off-Base locations (SW/SD614 and SW/SD677) are unlikely to have water present unless there has been recent rain. Therefore, it is proposed at a minimum that sediment samples are collected from these locations to assist with monitoring variability in PFAS levels along Kapooka Creek.
	Off-Base	SW/SD614 SW/SD677 SW680	
Sewer	On-Base	SW140 SW144 SW148 SW149	Sewer samples SW140 and SW148 are adjacent to former Fire Training Areas. SW144 and SW149 are included as these locations are immediately upstream and downstream of SW148. Similar sampling locations are not available for SW140. If results in the OMP are found to be consistent with those in the DSI, these sampling locations may be reviewed and possibly removed from future OMP monitoring rounds.
Wastewater treatment plant ponds	On-Base	SW/SD108 SW/SD111	The results from previous sampling rounds have shown a slight decreasing trend in PFOS + PFHxS concentration. The objective of these sampling locations is to assess this trend. As with the sewer samples, the need for sampling beyond the first OMP round should be reviewed based on results.
Overland drainage pathways – Former Quarry	On-Base	SW/SD127	Surface water and sediment sampling point downstream of the Former Quarry in the south-west area of the Base. The DSI identified that PFAS from the Former Quarry is considered to be localised and not migrating to Sandy Creek to the west. This sampling point is to monitor this over time and provide a trigger for review if concentrations of PFAS increase and/or decrease over time.

4.3.2 Surface Water Sampling Methodology

The methodology for the surface water monitoring is detailed in Table 4-4.

Table 4-4 Surface Water Monitoring

Item	Details
Field parameters	Surface water quality field parameters [i.e. pH, electrical conductivity (EC), oxidation reduction potential (ORP), dissolved oxygen (DO), and temperature] will be recorded at the time of sampling using a pre-calibrated water quality meter. The water quality meter will be bump tested daily and re-calibrated as required. Field observations such as colour, odours, suspended solids, sheen presence, condition of the water body that was sampled from such as the type (lake, stream etc.) and channel width will also be recorded on field sampling sheets, as applicable. Flow rate will also be quantitatively recorded where possible using the float method, with qualitative flow rates to be recorded where quantitative measurements are unable to be taken by field staff (such as when environmental conditions significantly limit visibility or access).
Surface Water Sampling Method	Where possible, surface water samples will be collected directly into laboratory supplied sample containers using a 'Grab' (manual) sample method via a long-handled sampling device. The sample container is secured to the end of the sampling device and is then lowered into the water, oriented with the capped opening facing downwards to avoid the collection of surface films. Where depth permits, the sample container should be positioned at least 10 cm below the surface water level and above the sediment bed before reorienting the sample container so that the capped opening is facing upwards, allowing it to fill. Samples will be collected in accordance with Australian/New Zealand Standards (AS/NZS 5667.1:1998) '*Water quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*'.
Sewer Sampling Method	Sewer sampling will be completed at maintenance pits. The maintenance cover (a round concrete plug) is to be lifted and a grab sample of water collected directly from the flow via a long-handled sampling device. For sampling within the Wastewater Treatment Plant ponds, the same method as surface water sampling should be followed.
Sample Collection	Water samples will be placed directly into appropriately labelled, laboratory supplied sample bottles and packed in chilled containers for delivery to the laboratory under COC documentation. Sample containers will include water resistant labels attached to the sample bottles.
Sample identification, preservation, transport and holding times.	Each sample will be labelled with the sample location, date, project identification number and sampler's initials. Sample labelling and naming will be in accordance with Annex L of the DCMM. Samples will be contained in 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 will comply with the requirements set out in "Australian Standard AS/NZS 5567.1:1998 and AS 4482.1".
Field Records	Field records will include the following information: ▪ Sampling time, date and name of the sampler. ▪ Weather conditions. ▪ Sample collection method. ▪ Sampling equipment decontamination procedures where non-disposable sampling equipment is utilised. ▪ Calibration records. ▪ Bump test records. All sample documentation including field notes, reporting records, COC documentation, equipment calibration certificates and bump test records, and procedures will be retained within project files.
Decontamination	All re-usable sampling equipment (such as the long-handled sampling device) will be thoroughly washed using phosphate-free detergent (Liquinox), then double rinsed with clean water before the sample collection.
Laboratory Testing	All surface water samples will be analysed for the full PFAS analytical suite (see Appendix B). The LOR for surface water, PFAS – Full Suite (28 Analytes), is 0.01-0.1 µg/L.
Laboratory Testing – Quality Control	Surface water QC samples will be collected at the following frequencies: ▪ Field duplicate (intra-laboratory) samples at 1 per 10 water samples or 1 per batch if the batch is less than 10 samples.

Item	Details
	▪ Field triplicate (inter-laboratory) samples at 1 per 10 water samples should be sent to a secondary laboratory. ▪ Rinsate blank sample at 1 per day [collected off re-used sampling equipment (e.g. interface probe)]. ▪ Trip blank samples of 1 per shipment to be included in the chilled sample containers upon transport to the laboratory. QC samples will be tested for a full PFAS analytical suite (see Appendix B).
Laboratory Accreditation	All surface water analysis will be undertaken by the following NATA-accredited laboratories: ▪ Primary analysis will be undertaken by ALS Global Laboratories. ▪ Secondary analysis will be undertaken by Eurofins.

4.3.3 Sediment Sampling Methodology

The methodology for sediment sampling is detailed in Table 4-5.

Table 4-5 Sediment Investigation Methodology

Item	Details
Sample Collection	Sediment samples should be collected from the approximate mid-point of the flow pathway, to the extent practicable, and collected from the top ten centimetres after removal of the immediate surface material using hand tools (e.g. trowel, hand auger, PVC pipe, etc.). Sediment samples should be collected after the co-located surface water sample is collected to prevent agitating sediments into the water body and surface water sample matrix. Samples should be 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 will be visually assessed and observations (physical description including makeup, colour, visible signs of contamination and moisture) recorded on field data sheets.
Field Records	Field records will include the following information: ▪ Sampling time, date and name of the sampler. ▪ Weather conditions. ▪ Sample collection method. ▪ Sampling equipment decontamination procedures where non-disposable sampling equipment is utilised. All sample documentation including field notes, reporting records, COC documentation and procedures will be retained within project files.
Decontamination	All re-usable sampling equipment (such as a trowel) will be thoroughly washed using phosphate-free detergent (Liquinox), then double rinsed with clean water before the sample collection.
Sample identification, preservation, transport and holding times.	Each sample will be labelled with the sample location, date, project identification number and sampler's initials. Sample labelling and naming will be in accordance with Annex L of the DCMM. Samples will be contained in 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 will comply with the requirements set out in "Australian Standard AS/NZS 5567.1:1998 and AS 4482.1".
Laboratory Testing	All sediment samples will be analysed for the full PFAS analytical suite (see Appendix B). The LOR for sediment, PFAS – Full Suite (28 Analytes), is 0.0002-0.001 mg/kg.
Laboratory Testing – Quality Control	Sediment QC samples will be collected at the following frequencies: ▪ Field duplicate (intra-laboratory) samples at 1 per 10 sediment samples or 1 per batch if the batch is less than 10 samples. ▪ Field triplicate (inter-laboratory) samples at 1 per 10 sediment samples should be sent to a secondary laboratory. All QC samples will be tested for a full PFAS analytical suite (see Appendix B).

Item	Details
Laboratory Accreditation	All sediment sample analysis will be undertaken by the following NATA-accredited laboratories: ▪ Primary analysis will be undertaken by ALS Global Laboratories. ▪ Secondary analysis will be undertaken by Eurofins.

4.4 Quality Control Contingency Measures

In the event there are any issues identified with quality control samples, such as detects being reported in a blank, Cardno will request the laboratories to undertake a detailed review of the results, and to carry out re-analysis of the sample (if necessary) to confirm the detect. In the event that the detect in a blank is confirmed, Cardno will notify Defence and include a discussion as to the potential cause or source of the detect in the blank sample, if it can be determined, in the QA/QC evaluation prepared for each factual report. The QA/QC evaluation will also include discussion of any RPD exceedances, internal laboratory quality outliers or other data quality issues which are identified during the sampling event, and whether any of these issues are considered to impact on the overall reliability and usability of the data set.

4.5 Waste Management

All liquid wastes generated from the OMP activities will be temporarily stored on-site (in an agreed location as approved by the Base) within either a wastewater drum or wastewater container and disposed off-site to a licensed facility. Disposal of the liquid waste is anticipated to occur once the drum(s) or container(s) are full, or as required.

Any solid waste generated during the sampling event will be disposed of either off-Site or in appropriate bins on-Site, as approved by Base Support.

4.6 Data Management

All data collected as part of the monitoring program will be reviewed and managed in accordance with the requirements of Annex L of the DCMM (Defence, 2021c), and uploaded into Defence's Environmental Data Management Software (EDMS). Data management will include the following:

> The Defence ESdat email address (DERP.LabReports@esdat.com.au) will be included on CoCs as a laboratory report recipient,

> The laboratory Project ID and the laboratory provided ESdat files will be populated to match the Project ID setup in the Defence ESdat,

> The location code and sample naming conventions outlined in Annex L of the DCMM will be followed,

> Field data will be uploaded to Defence's EDMS,

> Laboratory data will be uploaded to Defence's EDMS, associated QA/QC data will be reconciled, and the laboratory data will be approved.

5 Assessment Criteria

5.1 Groundwater and Surface Water

The assessment levels adopted for groundwater and surface water in this SAQP are based upon the PFAS screening criteria specified in the OMP (Jacobs, 2021b), which were adopted based on the guidance in the PFAS NEMP (HEPA, 2020). The adopted assessment criteria for groundwater and surface water are detailed in Table 5-1. Screening levels will be reviewed and updated (if deemed necessary) as part of the OMP review process.

Table 5-1 PFAS Criteria for Groundwater and Surface Water

Exposure Scenario	Adopted Assessment Criteria		Guidance
	PFHxS / PFOS	PFOA	
	µg/L		

Groundwater and Surface Water			
Human Health - Drinking Water Quality Guideline[1]	0.07^{2}	0.56	HEPA 2020
Human Health - Surface Water Recreational	2^{2}	10	HEPA 2020
Ecological (95% species protection)	0.13^{3}	220	HEPA 2020

Notes:
2. Drinking Water screening guidelines have been adopted for screening purposes for Industrial Water use, Stock Water use and Agriculture/Parks/Gardens Water use.
3. Combined PFOS and PFHxS.
4. PFOS only.

5.2 Sediment

There are currently no Australian regulatory endorsed assessment levels for risk posed to ecology or human health by PFAS in sediment.

6 Deviations From the OMP

Only one deviation from the OMP has occurred, with the addition of biannual surface water monitoring location SW680 to the monitoring network as of October 2022. The surface water location is located within a farm dam along the Kapooka Creek flow path.

7 Reporting

7.1 Factual Reporting

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

> Introduction.
> Scope of work completed.
> Field activities undertaken and description of sampling methodologies used.
> Field observations (e.g. condition of monitoring wells, description of purged water) and water quality parameter measurements.
> Use of appropriate nomenclature of sampling locations as per DCMM Annex L.
> Summary of any changes to the monitoring network condition that may affect data integrity, or require rectification works, and recommendations for repair, replacement of decommissioning of a location.
> Evaluation of the applicability of adopted assessment criteria.
> Review of the suitability of the data for assessment purposes (QA/QC evaluation).
> Summary tables presenting gauged groundwater levels.
> Presentation of inferred groundwater contours and inferred groundwater flow direction in a figure.
> Summary tables of analytical results in comparison to adopted assessment criteria generated through management of data on the Defence ESdat database, and naming of sampling locations as per DCMM Annex L.
> Figures showing results in accordance with the OMP Factual Report preparation guidance.
> Laboratory reports, COC documentation, field sampling records, data validation and QA/QC details, equipment calibration certificates and other relevant documentation.
> Any deviations from the SAQP encountered during completion of the sampling event.

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

It is noted that projects are active and laboratory data is to be received by the Defence ESdat Web Interface at the time of laboratory reporting to the consultant (Department of Defence, 2019a). The data are live and location data will be uploaded and reconciled as received.

7.2 Interpretive Reporting

Upon completion of each year's monitoring period, an AIR will be prepared. The report will be prepared in accordance with the Defence *PFAS OMP Annual Interpretive Report Guidance* document (Department of Defence, 2021b). As a minimum, each interpretive report should include the following:

> The factual information described in Section 7.1.

> Evidence of compliance with the requirements of the SAQP and meeting stated objectives of the OMP.

> Relevant figures depicting sampling locations and site-specific hydrogeological features.

> Use of appropriate nomenclature of sampling locations as per DCMM Annex L.

> Laboratory results and analysis including comparison with relevant screening criteria as identified in each OMP; data to be managed through the Defence ESdat database, and naming of sampling locations as per DCMM Annex L.

> Assessment and commentary on appropriate Quality Assurance/ Quality Control (QA/QC) procedures.

> A discussion of analytical results in relation to the following, taking into account the trigger levels and response measures set out in Section 4.3 of the OMP (Jacobs, 2021b):

- Trends in PFAS concentrations, including an assessment of temporal changes and/or changes to the extent of PFAS impacts. Trends should be assessed using an appropriate statistical analysis approach (e.g. using Mann-Kendall or similar analysis), with a specified level of confidence based upon the number of monitoring rounds completed.
- Consideration, based on data trends, as to whether any of the existing remediation / management measures should be re-assessed, with a view to potential modification, supplementation or cessation.
- Assessment of whether changes to the CSM and/or risk assessment are required.
- Whether recalibration or changes to the groundwater model are required to provide a better understanding of the potential future extent of PFAS impact in groundwater.

> Based on the data obtained, an assessment of the OMP sampling requirements with a view to establishing whether:

- The number of locations monitored could be reduced, such as where PFAS concentrations are stable and are considered to present a low risk to receptors.
- Additional monitoring locations are required, including the installation of new monitoring wells or sampling of additional existing wells (and/or private bores) to provide better understanding of the nature, extent or magnitude of PFAS impacts in a particular portion of the Management Area.
- The frequency of monitoring should increase or decrease to provide better understanding of PFAS concentration fluctuations and potential risks to receptors.

> An overview of remedial works or construction and maintenance activities undertaken in the management area during the reporting period, which may impact the CSM.

> All deviations from the SAQP encountered in the previous year's monitoring will be documented, along with a statement of how these deviations impact on the data quality objectives or overall objectives of the OMP.

> A statement as to whether the risk profile has changed overall, or at any specific location in the Management Area (on-Site and off-Site). Based on potential changes to the risk profile, recommendations would be made as to whether this should trigger an OMP and/or PMAP review, or other actions.

7.3 Provision of Results to Off-Base Landowners

In addition to the reporting of groundwater, surface water and sediment data collected Off-Base in the factual and interpretive reports described in Section 7.1 and Section 7.2, the analytical results of Off-Base sampling will also need to be reported to the landowners, by way of a factual results letter. The results letters will be delivered to the landowners following Defence review and approval and include the following information, as a minimum:

> A brief description of the purpose of the OMP;
> The PFAS assessment levels relevant at the time of sampling;
> The laboratory LORs;
> The analytical results of the samples collected;
> A description of how the data will be used; and
> Contact details of the appropriate Defence representative.

In the event that the results exceed screening criteria, a follow-up consultation will be conducted with the property owner by telephone unless otherwise directed.

Note: Identifying data for private properties, such as addresses, will not be included on the Defence ESdat database. However, the groundwater, surface water, soil, and sediment data will be included in the ESdat database.

7.4 SAQP Review

Prior to each monitoring event, the SAQP will be reviewed to ensure it complies with the following guidelines:

> Heads of Environmental Protection Authority's Australia and New Zealand (HEPA) (2020), PFAS National Environmental Management Plan (NEMP) Version 2.0, January 2020.;
> National Environment Protection (Assessment of Site Contamination) Measure (NEPM), National Environment Protection Council (NEPC), 2013;
> Department of Defence, 2016. Routine Environment Water Quality Monitoring Manual;
> 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; and
> State guidelines: Environment Protection Authority (EPA) or equivalent state environmental regulators relevant guidelines e.g. Victoria's Industrial Waste Resource Guidelines (IWRG) Sampling and Analysis of Waters, Wastewaters, Soils and Wastes, Publication 701.

Any changes to the SAQP identified as part of the review are to be documented by way of a revision of the SAQP.

Table 7-1 OMP SAQP History

Version	Effective Date	Description of Revision	Key Changes
2	21 October 2021	Final	-
3	18 October 2022	Revised Final	Switch from using dedicated Hydrasleeves® per groundwater monitoring well to single-use only. Added details around well development. Streamlining of wording in Section 4.1 Source Areas. Added SW680 to the list of biannual surface water monitoring locations.

8 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. Department of Defence (2019a), Pollution Prevention Management Manual – Annex 1L: Pollution Prevention Guidance - Routine Water Quality Monitoring.
3. Department of Defence (2021a), *PFAS OMP Factual Report Guidance*, May 2021.
4. Department of Defence (2021b), PFAS OMP Annual Interpretive Report Guidance, May 2021.
5. Department of Defence (2021c), Contamination Management Manual (DCMM), Annex L – Data Management, Amended June 2021.
6. Department of Defence, Department of Energy (2019), Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3, 2019.
7. Environment Protection Authority VIC (EPA) (2000), Groundwater Sampling Guidelines, Publication 669, April 2000.
8. EPA NSW (1997), Contaminated Land Management Act, No 140, Current Version 11 December 2020.
9. EPA NSW (2002), The NSW State Groundwater Dependent Ecosystems Policy.
10. EPA NSW (2004), Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales, Publication 1669.2, March 2004.
11. EPA NSW (2014), Waste Classification Guidelines – Part 1: Classification of Waste, November 2014
12. EPA NSW (2016a), Designing Sampling Programs for Sites Potentially Contaminated by PFAS.
13. EPA NSW (2016b), Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste
14. Heads of Environmental Protection Authority's Australia and New Zealand (HEPA) (2020), PFAS National Environmental Management Plan (NEMP) Version 2.0, January 2020.
15. National Environment Protection Council (NEPC) (1999 – amended 2013), National Environmental Protection (Assessment of Site Contamination) Measure (as amended 2013) (ASC NEPM).
16. National Health and Medical Research Council (NHMRC) (2019), Guidance on Per and Polyfluoroalkyl Substances (PFAS) in Recreational Water, August 2019.
17. USEPA (2000), Guidance for the Data Quality Objectives Process (EPA QA/G-4).
18. USEPA (2002), Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8).
19. Wagga Wagga City Council (2013). Wagga Wagga Spatial Plan 2013 -2043. https://wagga.nsw.gov.au/__data/assets/pdf_file/0004/26509/Wagga-Wagga-Spatial-Plan-2013-2043.pdf. Accessed 17th August 2020.

Site Specific References

20. KBR (2013), Kapooka Training Area Sustainability Monitoring and Reporting Plan (No. MEN208-TDEV-GEB-0005 Rev0). Kellogg Brown & Root Pty Ltd.
21. Golder (2017), Preliminary Site Investigation for PFAS Blamey Barracks Kapooka (0315) (No.1669283_001_R_Rev1). Golder Associates Pty Ltd.
22. Cardno (2017), Base Engineering Assessment Program. Part 5 Wastewater and Part 6 Storm Water, Kapooka Military Area Property ID: 0315 (No. 360517/100/5 and 360517/100/6). Cardno.
23. AECOM (2018a), Stage 2 Detailed Site Investigation Report, Blamey Barracks, Kapooka (0315) (No. 60551084). AECOM.

24. AECOM (2018b), Preliminary PFAS Assessment, Kapooka, Caltex. Caltex Australia Petroleum Pty Ltd. AECOM.
25. Jacobs (2019), Blamey Barracks Comprehensive PFAS Investigation – Detailed Site Investigation (No. IS253200-040-NP-RPT-0002 Rev4). Jacobs Group (Australia) Pty Ltd.
26. Jacobs (2021a), Blamey Barracks Comprehensive PFAS Investigation – Human Health and Ecological Risk Assessment (No. IS253200-040-NP-RPT-0006 Rev4 (23rd June 2021).
27. Jacobs (2021b), PFAS Ongoing Monitoring Plan (OMP) - Blamey Barracks Kapooka, June 2021.
28. Jacobs (2021c), PFAS Management Area Plan (PMAP) – Blamey Barracks Kapooka, June 2021.

APPENDIX

A

FIGURES

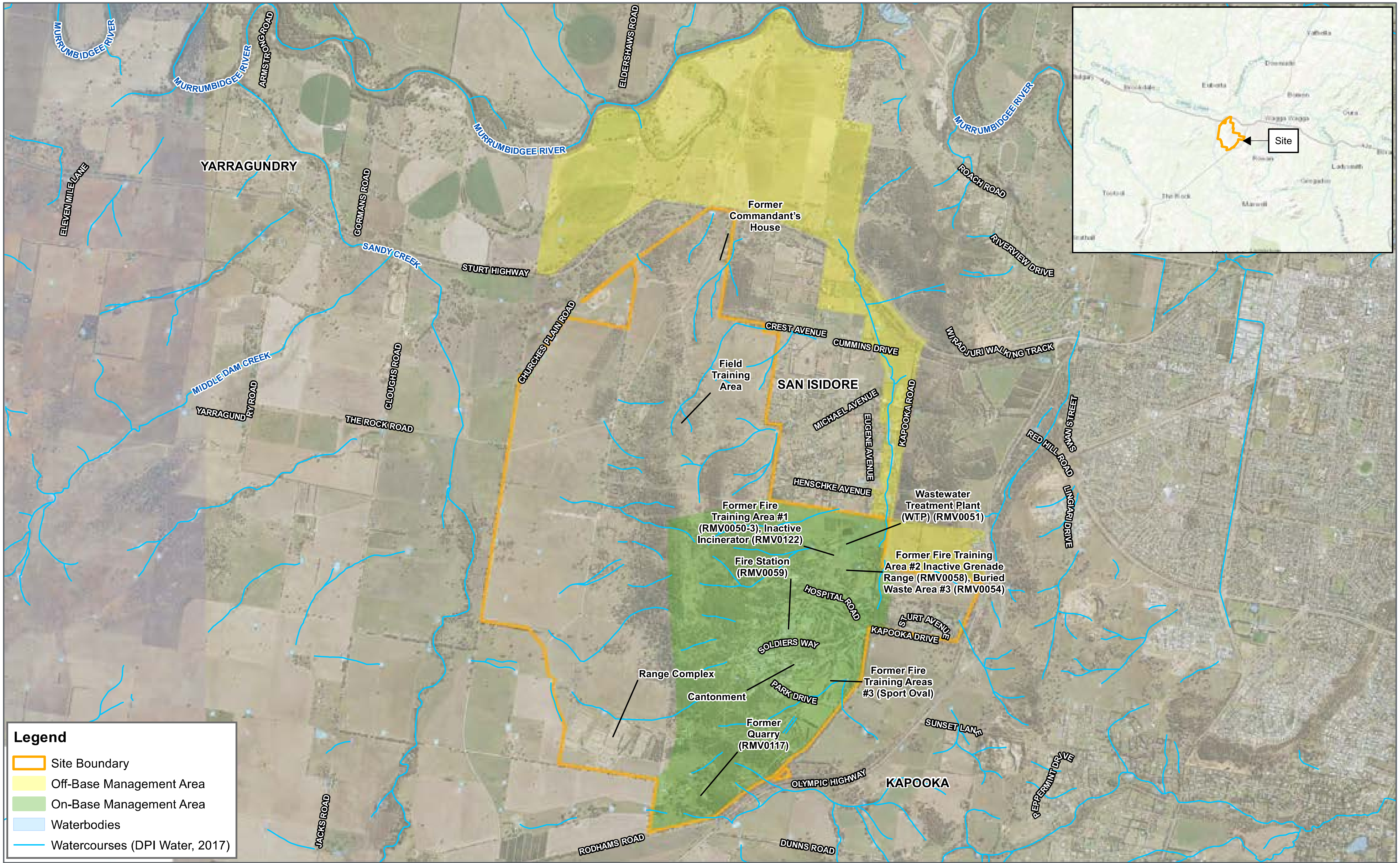

FIGURE 1

1:40,000 Scale at A3

Metres

0 1,000 2,000

Site Locality Plan & Management Areas

SAMPLING ANALYSIS AND QUALITY PLAN
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno

Map Produced by Cardno
Date: 2021-09-27 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0164-SiteLocalityPlan_K.mxd 01
Aerial Imagery Supplied by Metromap (March, 2021)

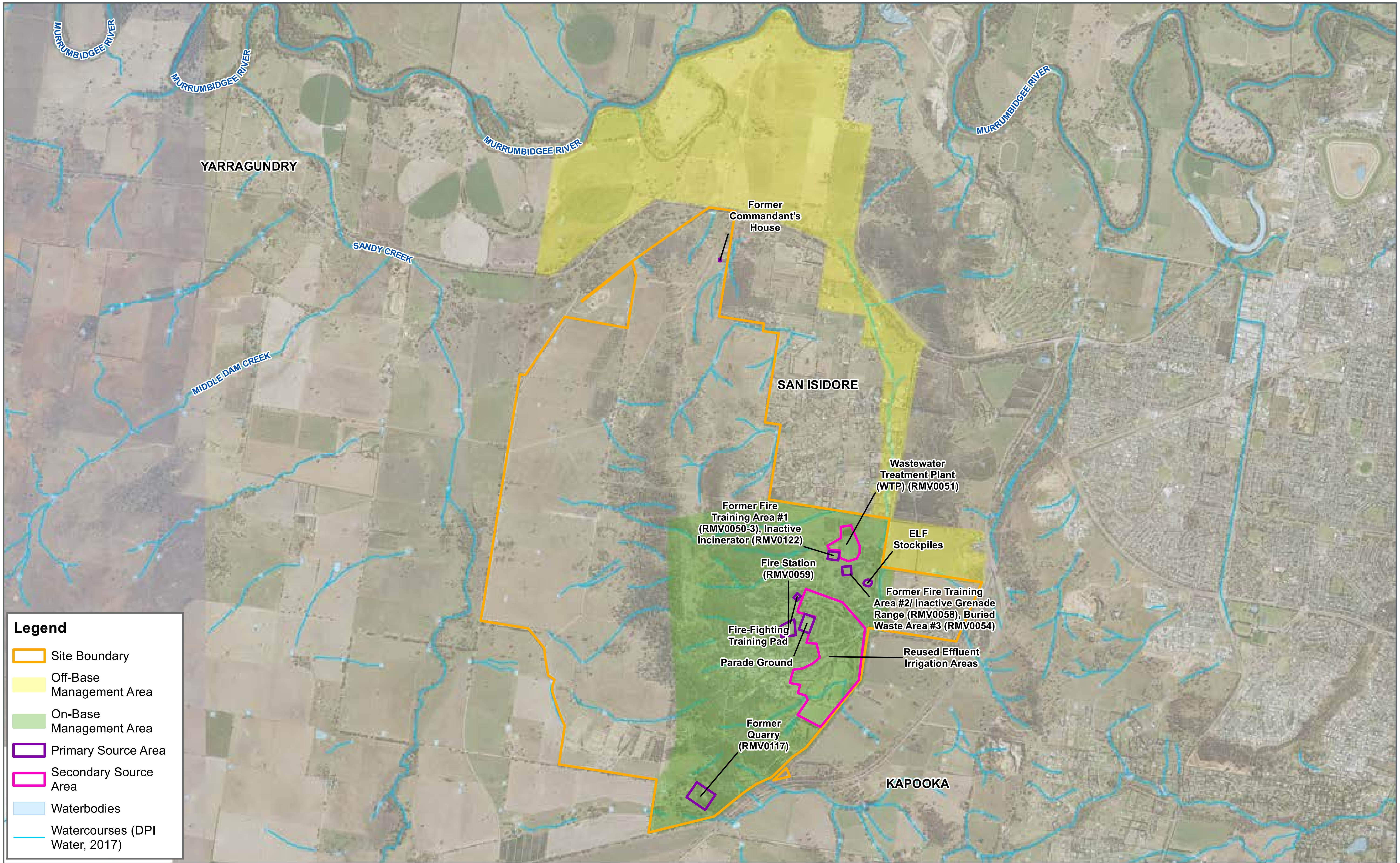

FIGURE 2

1:40,000 Scale at A3

Metres
0 1,000 2,000

Source Areas

SAMPLING ANALYSIS AND QUALITY PLAN
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno

Map Produced by Cardno
Date: 2021-10-21 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0165-SourceAreas_K.mxd 01
Aerial Imagery Supplied by Metromap (March, 2021)

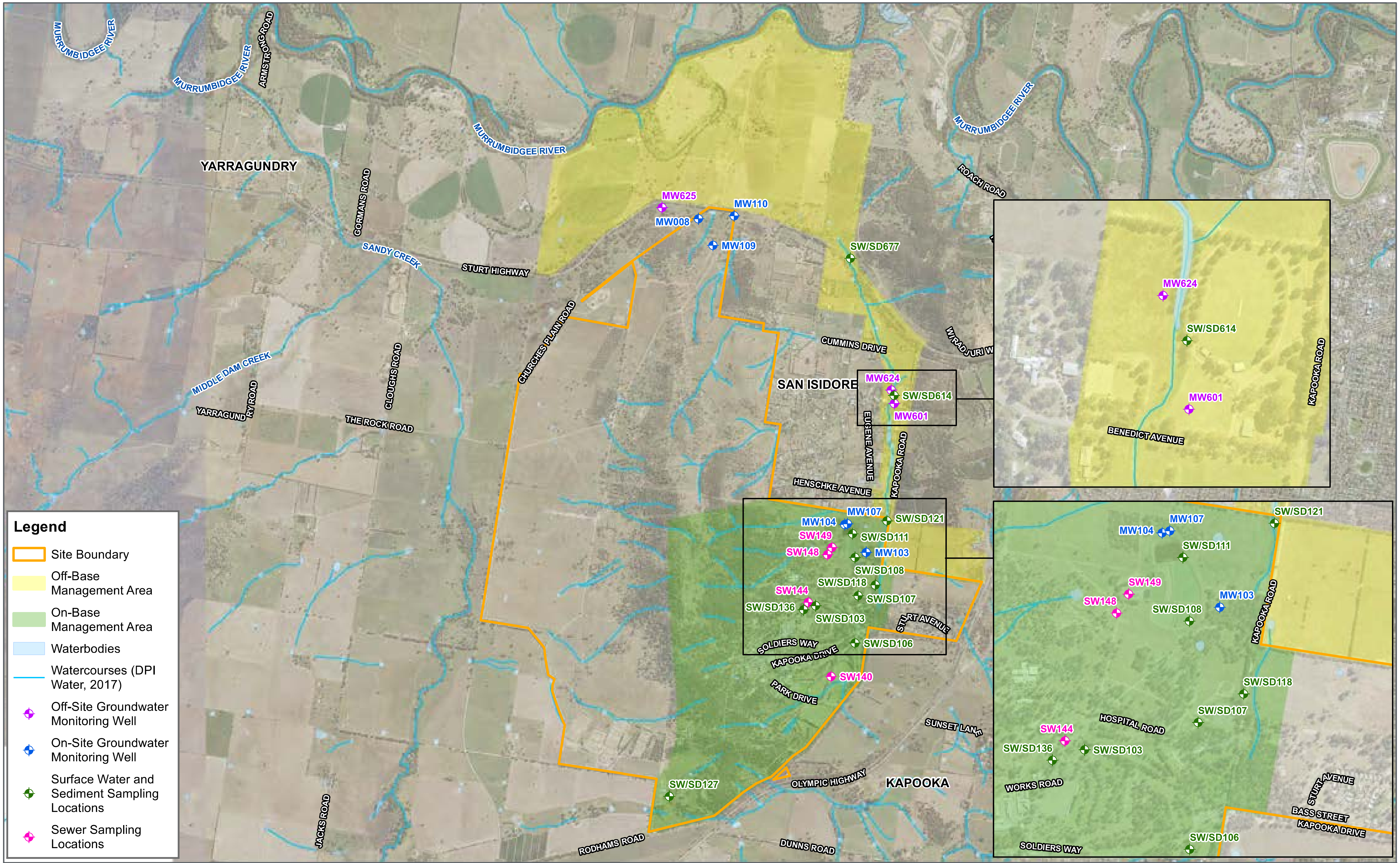

FIGURE 3

1:40,000 Scale at A3

Metres

0 1,000 2,000

Sampling Locations

SAMPLING ANALYSIS AND QUALITY PLAN
BLAMEY BARRACKS KAPOOKA
DEPARTMENT OF DEFENCE

Cardno

Map Produced by Cardno
Date: 2021-09-27 | Project: DEF19008
Coordinate System: GDA2020 MGA Zone 55
Map: DEF19008-GS-0166-SampleLocationsN_K.mxd 01
Aerial Imagery Supplied by Metromap (March, 2021)

APPENDIX

B

FULL PFAS ANALYTICAL SUITE

PFAS Analytical Suite

Group	Analyte
Perfluoroalkane Carboxylates (PFCAs)	Perfluorobutanoic acid (PFBA)
	Perfluoropentanoic acid (PFPeA)
	Perfluorohexanoic acid (PFHxA)
	Perfluoroheptanoic acid (PFHpA)
	Perfluorooctanoic acid (PFOA)
	Perfluorononanoic acid (PFNA)
	Perfluorodecanoic acid (PFDA)
	Perfluoroundecanoic acid (PFUnA or PFUnDA)
	Perfluorododecanoic acid (PFDoA or PFDoDA)
	Perfluorotridecanoic acid (PFTrDA or PFTriDA)
	Perfluorotetradecanoic acid (PFTeDA)
Fluorotelomer Sulfonates (FTSs)	1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2 FTS)
	1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2 FTS)
	1 H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2 FTS)
	1H, 1H, 2H, 2H-perfluorododecane sulfonate (10:2 FTS)
Perfluroalkyl sulfonates (PFSAs)	Perfluorobutane sulfonic acid (PFBS)
	Perfluoropentane sulfonic acid (PFPeS)
	Perfluorohexane sulfonate, or perfluorohexane sulfonic acid (PFHxS)
	Perfluoroheptane sulfonate (PFHpS)
	Perfluorooctane sulfonate, or perfluorooctane sulfonic acid (PFOS)
	Perfluorodecane sulfonic acid (PFDS)
Perfluorooctane sulfonamidoethonals and perfluorooctane sulfonamidoacetic acids	N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)
	N-ethyl perfluoro-1-octane sulfonamide (N-EtFOSA)
	2-(N-methyl perfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)
	N-methyl perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)
	2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)
	N-ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)

APPENDIX

C

OMP WELL CONSTRUCTION DETAILS

Site_ID	Project_ID	Location_Code	TOC (mAHD)	Top_Screen_Depth (mBTOC)	Bottom_Screen_Depth (mBTOC)	Monitoring_Unit	Base_Depth (mbgl)	Casing_Description	Inner_Diameter (mm)	Screen_Description	Comments	Stickup (m)
0315	ACTNSW_Hist_202009-2	MW008				S	13				No borelogs present and no construction information in report	1
0315	NSW_0315_PFAS	MW103	225.8	49.8	52.8	S	52					0.8
0315	NSW_0315_PFAS	MW104	231.87	38.9	53.9	S	54					0.9
0315	NSW_0315_PFAS	MW107	230.54	13.2	16.2	P	15.5					0.7
0315	NSW_0315_PFAS	MW109	180.29	22.58	31.58	S	33.5	Class 18 PVC	50	Slotted PVC		0.92
0315	NSW_0315_PFAS	MW110	193.62	15.56	19.06	S	21	Class 18 PVC	50	Slotted PVC		0.94
0315	NSW_0315_PFAS	MW601	205.3	9.8	15.8	P	17				Gattic	-0.2
0315	NSW_0315_PFAS	MW624	205.92	28.03	50.03	S	53.1	Class 18 PVC	50	Slotted PVC		0.97
0315	NSW_0315_PFAS	MW625	174.572	15.5	21.5	S	22	Class 18 PVC	50	0.4 mm slotted		

Monitoring Units: P = perched water, S = shallow acquifer

About Cardno

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

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APPENDIX

F

ABOUT AN ESA

now

About Site Environmental Assessment Reports

1. Introduction

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

2. What is an ESA?

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

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

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

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

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

3. The ESA Process

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

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

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

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

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

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

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

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

4. Environmental Assessment Report

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

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

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

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

5. Limitations of Environmental Assessment Report

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

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

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

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

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

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

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

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

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

Cardno

13 August 2015