Fire & Rescue NSW

Deniliquin Training Facility

Phase 2 Environmental Site Assessment - PFAS

October 2017

Executive summary

GHD Pty Ltd (GHD) was commissioned by Fire and Rescue NSW (FRNSW) to undertake a combined preliminary and detailed site investigation at the firefighting training site at Deniliquin Airport, NSW 2710 (the 'site').

The site is owned by Deniliquin Council NSW, and is currently used by FRNSW as a firefighting training facility. The site forms part of Deniliquin airport, which surrounds the site to the west, south and east. Macknight Drive and vacant land are present to the north. The site was used as a station for the Royal Australian Air Force (RAAF), during the Second World War as part of the Empire Air Training Scheme

Historical use of the site by FRNSW for training purposes has potentially included the use of aqueous film forming foams (AFFF). The AFFF used, may have contained per- and polyfluoro alkyl substances (PFAS) including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which are potentially harmful to human health and the environment.

A preliminary site investigation (PSI) was undertaken by GHD in 2016 to identify potential sources of contamination and areas of potential concern and develop a sampling and analytical plan for further intrusive investigations. Intrusive site investigations were later completed by GHD between November 2016 and February 2017 to further characterise impacts from PFAS on the site. The findings of these works identified concentrations of PFAS in onsite sediments, soil, surface waters and groundwater and further delineation was recommended, particularly relating to the presence of PFAS in groundwater and surface waters.

The overall objective of this investigation is to further assess the extent of the PFAS impacts identified during the ESA completed by GHD between November 2016 and April 2017 and to confirm surface water flow directions off-site.

The scope of work comprised:

- Drilling and installation of three groundwater monitoring wells (MW04, MW05 and MW06) and two soil bores (SB06 and SB07)
- Collection of eighteen sediment samples (SS01 to SS18) and eleven surface water samples (SW01 to SW11, of which seven had adequate water to sample)
- A groundwater monitoring event (GME) of the six groundwater wells (MW01 to MW06)
- Laboratory analysis of selected soil, sediment, surface water and groundwater samples for chemicals of potential concern (COPC) including:
  - PFAS, and total organic carbon (TOC) in soils and sediments.
  - PFAS, and total dissolved solids (TDS) in groundwater and surface water.
- Laboratory analysis of soil and sediment samples for Australian standard leaching procedure (ASLP)
- Laboratory analysis of a selection of soil and sediment samples for Australian standard leaching procedure (ASLP) and two soil samples for toxicity characteristics leaching procedure (TCLP)
- Surveying of newly installed wells.

Based on this scope of works and subject to the limitations presented in Section 11, the following conclusions are made:

- The site contains contamination from historical use of AFFF products containing PFAS.
- The primary sources of the PFAS are no longer present on site
- Secondary sources include soil, drain sediment and surface water.
- Generally, soil and groundwater exceedances are highly localised to the site
- Risks to onsite and offsite human receptors from direct contact with impacted media are considered low. Consumption of impacted agricultural produce may pose a risk to human health but this has not been assessed and is considered an unlikely exposure route.
- The most significant risk appears to be to terrestrial animals and birds consuming soil, water or impacted prey species. The level of this risk has not been assessed.

Based on the findings of these works, the following recommendations are made:

- Further investigation into the land use of the surrounding properties to assess the potential for agricultural use (particularly stock for human consumption) and water use habits. If stock used for human consumption are determined to be present, a preliminary site specific risk assessment would be required, possibly including the derivation of soil assessment criterion for human health under a rural land use scenario (as recommended by OEH, 2017). Previously collected soil and sediment data from off-site monitoring investigation locations could be used for this risk assessment (if required).
- Further investigation of water use could be conducted to better characterise groundwater and surface water use at properties surrounding the site and along the drainage channel lines. This should include investigation into how often the final surface water dams along the drainage line would over top.
- Further investigation of other potential sources in the area e.g. Deniliquin Freighters and the airport.
- Consideration of institutional/management controls for adjacent properties to mitigate the risk posed by sediment exceeding the indirect agricultural guidelines. These controls could include minimising the use of vacant properties for stock/crops, and would be addressed as part of the remedial options appraisal for this site.

Glossary

Abbreviation	Description
AHD	Australian Height Datum
ALS	Australian Laboratory Services
ANZECC	Australian and New Zealand Environment and Conservation Council
BTEXN	Benzene, toluene, ethylbenzene, xylenes and naphthalene
COC	Chain of custody
COPC	Contaminants of potential concern
CSM	Conceptual site model
DBYD	Dial Before You Dig
DO	Dissolved oxygen
DQI	Data quality indicator
DQO	Data quality objective
DTW	Depth to water
EC	Electrical conductivity
EIL	Ecological Investigation Level
EPA	NSW Environment Protection Authority
ESA	Environmental Site Assessment
ESL	Ecological Screening Level
GIL	Groundwater Investigation Level
GME	Groundwater monitoring event
GPR	Ground penetrating radar
HIL	Health Investigation Level
HSL	Health Screening Level
JSEA	Job Safety Environmental Analysis
LOR	Limit of reporting
mAHD	metres Australian Height Datum
m bgl	Metres below ground level
mbTOC	Metres below top of casing
mg/L	Milligrams per litre
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
PID	Photo-ionisation detector
QA/ QC	Quality assurance/ quality control
REDOX	Oxidation-reduction potential
RPD	Relative Percent Difference
SFOP	Standard field operating procedures
SPR	Source pathway receptor

Abbreviation	Description
SWL	Standing water level
TOC	Top of casing
TPH	Total petroleum hydrocarbons
TRH	Total recoverable hydrocarbons
µg/L	Micrograms per litre
UPSS	Underground Petroleum Storage System
USCS	Unified Soil Classification System

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Appendices

1. Introduction

Fire and Rescue NSW (FRNSW) engaged GHD Pty Ltd (GHD) to provide a phase 2 environmental site assessment (ESA) at the firefighting training site at Deniliquin Airport, NSW 2710 (the 'site'). The site comprises Lot 48 DP 1189132. The approximate site boundaries are presented in Figure 1, Appendix A.

The site is owned by Deniliquin Council NSW, and is currently used by FRNSW as a firefighting training facility. It is part of Deniliquin airport, which surrounds the site to the west, south and east. Macknight Drive and vacant land are present to the north. The site was used as a station for the Royal Australian Air Force (RAAF), during the Second World War as part of the Empire Air Training Scheme (No. 7 Service Flying Training School).

The site is used for the training of firefighters, which has potentially included the use of aqueous film forming foams (AFFF). The AFFF used, may have contained per- and poly-fluoro alkyl substances (PFAS) including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which are potentially harmful to human health and the environment.

The NSW Environmental Protection Authority (NSW EPA) is currently undertaking an investigation program to assess the historical legacy of PFAS use across NSW. In 2016, the EPA requested further investigation at this site to understand potential contamination issues be undertaken by FRNSW.

1.1 Project background

A preliminary site investigation (PSI) was undertaken by GHD in 2016 to identify potential sources of contamination and areas of potential concern and develop a sampling and analytical plan for further intrusive investigations. The findings of the PSI are reported in:

- GHD (2016) *Deniliquin PFAS Investigation, Preliminary Site Investigation and Sampling & Analysis Quality Plan*. August 2016.

Following the PSI, an environmental site assessment (ESA) was undertaken by GHD in 2016 and 2017. The aim of the investigation was to further characterise impacts from PFAS on the site. The findings of the ESA are reported in:

- GHD (2017) Fire & Rescue NSW, *Deniliquin Training Facility, Environmental Site Assessment - PFAS*. April 2017.

The conceptual site model from this report is presented in Section 2.8 of this report as a basis for the current phase of works. The NSW EPA reviewed the ESA report and made the following conclusions in a letter review to FRNSW (NSW EPA, March 2017):

- *The reported PFAS concentrations in onsite sediment, soil, and surface water and groundwater samples may be of concern if complete pathways and receptors exist on- or off-site. Further delineation of groundwater pathways to potential users of groundwater and potential ecological receptors in creeks is required. Confirming the potential for transport of PFAS and connectivity / pathways to the Mulwala Canal is also important.*
- *Further characterisation of potential groundwater flow direction and potential for PFAS plume beyond the close proximity of the site boundary and towards potential receptors such as Aljoes Creek / Edward River and any groundwater users. C&R note if there are groundwater users in the east, west and south of the site, these should also be*

considered in the assessment due to current the lack of information on groundwater flow direction (including the Mulwala Canal)

- *Confirm if the local community undertake significant recreational fishing and consume fish / crustaceans from any of the local dams, creeks and water holes. If yes this should include information such as how much, how often and what species.*
- *The EPA supports the recommendations listed in the Fire & Rescue NSW, Deniliquin Training Facility Environmental Site Assessment – PFAS, GHD April 2017.*

This report documents the outcomes of further intrusive site investigations undertaken as part of the current phase of works on the site. For full details on the site history, reference is made to the PSI report (GHD, 2016).

1.2 Objective

The overall objective of this investigation is to further assess the extent of the PFAS impacts identified during the ESA completed by GHD between November 2016 and April 2017 and to confirm surface water flow directions off-site.

To address the investigation objectives outlined above, and based on the data gaps identified in the conceptual site model (CSM, Table 8.1 in GHD, 2017, and repeated in Section 2.8 of this report), this current stage of investigation has been designed to target:

- Potential off-site migration of impacted groundwater
- Surface water drainage and sediment migration off-site

1.3 Scope

The scope of work comprised:

- Preparation of a Health, Safety and Environment Plan (HSEP) and site specific Job Safety and Environmental Analysis (JSEA)
- Service location including a review of site plans (where available), dial before you dig (DBYD) plans, and scanning to identify the presence of underground services
- Drilling and installation of three groundwater monitoring wells (MW04, MW05 and MW06) and two soil bores (SB06 and SB07)
- Collection of eighteen sediment samples (SS01 to SS18) and eleven surface water samples (SW01 to SW11, of which seven had adequate water to sample)
- A groundwater monitoring event (GME) of the six groundwater wells (MW01 to MW06)
- Laboratory analysis of selected soil, sediment, surface water and groundwater samples for chemicals of potential concern (COPC) including:
  - PFAS, and total organic carbon (TOC) in soils and sediments.
  - PFAS, and total dissolved solids (TDS) in groundwater and surface water.
- Laboratory analysis of soil and sediment samples for Australian standard leaching procedure (ASLP)
- A quality control and quality assurance (QA/QC) program
- Surveying of newly installed wells.
- Preparation of this detailed site investigation report

1.4 Limitations

This report is subject to the limitations provided in Section 11.

2. Site setting

2.1 Site identification

A summary of FRNSW site identification details is provided in Table 2-1. The site location is presented in Figure 1 in Appendix A.

Table 2-1 FRNSW site identification summary

Information	Details
Street Address	The firefighting training site at Deniliquin Airport, Macknight Drive, NSW 2710
Lot and DP number	Lot 48 Deposited Plan 1189132
Site Area	Approximately 23 000 m^2 (2.3 ha) , with a perimeter of approximately 610 m.
Local Government Area	Deniliquin Council
Local Land Use Zoning	IN1 – General Industrial
Current Land Use	Training site.
Ownership	Land parcel owned by Deniliquin Council and is leased by FRNSW for use as a training facility. The lease area has been occupied by FRNSW since 1996.

2.2 Surrounding land and environment

The surrounding land uses and local environment are summarised below in Table 2-2. For further details on each characteristic, refer to the PSI (GHD, 2016) and ESA (GHD, 2017) reports.

Table 2-2 Summary of surrounding land use and local environment

Characteristic	Description
Surrounding land use	Rural properties including portions of vacant land and some industrial / commercial rural properties to the north (e.g. Deniliquin Freighters, Deniliquin Bulk Fertilisers, zoned as general industrial). Deniliquin Airport surrounds the site to the east, south and west (zoned as Infrastructure; Air Transport facilities).
Topography	The regional topography appears to be mostly flat, with a slight fall from south-east to north-west. The investigation area lies approximately 96 m Australian Height Datum (m AHD) and is relatively flat, except for some artificial grading around the former pool area.
Soils	The site is within the brown Chromosols landscape. The brown Chromosols landscape is found in sites with average rainfall between 0.35 m and 1.4 m. The soils have moderate agricultural potential, chemical fertility and soil drainage. The upper horizons are described as dark brown with up to 10% orange mottles silty clay loam, grading into a dark brown medium heavy clay. There is a low probability of encountering acid sulphate containing soils.

2.3 Geology

The 1:250,000 scale Deniliquin geological map indicated the site is situated on the Shepparton Formation. The Shepparton Formation is described as unconsolidated to poorly consolidated, mottled, variegated clay, silty clay with lenses of polymictic, coarse to fine sand and gravel; partly modified by pedogenesis, includes intercalated red-brown palaeosols. The presence of clays to approximately 14 m has been confirmed through previous site investigations (GHD, 2017) and through bore logs from registered bores within the local area.

2.4 Hydrogeology

2.4.1 Aquifers

The site is located on Quaternary aged, Shepparton Formation, which is expected to form the primary water bearing aquifer unit in this area. According to the 'Deniliquin' 1:250,000 scale Hydrogeological Map (Geoscience Australia, 1993), the total dissolved solids (TDS) in the groundwater beneath the site is likely to be in the order of 1000 to 1500 mg/L. This would be suitable for stock, domestic and some irrigation purposes. Additionally, bore yields were shown to be 0.5 to 5 L within the sand aquifer, with hydraulic conductivities between 5 to 10 m/day. The bore log for GW503702 (NSW Department of Primary industries, Office of Water, groundwater database, 2016) located on the Deniliquin Airport indicates that locally the salinity approximates 4200 mg/L. This is above recommended Australian drinking (NHMRC & NRMMC, 2011) and stock water criteria (ANZECC, 2000), which indicates that shallow groundwater is of limited beneficial use potential in this area. However, fresher water is likely to be located closer to the township of Deniliquin and the Edward River where several production bores are located (greater than 1.7 km to the east of the site). The bore records for these wells indicate that their salinities are less than the 1000 mg/L with yields above 1 L/s indicating that the aquifer is potentially of high beneficial use. The large number of wells in and around Edward River used for water supply purposes supports this interpretation.

Based on the topography and the location of Edward River, groundwater flow is likely to be towards the east and north in the area off the site. However, the Deniliquin Hydrogeological map indicated a generally westerly groundwater flow in the shallow aquifer which might suggest the Edward River is generally a losing river and flow is more dominant towards the Murray River to the west.

2.4.2 Existing Groundwater Bores

GHD conducted a review of existing groundwater borehole records using the NSW Department of Primary industries, Office of Water, groundwater database in July 2017. The search was conducted to identify registered groundwater boreholes in close proximity and to record information such as use and standing water level. No bores were located on the site but two groundwater monitoring bores were identified within a 500 metre radius of the site, located on the adjoining Deniliquin Airport to the south (summarised in Table 2-3).

As noted in Table 2-2, a large number of water supply wells were identified at a distance of greater than 1.7 km to the east of the site near to Edward River which are screened within slightly deeper units of the Shepparton Formation. A number of water supply wells screened in the Shepparton Formation are also located to the west at distances of greater than 2 km. The closest registered beneficial use bores in the possible directions of hydraulic flow have been included in Table 2-3.

Table 2-3 Registered groundwater bores

Borehole ID	Purpose	Depth (m)	Screen (m)	Standing Water Level (m)	Approx. Distance from Site	Licence status
GW503702	Monitoring Bore	14.50	12.5-13.5	No details	400 m south east	Active
GW503704	Monitoring Bore	11.0	9-10	No details	500 m south east	Active
GW501823	Stock, domestic, irrigation	226.0	188 - 226	No details	1820 m west	Converted

Borehole ID	Purpose	Depth (m)	Screen (m)	Standing Water Level (m)	Approx. Distance from Site	Licence status
GW503094	Domestic, Stock	42.50	32 – 42.5	7.0	1700 m east	Converted

2.5 Hydrology

Surface water flow is expected to follow the local topography on site and flow generally north and eastwards. Artificial drainage channel exist on and off-site to direct surface water flows. Further discussion is provided in Section 6.5.1.

The closest natural water body is Aljoes Creek located 2.5 km east of the site. Aljoes Creek discharges to Edward River located approximately 2.8 km to the east and north of the site.

An irrigation channel, Mulwala Canal, runs approximately 800 m to the east and north of the site. It starts at Lake Mulwala (over 130 km to the south-east of the site) and diverts water from the Murray River across the southern Riverina plain to the Edward River at Deniliquin and beyond. The Mulwala canal supplies water to the southern Riverina towns Berrigan and Finley (both up gradient of the site), Bunnaloo and Wakool (down gradient of the site), as well as agricultural properties. The water level in Mulwala Canal is regulated and controlled via Yarrawonga Weir at Lake Mulwala. 'Irrigation season' in Victorica and NSW Murray System channels usually extends from mid August to mid May, however the water level in the canal is ultimately driven by irrigators' demand for allocated water. Stormwater originating from the site is not expected to travel to either the Edward River or Mulwala Channel. Water that does not reach the off-site dam is likely to seep into the ground.

2.6 Water use surveys

Since the ESA report (GHD, 2017), community engagement efforts have focused on consulting with property owners in the area surrounding the Deniliquin training facility to understand water use within the broader area. This involved the distribution of fact sheets, and the hosting of a community meeting and an information session (23 May 2017). A *water use survey* was also distributed to a sample set of landowners within the Deniliquin area, the boundaries of which were based on advice from the EPA. A water use survey report was produced from the questionnaire and is included in Appendix J.

Of the 13 mail out surveys (also available on the FRNSW website), four responses were provided and a summary of the key findings are:

- All of the properties that responded to the survey identified as Industrial/Commercial Agricultural
- All of the properties identified use town water as their primary water source
- No properties indicated they have a bore on their property, or that they had ever used bore water
- No properties indicated they have a dam on their property, or that they have ever used surface or dam water
- No respondents indicated that they have used local creeks for recreational purposes.

While these are valuable insights into the surrounding community water use habits, the report concludes that FRNSW are likely to require a larger response rate in order to capture a more representative understanding of water use habits in the Deniliquin area close to the FRNSW site.

2.7 Site layout and key site features

A site inspection was undertaken initially by GHD in June 2016. Observations made during the site inspection are presented in GHD (2016). Table 2-4 provides a summary of details including the layout and key features.

Table 2-4 Key features

Item	Summary observations
Fencing and access	A main cyclone fence encompasses the training facility. The FRNSW site is secure access, for authorised entry only with a locked gate from MacKnight Drive. The site boundary is shown on Figure 2, Appendix A.
FRNSW site features	Key features of the area occupied by FRNSW include: Small site office and garage area adjacent to entry driveway. Asphalt area in the centre of the site used as fire training areas (including a partial building structure on the southern corner and hose drying poles, with a fence around the outside of the asphalt). A former swimming pool (from when the site was used by the air-force) which has been built up around the sides and covered with a roof. It is now used for confined space training. Police illicit substance incineration area on the southern portion of the site.
Ground surface	Actively used areas of the site are covered with a concrete and/or asphalt hard stand. The western portion of the site and around the former pool area have a grassed surface.
Waste drums or bulk storage facilities	The are two above ground storage tanks (ASTs) for LPG. GHD is not aware of any underground storage tanks (USTs) on the site.

2.8 Conceptual site model

A preliminary conceptual site model (CSM) was prepared by GHD in 2016 as part of the PSI (GHD, 2016) and further developed as part of the ESA completed in 2017 (GHD, 2017). A summary of the CSM is provided below. The CSM was used as the basis for the current investigation works. For further information about the transport mechanisms of PFAS, refer to section 8.3.1 of the ESA report (GHD, 2017). An updated version of the CSM, based on the outcome of these works, is provided in Section 8.

2.8.1 Sources

GHD understands that the site is currently occupied by FRNSW and is used by staff as storage space and fire training and that AFFF containing PFAS are no longer used at the site.

Based on the findings of the PSI (GHD, 2016) and the results of intrusive investigations, the following primary sources of contamination and associated COPC have been identified:

- The firefighting training area (asphalt surface area) and former AFFF use area on the central to southern portion of the site.
- The sediments and surface water in storm water drainage channels, on and off-site.
- The former pool area (considered unlikely, however further sampling was conducted to confirm this - SB06 and SB07)

- Site offices including storage of AFFF were identified as a possible source in the PSI (GHD, 2016). Installation of groundwater monitoring location MW04 as part of this scope of works is considered to address possible impacts to groundwater from this source.

Impacted soils and sediments which have migrated from the main source zones (including to off-site locations), with subsequent leaching of PFAS, represent a secondary source of contamination.

2.8.2 Receptors

The following receptors were previously considered:

- On site (FRNSW) site commercial workers.
- Potential intrusive maintenance workers on and off-site.
- Off-site hydraulically down-gradient agricultural and commercial receptors surrounding the site.
- Beneficial uses of groundwater, including drinking water/domestic use, stock, irrigation and recreational use of groundwater resources.
- Terrestrial and aquatic ecological receptors on and off-site in land based ecosystems and surface water bodies (including those recharged by groundwater).

Given the rural nature of the area and proximity to the town of Deniliquin, it is possible that there are some residential properties amongst the commercial/industrial properties surrounding the site. Residential receptors have therefore also been considered as a conservative measure.

2.8.3 Exposure pathways

The primary pathways by which receptors could be exposed to the sources of contamination outlined above are considered to be:

- Dermal contact with contaminated shallow soil, sediments and dust.
- Incidental ingestion of contaminated soils and dust.
- Direct contact or ingestion of groundwater and/or surface water.
- Inhalation of contaminated soils or dust.
- Vertical and horizontal migration of contaminated liquid through the unsaturated zone into the saturated zone, and subsequent horizontal migration within the groundwater and subsequent discharge to surface waters. The US EPA (2014) notes that PFAS are water soluble and can migrate readily from soil to groundwater, where they can be transported long distances.
- Surface runoff and sediment transport into storm water drainage and subsequent transport and discharge to surface waters.
- Consumption of impacted flora and surface waters by terrestrial animals
- Predation of impacted fauna.

Secondary exposure pathways exist for PFAS. Once in soil, PFAS can leach from soil to water (due to its solubility in water) as water migrates downward through soil to the water table, resulting in contaminated groundwater. Generally, the shorter chain PFAS species are more soluble than the longer chain PFAS. Groundwater will migrate and discharge into the nearest down gradient surface water body.

2.8.4 Source-pathway-receptor linkages

The ESA report (GHD, 2017) presents the preliminary CSM for on site sources of contamination. The visually representation of this (from Figure 8, Appendix A of the ESA report – GHD, 2017) is presented below.

This investigation is focused primarily on PFAS contamination, and other potential sources of contamination identified during the PSI and ESA associated with general site activities are not considered further as part of these works. Reference to these sources is provided in the CSM in GHD 2017.

Conceptual diagram only - not to scale

LEGEND

- PFAS impact
- Groundwater table
- Vapour migration
- Surface water drainage
- Groundwater migration
- Sample location
- Soil bore
- Piezometer (groundwater well)
- Screen

Fire & Rescue NSW
Deliniquin Fire Training Centre

Conceptual Site Model

Job Number	21-25583
Revision	A
Date	3 Mar 2017

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3. Data Quality Objectives

The Data Quality Objectives (DQOs) for the investigation are based on guidance presented in:

- NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Amended Measure (NEPM) No. 1 – Schedule B1, Guideline on Investigation Levels for Soil and Groundwater.*

The DQOs establish a framework for contamination investigations which incorporates a seven stepped continuum that defines the problem at the site. A series of stages then optimises the design of the investigation. The seven steps are outlined below:

- Step 1: State the Problem
- Step 2: Identify the Principal Study Question
- Step 3: Inputs to the Decision
- Step 4: Boundaries of the Study
- Step 5: Decision Rules
- Step 6: Tolerable Limits on Decision Errors
- Step 7: Optimisation of the Data Collection Process

An overview of the DQOs for the investigation are presented in the following steps.

Step 1: State the problem

The area has previously been used for the training of firefighters, which has potentially included the use of aqueous film forming foams (AFFF). The AFFF used may have contained PFAS including perfluorooctane sulfanoate (PFOS) and perfluorooctanoic acid (PFOA), which are potentially harmful to human health and the environment.

The problem as it stands is that the use of AFFF containing PFAS has resulted in contamination of soil, surface water, groundwater and sediments on site, which requires further investigation.

Step 2: Identify the decision/goal of the study

The key study questions to be answered as part of the works include:

- What is the extent of groundwater and surface water contamination beneath the site and off-site?
- Are contaminants present on and off the site at concentrations which pose a potentially unacceptable risk to human health or the environment under the current land use (training facility) and adjacent land-uses (including rural land use)?
- Is the data obtained of an acceptable quality to enable appropriate conclusions to be made in relation to the overall risks to human health and/ or the environment?

Should contamination present at the site pose a potentially unacceptable risk to human health for the current land uses or the environment based on concentrations of PFAS in soils, sediments, groundwater or surface waters, the other decisions to be made are:

- Is the extent of the impact adequately delineated?
- Is further assessment or remediation/management required?

Step 3: Identify the information inputs

The following inputs are required for the decision:

- The location of potential PFAS contamination sources
- The concentrations of PFAS in soil, sediment, groundwater and surface water from laboratory analysis.
- Identify potential exposure routes and contamination migration pathways.
- The likelihood of PFAS migrating to groundwater and subsequently off-site.

Step 4: Define the boundaries of the study

Boundaries of the investigation are summarised in Table 3-1.

Table 3-1 Investigation boundaries

Boundary	Definition
Spatial boundaries	The spatial boundaries for the site are identified as the lateral extent of the investigation area as shown in Figure 3, Appendix A, and down to a depth of approximately 15 m below ground level (m bgl), which is the maximum intrusive investigation depth.
Temporal boundaries	The timeframe for this investigation's scope of work primarily defined to the period of works undertaken in the investigation area as part of this assessment; namely May and June 2017.
Scale of decision making	The scale of the decision making is limited to the boundaries of the training facility and identified off-site receptors

Step 5: Decision rules

The degree of impact by contaminants and the decisions associated with accepting data will be assessed with reference to the chosen site investigation levels, which were established within the framework of guidelines made or approved by the NSW EPA.

The criteria used for screening analytical results are discussed in Section 5.

The decision rule was considered to be:

- If concentrations of the COPC in soil, sediment, surface water, or groundwater on or off-site exceed the adopted criteria for permissible land use(s) (as per current zoning), then further assessment, remediation and/or management may be required.
- Conversely, no further action may be required in the event that concentrations are below adopted site criteria.

Step 6: Tolerable limits on decision errors

Data generated during this investigation must be appropriate to allow decisions to be made with confidence.

Specific limits for this investigation have been adopted in accordance with the appropriate guidance from the AS4482.1-2005, which includes appropriate indicators of data quality (data quality indicators [DQIs] used to assess QA/QC, and GHD's Standard Field Operating Procedures). The pre-determined DQIs established for the investigation are discussed in Appendix F.

If any of the DQIs are not met, further investigation will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data.

Step 7: Optimisation of the data collection process

This step involves identifying the most resource effective sampling and analysis design which is required to satisfy the DQOs. The sampling and analysis plan, which was developed to meet this objective, is summarised in Section 4.

4. Methodology

4.1 General

The scope of work is summarised in Section 1.3. The tables in Section 4.2 to 4.5, summarise the groundwater well installation and soil sampling, sediment sampling, groundwater sampling and surface water sampling methodologies. In summary, the following activities were conducted in 2017:

- 16 May 2017 – installation of three new groundwater wells and associated soil sampling (MW04 to MW06), surface water sampling, and sediment sampling
- 5 June 2017 – groundwater sampling of all monitoring wells (MW01 to MW06)

Sampling methodologies were completed with reference to the procedures outlined in the following references:

- NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*
- NSW DEC (2006) *Contaminated Sites: Guidelines for NSW Site Auditor Scheme*
- NSW DECC (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*
- NSW EPA (2011) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*
- NEPM (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure (No.1),* National Environment Protection Council (NEPC)
- Western Australia Department of Environment Regulation (WA DER) 2017 *Interim Guideline on the assessment and management of perfluoroalkyl and polyfluoroalkyl substances* Appendix 1 (PFAS specific sample collection methods, equipment and equipment decontamination methods).

4.2 Groundwater well installation and soil sampling

Table 4-1 Groundwater well installation methodology (including soil and soil bore sampling)

Item	Description
Date of fieldwork	16 May 2017
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	National Uniform Drillers Licensing Committee (2011) Minimum Construction Requirements for Water Bores in Australia (Edition 3, 2012) and WA DER (2017) sampling procedures.
Ground clearance	Scanning using electromagnetic locating prior to mechanical drilling.
Drilling technique	Following hand auguring clearance to 1 m bgl, solid flight augers were employed until termination.
Bore logging	All field observations and subsurface conditions were recorded on lithological logs (Appendix D).
Field screening	Field screening for volatiles was undertaken prior to collection of soil samples for laboratory analysis using a PID, the results of which are included in Appendix D. PID calibration data is presented in Appendix C.

Item	Description
Soil sampling	Discrete soil samples were collected from the surface and from each lithological zone. Samples for VOC screening were collected in separate snap lock bags. Additionally, soil was sampled into laboratory supplied jars.
Sample Analysis	Three soil samples from each borehole, and two from each monitoring well were submitted for laboratory analysis of COPC including PFAS and total organic carbon (TOC).
Sample handling and transport	Following collection, soil samples were immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a chain of custody (COC) form Appendix E.
QA/QC	A QA/QC sampling procedure was implemented. Further details are described in Appendix F.
Well construction	Wells were installed with the following general characteristics: - 50 mm polyvinyl chloride (PVC) Class 18 blank and screened casings - Primary filter pack material comprising a chemically inert material which was well rounded, with a high coefficient of uniformity and extended at least 0.5 m above the screened PVC casing - Bentonite pellets used as annular sealant which extended at least 0.5 m above the filter pack, followed by a cement slurry to the ground surface - Monitoring wells were finished with monuments and concrete
Development	Well development occurred following installation using bailers until: - No further noticeable sand or silt was recovered - The water was relatively clear when removed from the well - All water was removed from the well
Surveying	Following well installation, all newly installed were surveyed by a registered surveyor. The survey report for the wells is provided in Appendix H.
Waste disposal	Soil cuttings and purged groundwater were collected and stored in 205 L drums on the FRNSW site for disposal to a licenced waste facility. Waste disposal documentation is provided in Appendix G.

4.3 Sediment sampling

Table 4-2 Sediment sampling methodology

Item	Description
Date of fieldwork	16 May 2017
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	GHD's Standard Field Operating Procedures
Sampling	Samples were collected by hand using a trowel and were placed directly into laboratory supplied sample jars. Samples were collected from 18 locations, summarised in Table 6-6.
Sample handling and transport	Following collection, sediment samples were immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a COC form (Appendix E).

Item	Description
Decontamination	Prior to and following the collection of each sediment sample, all non-disposable sampling equipment underwent decontamination including: rinsing of equipment with fresh water.
Sample analysis	All sediment samples were submitted for laboratory analysis of COPC including PFAS and total organic carbon (TOC).
Quality assurance and quality control (QA/QC)	A QA/QC sampling procedure was implemented. Further details are described in Appendix F.

4.4 Groundwater sampling

Table 4-3 Groundwater sampling methodology

Item	Description
Date of fieldwork	5 June 2017
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	ASTM D6771–02, Standard practice for low-flow purging and sampling for wells and devices used for groundwater quality investigations, ASTM International Australian Standard 5667:1998 Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS 5667.1:1998) Australian Standard 5667:1998 Water Quality – Sampling, Part 11: Guidance on the Sampling of Groundwaters (AS 566.11:1998) WA DER (2017) sampling procedures.
Gauging	Four on site monitoring wells (MW01, MW02, MW03 and MW04) and two off-site wells (MW05 and MW06) were gauged using an oil/water interface probe to measure standing water levels (SWL) and assess for the potential presence of light non-aqueous phase liquid (LNAPL). LNAPL was not encountered, therefore no LNAPL sampling was required.
Field chemistry	Field measurements were taken using a calibrated water quality meter and flow through cell, with measurements of temperature, pH, electrical conductivity (EC), dissolved oxygen (DO) and oxidation-reduction potential (REDOX) recorded. Field sampling sheets are presented in Appendix C.
Sampling	All monitoring wells were low flow sampled using a micropurge pump.
Sample handling and transport	Following collection, samples were placed in the sample bottles. The groundwater samples were then immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a COC form (Appendix E).
Decontamination	Prior to and following the collection of each groundwater sample, all non-disposable sampling equipment underwent decontamination including rinsing of equipment with fresh water
Sample analysis	All groundwater samples were submitted for laboratory analysis of COPC including PFAS and total dissolved solids (TDS). Laboratory results are summarised in Appendix B and certificates of analysis and COC included in Appendix E.
Quality assurance and quality control (QA/QC)	A QA/QC sampling procedure was implemented. Further details are described in Appendix F.

Item	Description
Waste disposal	Soil cuttings and purged groundwater were collected and stored in 205 L drums on the FRNSW site for disposal to a licenced waste facility. Waste disposal documentation is provided in Appendix G.

4.5 Surface water sampling

Table 4-4 Surface water sampling methodology

Item	Description
Date of fieldwork	16 May 2017
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	GHD's Standard Field Operating Procedures
Sampling	Surface water samples were collected from locations close to the water's edge using a hand held water sampler fitted with a laboratory provided plastic unpreserved container that was changed between locations.
Sample handling and transport	The surface water samples were then transferred into laboratory provided bottles. The sample bottles were transferred to an ice filled cool box for sample preservation prior to and during shipment to the sampling laboratory. A chain of custody form was completed, and forwarded with the samples to the testing laboratory.
Decontamination	Dedicated sample bottles will be used to collect surface water samples, eliminating the need for decontamination of equipment and rinsate samples.
Sample analysis	All surface water samples were submitted for laboratory analysis of COPC including PFAS and total dissolved solids (TDS). Laboratory results are summarised in Appendix B and certificates of analysis and COC included in Appendix E.
Quality assurance and quality control (QA/QC)	A QA/QC sampling procedure was implemented. Further details are described in Appendix F.

5. Assessment criteria

5.1 Basis for assessment

Screening criteria for the assessment of PFAS impacted sites are still in the process of development in Australia. Only a few values have been published by Australian regulatory agencies, some of which are interim, draft or are "to be reviewed". GHD has been involved with the development of National guidelines for the assessment and management of PFAS contamination which has included drafting of the guidelines for a working group organised by CRC CARE and involving State and Commonwealth regulatory agencies and organisations. These have now been released in draft and have been considered as part of this investigation.

Published guideline documents currently available and considered as part of this review include:

- CRC CARE 2017. Assessment, management and remediation guidance for perfluorooctanesulfonate (PFOS) and perfluorooctanoic acid (PFOA) – Part 2: Health screening levels, CRC CARE Technical Report no. 38, CRC for Contamination Assessment and Remediation of the Environment, Newcastle, Australia.
- Department of Environment and Energy (DoEE), October 2016. DRAFT *Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFAS)*
- EC 2017. Canadian Environmental Protection Act, 1999 Federal Environmental Quality Guidelines Perfluorooctane Sulfonate (PFOS). Environment and Climate Change Canada, February 2017.
- Health 2017. Release of Food Standards Australia New Zealand's (FSANZ) report on: Perfluorinated chemicals in food Supporting Information. Australian Government Department of Health, 31 March 2017.
- OEH/NSW Health 2017. Calculation of Tier I human health PFAS screening values for soil and fish. In preparation**.**
- Western Australia Department of Environment Regulation (WA DER) 2017 *Interim Guideline on the assessment and management of perfluoroalkyl and polyfluoroalkyl substances.*

For the purpose of the assessment of data collected from the site, a number of guidelines and information sources have been reviewed in order to identify the most appropriate and current site assessment criteria at the time of preparation of this report. GHD notes that the criteria used differ slightly to those outlined in the letter from the EPA to FRNSW (dated 31/03/2017) as new documentation and guidance has been published since the receipt of that letter. The screening criteria documented herein supersede any criteria previously specified in the site PSI (GHD, 2016) and ESA (GHD, 2017).

It is noted that the assessment of PFAS impacted sites is a rapidly developing field and consequently site assessment criteria are continually under review and may be revised as new scientific information comes to light.

5.2 Rationale for assessment criteria

The assessment criteria were selected to allow decisions to be made for the receptors identified in Section 2.8.2.

Recreational receptors were not considered in this investigation, as the surface water on site and immediately surrounding the site in the drainage lines are unlikely to be used for

recreational purposes. Additionally, there is no groundwater abstraction within a 1 km radius of the site.

5.3 Nominated assessment criteria

The objective of this investigation focuses on PFAS contamination. Therefore, PFAS is the primary COPC which was analysed in samples and the adopted assessment criteria for this investigation are specific for PFAS investigations.

It is noted that no assessment criteria or guidance exists to account for intrusive maintenance workers. Therefore, no specific assessment criteria has been adopted to account for this receptor.

5.3.1 Surface water and groundwater

The nominated assessment criteria and screening levels for PFAS are outlined in Table 5-1, and are shown on Table C, Appendix B.

In accordance with NSW EPA (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*, contaminants identified in groundwater will be screened against existing generic groundwater investigation levels (GILs) which protect the following environmental values:

- Drinking water
- Aquatic ecosystems

On the basis that groundwater and surface water could discharge to a fresh water system, GILs for fresh waters have been adopted.

GHD notes that direct toxicity for freshwater ecology has been adopted for this assessment. OEH (2017) recommends that secondary poisoning and bioaccumulation should be assessed using biota sampling/analysis (instead of using water) and the wildlife diet screening values provided by Canadian guidelines. This was not considered appropriate for this stage of assessment as the extent of contamination was not yet delineated in aquatic environments.

Not criteria has been established to assess the use of surface water or groundwater for stock watering.

Historic results are also presented in Table C. No assessment criteria was assigned to other COPC, which were previously analysed as part of the phase 1 investigation works. For discussion on these results, refer to the Phase 1 ESA report (GHD, 2017).

Table 5-1 Nominated screening criteria for surface water and groundwater

Exposure Scenario	PFOS + PFHxS	PFOA	Basis for nomination of criteria
Drinking water quality	0.07 µg/L	0.56 µg/L	Criteria adopted from the Australian Government Department of Health *Release of Food Standards Australia New Zealand report on perfluorinated chemicals in food supporting information* (Health, 2017) as recommended by NSW Office of Environment and Heritage (OEH). Drinking water is not extracted on site and no registered domestic use groundwater bores were located in a 500 metre radius of the site. However, the potential for localised use of groundwater for domestic or stock purposes should not be discounted, and as such drinking water criteria are considered for the purpose of this initial screening.
Ecological - freshwater	0.13 µg/L (PFOS only)	220 µg/L	Criteria adopted for direct toxicity assessment from the Draft Commonwealth Environmental Management Guidance on Perfluorooctance Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA)(Australian Government Department of the Environment and Energy (DoEE), 2016). As directed by NSW EPA (2017), a 95% species protection level has been adopted (slightly to moderately disturbed ecosystems).

5.3.2 Soil

Human health

The site is considered to be a 'commercial/industrial' land use scenario due to its primary purpose as a training facility for a commercial organisation. However, the NSW EPA has stated that industrial/commercial PFAS guideline values protective of human health are not suitable for the assessment of fire training sites due to the use and activities on the site not corresponding with the assumptions of guidelines created for that land use scenario. The guidelines that are currently recommended for use (OEH/NSW Health, 2017) are calculated based on standard assumptions in the National Environmental Protection Measure (NEPM, 2013) for each land use scenario. Whilst the use of PFAS on a fire training ground does differ from standard commercial/industrial sites, the exposure of current site users to impacted soils is likely to remain consistent with the NEPM (2013) assumptions. The NEMP states the following for exposure in a commercial/industrial land use scenario:

> *"The outdoor areas of the commercial/industrial facilities are largely covered by hardstand, with some limited areas of landscaping or lawns and facilities. Employees may make use of outdoor areas of a commercial/industrial premises for activities such as meal breaks. Opportunities for direct access to soil by employees using these facilities are likely to be minimal, but there may be potential for employees to inhale, ingest or come into direct dermal contact with dust particulates derived from the soil on the site."*

The site is understood to be used as follows:

- Site facility manager works approximately 16 hours per week, however not all of these hours are spent at the Deniliquin facility. When on site, his duties are general site maintenance (such as mowing lawns) and OHS duties during training programs.
- Training programs are run at the site approximately three times per year for an eight day period. Two training instructors consistently run these training sessions, however the pupils vary for each course.

- The local fire station runs one training drill per year, which is consistently attended by a similar group of approximately 10 people from the local fire brigade.
- Infrequent maintenance workers for specialised tasks.

It is understood that the majority of these activities occur on the sealed/hardstand portions of the site. GHD therefore considers the NEPM (2013) exposure assumptions for a commercial/industrial land use scenario applicable for the assessment of on site human health.

Criteria associated with commercial/industrial land use was also used for the assessment of human health at all off-site locations. The lots immediately adjacent to and opposite the FRNSW site on MacKnight Drive have not been observed to be used for residential purposes and therefore the NEPM residential exposure assumptions are not considered applicable for these properties. All samples were collected from areas that are unlikely to be directly accessed by rural-commercial site users on a frequent basis (eg. From the paddock drainage lines or adjacent to the airfield). Considering the observed land use of adjacent sites, and the location of samples within these sites, the commercial/industrial land use assessment criterion were considered most appropriate under the NEPM guidance.

No cropping activities have been observed on the surrounding commercial/industrial sites, which are either used as open space (grass land) or for commercial/industrial activities such as other emergency services (Rural Fire Brigade and the SES), truck freighting or storage facilities. To account for the use of the open space on these sites for stock (as observed) which could be used as a food source, a preliminary site specific risk assessment would be required due to the lack of soil assessment criterion for human health under a rural land use scenario (as recommended by OEH, 2017). This has not been conducted as part of this investigation, however it has been recommended as part of the next stage of works.

Leaching and off-site transport has been assed using Australian Standard Leachate Potential test on soils and through sediment sampling across the site.

Ecological

To account for possible terrestrial and aquatic ecological receptors off-site, the department of Environment and Climate Change Canada *Federal Environmental Quality Guidelines Perfluorooctane Sulfonate (PFOS)* (EC, 2017) indirect agricultural assessment criteria have been adopted, as outlined by OEH (2017) as an interim measure. The criteria for indirect soil contact under agricultural land use scenario has been adopted to account bioaccumulation and/or off-site migration of soils. Agricultural land use is defined as where the primary land use is growing crops or tending livestock (CCMC, 2006). It also includes agricultural lands that provide habitat for resident and transitory wildlife and native flora. The assessment criteria for agricultural land use considers exposure to primary, secondary and tertiary consumers in the food web, and is primarily protective of crop/livestock health.

Given the semi-rural nature of the site and the presence of some grassed areas, terrestrial ecology on site is likely despite the commercial/industrial nature of the site. As such, the Department of Environment and Climate Change Canada *Federal Environmental Quality Guidelines Perfluorooctane Sulfonate (PFOS)* (EC, 2017) assessment criteria for indirect commercial/industrial land use has also been adopted. This criteria also accounts for potential bioaccumulation and is protective of managed ecological areas (eg. Cultivated lawns) as opposed to natural areas (eg. Bush/scrub land). The ecological receptors predicted to be present on commercial land are expected to be soil dependent biota and/or general wildlife, therefore direct contact with the soil is the primary exposure route. Soil ingestion by wildlife on commercial land is generally considered unlikely to be significant because residence time on commercial land is predicted to be low relative to agricultural, residential or parkland land use.

The nominated assessment criteria and screening levels for PFAS are outlined in Table 5-2, and are shown on Table B in Appendix B.

Table 5-2 Nominated PFAS screening criteria for soil

Exposure Scenario	Analyte		Basis for nomination of criteria
Health based	**PFOS + PFHxS**	**PFOA**	
Commercial/ industrial	20 mg/kg	100 mg/kg	Criteria adopted from OEH and NSW Health *Calculation of Tier 1 human health PFAS screening values for soil and fish* (2017 – in preparation) to account for commercial activity on the site and in surrounding properties.
Ecological	**PFOS**	**PFOA**	
Indirect commercial/industrial	0.14 mg/kg	-	Adopted from EC (2017) to account for possible on site ecology.
Indirect agricultural land	0.01 mg/kg	-	Adopted from EC (2017) to account for possible off-site ecology.

Leachate data is useful to demonstrate potential for off-site transport. However, as noted by NSW EPA (2017), uncertainties in the relevance of leach testing to real world processes means comparing leachate values to screening values is problematic, even if adjusted for dilution. As such, no screening value or action level have been applied to leachate data.

5.3.3 Sediment

According to *Sediment quality assessment: a practical guide* (Simpson and Batley, 2016), a sediment is defined as 'unconsolidated mineral and organic particulate material that has settled to the bottom of aquatic environments'. All sediment samples were collected from constructed drainage lines that are not considered to be 'aquatic environments'. Therefore, the sediment samples collected in this investigation were assessed against the adopted soil assessment criteria outlined in Section 5.3.2.

6. Results

6.1 General

This section presents the results of all soil, groundwater, sediment and surface water investigations undertaken on the site by GHD in December 2017.

Analytical results and groundwater/surface water field parameters are summarised in the following tables in Appendix B:

- Table A: Soil and sediment analytical results – Human health and ecological
- Table B: ASLP analytical results
- Table C: Groundwater and surface water analytical results including field parameters

Historical results for PFAS are also displayed for comparison on each table. Refer to the ESA report (GHD, 2017) for other COPC previously tested.

6.2 Quality assurance and quality control

An evaluation of the field and laboratory data quality was undertaken in accordance with the NEPM – Schedule B2, Assessment of data quality.

The relative percentage difference (RPD) between primary and duplicate samples was calculated, and found to exceed the nominated assessment criteria in one sediment sample pair. The data for both the primary and duplicate sample results should be considered in the data evaluation process for this site.

Other than this RPD exceedance, the review of the QA/QC program indicates that the soil, groundwater, surface water and sediment analytical data are of an acceptable quality upon which to draw meaningful conclusions regarding impacts to groundwater and soil.

6.3 Soil results

Soil was examined by GHD during drilling works at newly installed groundwater wells (MW04 to MW06) and soil bores (SB06 and SB07). Descriptions of the lithology including visual and olfactory observations, sample identifications along with the well construction details and elevations are presented in borehole logs contained in Appendix D.

6.3.1 Soil profile

The observed lithology at across the eight investigation locations completed during this scope of works is summarised in Table 6-1. No odours or staining were noted at any investigation location.

Table 6-1 Generalised lithology encountered

Depth range (m)	Lithology
0.0 – 7.5	CLAY, brown or grey mottled orange, low plasticity, firm to very stiff, dry. Some sandy clay layers at approximately 5 m bgl.
7.5 – 15.0 (maximum depth)	Sand, fine to coarse, poorly graded, sub-angular. Distinct layers that varied from grey to yellow or orange in colour. Clay layers noted within sands at MW06

6.3.2 Soil analytical results

The soil and sediment sampling laboratory results are summarised in Table A, Appendix B. Laboratory certificates of analysis are presented in Appendix E.

Soil results exceeding the nominated assessment criteria are summarised in Table 6-2. It is noted that a number of results from previous investigative works also exceed the nominated criteria. There were no exceedances of the adopted human health assessment criteria (OEH/NSW Health, 2017 commercial/industrial land use).

Table 6-2 Summary of soil exceedances – May 2017

Guideline (receptor)	Ananlyte	Monitoring location	Comments
Indirect agricultural – EC, 2017 (ecological)	PFOS	MW04_0.0-0.05 SB06_0.0-0.05 SB06_1.0-1.05 SB07_0.0-0.05 (primary and duplicate samples)	Each of these are onsite investigation locations, however this guideline was adopted to be protective of off-site agricultural ecology.
Indirect commercial / industrial ecology – EC, 2017 (ecological)	PFOS	SB06_0.0-0.05	

The concentration of PFAS (sum of total) was greater than the laboratory limit of reporting (LOR) in all samples from monitoring locations SB06 and SB07, and surface soil samples at MW04 to MW06. The concentration of PFAS (sum of total) dropped significantly with depth although was detected at a depth of approximately 9 m in MW01. The maximum concentration of PFAS was at SB06_0.0-0.05 (0.238 µg/L).

6.3.3 ASLP

All soil samples were submitted for ASLP testing for PFAS. The leachate laboratory results are summarised on Table B, Appendix B.

No assessment criteria were adopted for ASLP assessment, as the purpose of the leachate analysis was to assess the potential for leachate to form, and to confirm a possible migration mechanism.

The concentration of PFAS (sum of total) in leachate was relatively low for all soil samples from offsite monitoring locations MW05 and MW06, and from samples 2 m bgl or deeper from SB06 and SB07. The concentration was noted to be an order of magnitude greater in shallow soil samples at MW04, SB06 and SB07 indicating a direct relationship between soil concentration and leachate concentration.

The maximum concentration of PFAS (sum of total) in leachate was at SB06_0.0-0.05 (11.9 µg/L). However, this is noted to be an order of magnitude lower than the maximum concentration recorded for the site (SB02_0.1, 889 µg/L – in the assumed source zone of the former AFFF training area).

6.4 Groundwater results

6.4.1 Groundwater gauging results

Gauging results are summarised in Table 6-3. The top of casing (TOC) elevation was determined by a professional surveyor and was used to calculate the groundwater elevation in metres Australian Height Datum (AHD).

Table 6-3 Groundwater Gauging Data

Well ID	Depth of well (m)	Depth to groundwater (m bTOC)	TOC (m AHD)	Corrected groundwater elevation (m AHD)
MW01	14.066	11.3	93.688	82.388
MW02	12.735	11.148	92.682	81.534
MW03	17.073	12.19	92.810	80.620
MW04	13.665	12.023	93.515	81.492
MW05	13.4	12.222	93.757	81.535
MW06	13.467	12.274	93.668	81.394

Note: TOC = top of casing

A groundwater contour map showing the interpolated groundwater contours and the inferred groundwater flow direction is presented on Figure 4 in Appendix A. Groundwater contours were calculated based on groundwater elevations using an inbuilt ArcGIS interpolation tool to derive the contours with a kriging method.

Based on the interpolated contours, the local groundwater flow was inferred to be in a north to north-easterly direction. This corresponds with the expected groundwater flow, as outlined in Table 2-2.

6.4.2 Groundwater quality

Prior to groundwater sample collection, field parameters and observations were recorded during the purging of the well. Field parameters are summarised in Table 6-4 and Table C, Appendix B.

Table 6-4 Summary of groundwater quality field parameters – June 2017

Parameter	Results Range
pH	7.06 (MW06) and 7.65 (MW03)
Temp (°C)	17.9°C (MW04) and 19.3°C (MW01 and MW05)
EC (µS/cm)	1,507 µS/cm (MW01) and 4,551 µS/cm (MW04)
DO (mg/L)	0.53 mg/L (MW04) and 6.72 mg/L (MW01)
ORP* (mV)	206.9 mV (MW04) and 308.3 mV (MW02)

* Oxidation Reduction Potential – field values adjusted to SHE by +205

No hydrocarbon or chemical odours or sheen were noted. The purged groundwater was brown to yellow tinge and slightly turbid.

6.4.3 Analytical results

Samples were collected from six groundwater monitoring wells located both on the FRNSW site (MW01, to MW04) and off-site (MW05 and MW06). The groundwater and surface water laboratory results are summarised in Table C, Appendix B. Laboratory certificates of analysis are presented in Appendix E.

Groundwater COPC reported in excess of the nominated screening criteria are summarised in Table 6-5, and are shown on Figure 6 in Appendix A. The concentration of PFAS (sum of total) was below the laboratory LOR at MW02, MW03, MW05 (primary and duplicate sample) and MW06.

Table 6-5 Summary groundwater exceedances – June 2017

Guideline Exceedance	Analytes	Monitoring locations
FSANZ - PFAS Drinking water quality guideline (human health)	PFHxS and PFOS (Sum of Total)	MW01 MW04
Commonwealth (Draft) Env. Mgmt. Guidance on PFOS and PFOA - FW 95% (ecological)	PFOS	MW01

6.5 Surface water results

6.5.1 Surface water drainage

A preliminary inspection of surface water drainage channels was undertaken by the environmental field scientist during May 2017 to provide further information about the drainage patterns on site. The observed flow patterns are shown on Figure 6, Appendix A and photographs from the inspection are shown in Appendix I.

Current drainage patterns

Stormwater on site appears to be directed off-site by a series of small, shallow spoon drains (Photograph 1) and/or a deeper, box channel (Photograph 2). One deep channel was observed to extend off-site in a south easterly direction to the airport (Photograph 2), however the flow direction of this channel is unclear. Surface water pooling in the unsealed area adjacent to the former AFFF use area may flow into this drainage channel.

A second deep channel starts near the former pool and passes through the central portion of the site in an easterly direction. It extends off-site and passes under MacKnight Drive, before turning sharply north-west to flow parallel along MacKnight Drive (Photograph 3). At this point, the drain becomes unlined. A small, shallow, unlined drainage line starting from near the State Emergency Service (SES) building joins the flow path. After following MacKnight Drive for approximately 65 m, this drainage line then bends and flows northward across the vacant land north of the site (Photograph 4), and into a constructed dam via an underground pipe. This dam has an overflow channel which continues north to a vacant portion of the property owned by Deniliquin Freighters (accessed from Saleyard Road). The channel ends in a relatively flat area of this property, and it is assumed that water overflowing from the dam evaporates or infiltrates from this point. A marshy area was noted on the northern portion of this property, and is understood to be the overflow point of the truck wheel wash. Currently, it appears unlikely that this area is connected to the site evaporation area unless under flood conditions.

Historic drainage line

It is understood that stormwater from the site was originally diverted to an unlined drain that ran approximately eastwards towards Edward River. At some point, stormwater has been diverted to the north of the site as described above. The eastern drainage channel was observed to be relatively deep compared to the current drainage line and started with an underground pipe (Photograph 6), the entry point of which is unclear. No pipe of similar diameter was observed during the inspection which could have been a possible entry point. Additionally, no information was provided by Dial Before You Dig (DBYD) plans about underground drainage in this area. A small PVC pipe extending towards the SES building was noted to discharge into the drainage line approximately 15 m east of the underground pipe.

The drainage channel then extends towards the east, passing beneath roadways through culverts. East of the airport the channel bends to the north-east for approximately 185 m

(Photograph 7). Aerial photographs show that the drainage line may have continued in a north-easterly direction, however it currently appears to bend sharply east to Cobb Highway. Another shallow drainage line from the radio towers joins at this bend. The drainage line flows north parallel to Cobb Highway (Photograph 8) until it reaches a newly constructed culvert, which passes under the Cobb highway and extends to the north-east (Photograph 9). That flow path was not followed further due to access issues. A drainage line from the north (from along Cobb Highway and from Saleyard Road) was observed to also connect to this culvert, and stormwater is assumed to flow towards it.

A newly constructed dam was observed adjacent to the culvert passing under Cobb Highway. The drainage line did not appear to be connected to this dam from either the eastern side (Cobb Highway, Photograph 10) or via the drainage channel from the south east.

6.5.2 Summary of surface water and sediment samples

Eighteen sediment samples and seven surface water samples were collected in May 2017. Table 6-6 summarises the surface water and sediment sample pairs, the locations of which are shown on Figure 3, Appendix A. Some sample locations were also assessed in November 2016 as part of the ESA report (GHD, 2017) as indicated in Table 6-6.

Table 6-6 summary of surface water and sediment samples collected

Sediment		Associated surface water		Location description
Sample ID	Sample dates	Sample ID	Sample dates	
SS01	Nov 2016 May 2017	-	-	On site, near eastern site boundary in swale area
SS02	Nov 2016 May 2017	-	-	On site, near eastern site boundary in swale area
SS03	Nov 2016 May 2017	-	-	Off-site in drainage channel, south of MacKnight Drive
SS04	Nov 2016 May 2017	SW02	Nov 2016 May 2017	Off-site in eastern drainage channel, adjacent to SES building
SS05	Nov 2016 May 2017	-	-	Off-site in active drainage channel, north of MacKnight Drive at the bend in the channel
SS06	Nov 2016 May 2017	SW01	Nov 2016 Dry May 2017 – not sampled	Off-site in active drainage channel, northern boundary of vacant land
SS07	Nov 2016 May 2017	SW03	Nov 2016 May 2017	Off-site dam north of vacant property
SS08	May 2017	-	-	Off-site at the end point of the active drainage channel on Deniliquin Freighters property (evaporation area)
SS09	May 2017	SW05	Dry May 2017 – not sampled	Off-site in eastern drainage channel near Deniliquin airport
SS10	May 2017	SW06	May 2017	Off-site in eastern drainage channel

Sediment		Associated surface water		Location description
Sample ID	Sample dates	Sample ID	Sample dates	
SS11	May 2017	SW07	Dry May 2017 – not sampled	Off-site in eastern drainage channel
SS12	May 2017	SW08	May 2017	Off-site in eastern drainage channel at bend on Cobb Highway
SS13	May 2017	SW09	No - dry	Off-site in eastern drainage channel on Cobb Highway, south of culvert under the highway
SS14	May 2017	-	-	On site at site boundary in drainage channel
SS15	May 2017	SW04	May 2017	On Deniliquin Freighters property (evaporation area) in discharge area for the wheel wash bay
SS16	May 2017	SW10	May 2017	Off-site in drainage channel north of Sales Yard Road along the Cobb Highway
SS17	May 2017	-	-	Off-site in eastern drainage channel, east of the Cobb Highway
SS18	May 2017	-	-	Off-site in eastern drainage channel on the southern corner of Sales Yard Road and the Cobb Highway
-	-	SW11	May 2017	Mulwala Canal

6.5.3 Surface water quality

Field parameters and observations were recorded if there was adequate surface water available after sampling. No field parameters were recorded for monitoring locations SW01, SW04 and SW11. Field parameters for the remaining five sample points assessed in May 2017 are summarised in Table 6-4 and Table C, Appendix B.

Table 6-7 Summary of surface water quality field parameters – May 2017

Parameter	Results range
pH	7.35 (SW06) to 8.82 (SW02)
Temp (°C)	13.5°C (SW03 and SW06) to 17.5°C (SW02)
EC (µS/cm)	79.1 µS/cm (SW02) and 254.7 µS/cm (SW03)
DO (mg/L)	0.84 mg/L (SW06) and 8.93 mg/L (SW02)
ORP* (mV)	319.3 mV (SW02) and 386.3 mV (SW06)

* Oxidation Reduction Potential – field values adjusted by +205

6.5.4 Analytical results

The groundwater and surface water laboratory results are summarised in Table C, Appendix B. Laboratory certificates of analysis are presented in Appendix E.

Surface water COPC reported in excess of the nominated screening criteria are summarised in Table 6-8, and are shown on Figure 6 in Appendix A.

Table 6-8 Summary surface water exceedances – May 2017

Guideline Exceedance	Analytes	Monitoring locations
FSANZ - PFAS Drinking water quality guideline (human health)	PFHxS and PFOS (Sum of Total)	SW02 SW03 (primary and duplicate sample) SW04 SW06 SW08 SW10
Commonwealth (Draft) Env. Mgmt. Guidance on PFOS and PFOA - FW 95% (ecological)	PFOS	SW02 SW03 (primary and duplicate sample) SW04 SW06 SW08

The concentration of all PFAS analytes was noted to be less than the laboratory LOR in sample SW11 from Mulwala Canal.

The maximum PFAS (sum of total) concentration was at SW03 (duplicate sample, 2.46 ug/L), collected from the dam located on private property approximately 300 metres north of the site boundary. The concentration of PFAS (sum of total) relative to the distance from the source zone on site is shown on Chart 1, Section 6.6.1.

6.6 Sediment results

Sediment samples were collected from drainage lines on site (SS01, SS02 and SS14) and off-site (SS03 to SS13, and SS15 to SS18). Further description about these drainage lines is provided in Section 6.5.1 and a summary of sediment sample locations is provided in Table 6-6, with locations shown on Figure 3, Appendix A.

Sediment samples were generally brown clay, some with trace sands and/or gravels, with the exception of SS13 which was logged as a sand. SS14, SS05, SS03, SS06, SS09, SS10, SS16 and SS18 were noted to have high amounts of organic matter amongst the sample. Field notes showing the sediment logs are provided in Appendix C.

6.6.1 Analytical results

Sediment COPC reported in excess of the nominated screening criteria are summarised in Table 6-9, and are shown on Figure 5 in Appendix A. There were no exceedances of the adopted human health assessment criteria (OEH/NSW Health, 2017 commercial/industrial land use).

Table 6-9 Summary sediment exceedances – May 2017

Guideline Exceedance	Analytes	Monitoring locations	
Indirect commercial / industrial ecology – EC, 2017 (ecological)	PFOS	SS01 SS02 (primary and duplicate samples)	
Indirect agricultural – EC, 2017 (ecological)	PFOS	SS01 SS02 (primary and duplicate samples) SS03 SS04 SS05 SS06	SS07 SS08 SS09 SS14 SS15

All locations reported detectable concentrations of PFAS. The maximum concentrations reported for PFOS and PFOA in sediments were 0.504 mg/kg and 0.0062 mg/kg respectively, both at SS02, onsite. The concentration of PFAS (sum of total) was generally noted to be an order of magnitude greater in samples collected from onsite monitoring locations compared to off-site. The variation in PFAS concentration with increasing distance from the source zone (former AFFF use area on site) is shown in Chart 1. Distance 0 in chart 1 below is taken to represent the on-site source areas identified as being the former AFFF training areas (refer to Figure 2, Appendix A).

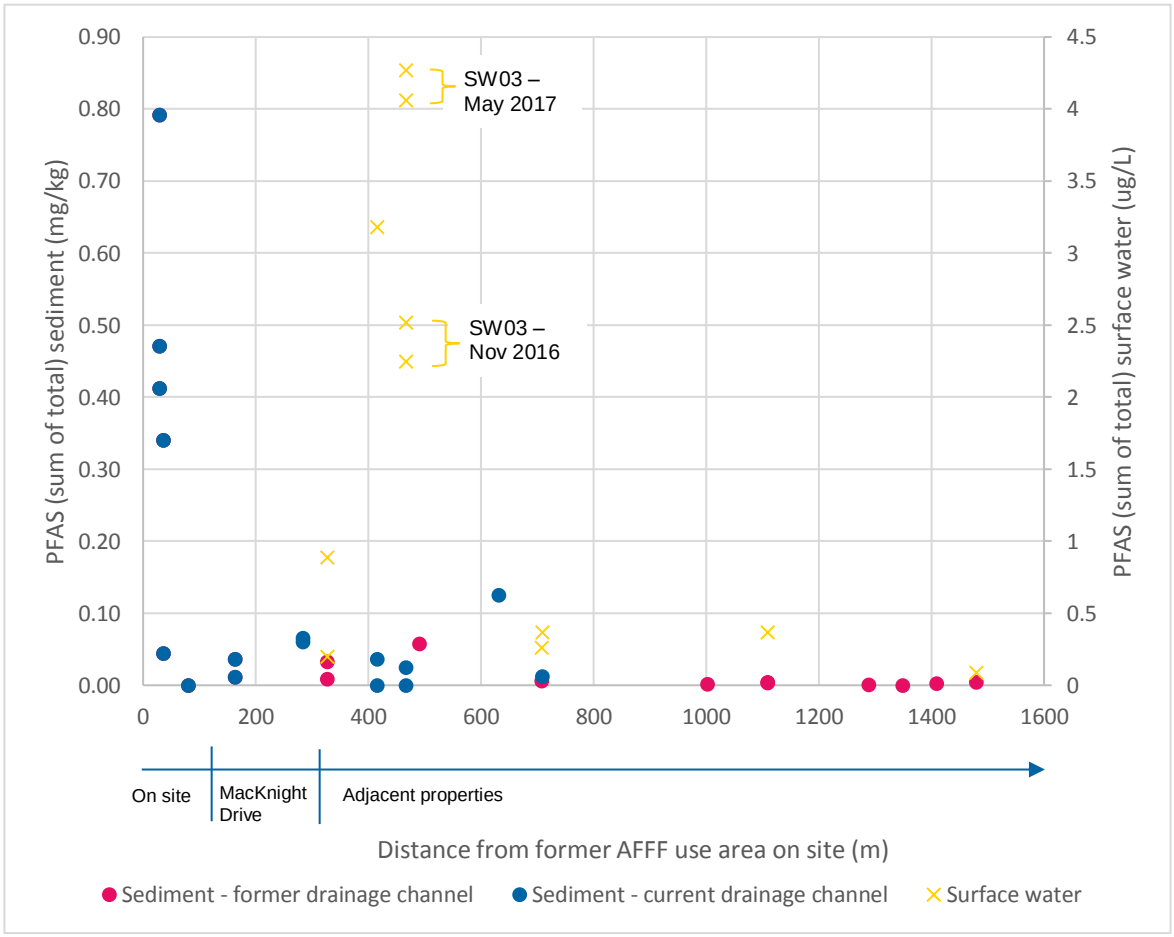

Chart 1 Changes in the concentration of PFAS (sum of total) over distance from the source zone (GHD, 2016 and 2017)

6.6.2 ASLP results

All soil samples and sediment samples were submitted for ASLP testing for PFAS. The leachate laboratory results are summarised on Table B, Appendix B.

The maximum concentration of PFAS (sum of total) in leachate from sediment samples was 53.7 µg/L at SS02. This concentration was noted to be an order of magnitude greater than all other sediment leachate samples except for SS01 (also located in the drainage area from the former AFFF use area). Only two sediment samples had a PFAS (sum of total) concentration lower than the laboratory LOR in the leachate; SS13, and SS17.

7. Discussion

Historical PFAS results are included on the results tables provided in Appendix B for completeness. This stage of works is focused primarily on PFAS contamination associated with historical use of AFFF. Other contaminants of concern, initially considered during the previous ESA (GHD, 2017) are not discussed further in this report.

7.1 PFAS Contamination status

7.1.1 Soil and sediments

The risks to human health posed by soil and sediment PFAS contamination offsite include the use of land for stock grazing and food production. Currently there is no criteria to assess this risk under a rural land use scenario (as recommended by OEH, 2017). A preliminary site specific risk assessment would be required to derive such criteria. This has not been conducted as part of this investigation, however it has been recommended as part of the next stage of works (Section 9.2).

PFAS in soils on site

The main source of the PFAS in the soils is considered to be the former use of AFFF for training purposes and site infrastructure that was used to contain AFFF or waste.

Investigation locations SB06 and SB07 were installed to further assess the potential of the former pool as a potential legacy source of PFAS. They were drilled to a depth greater than the depth of the pool to assess possible leakage from the sides or base of the pool structure to surrounding soils. Similarly to MW03 (adjacent to the north-east corner of the pool, previously assessed in GHD, 2017), samples from the surface contained greater concentrations of PFAS (sum of total) than samples from 2 m bgl or more at SB06 and SB07. This supports the notion that PFAS impact at these locations is likely to be derived from surface activities, rather than through the underground pool structure and that PFAS concentrations generally decrease with depth.

It is noted that SB06 and SB07 surface samples contained greater concentrations of PFAS than the surface sample from MW03. SB06 and SB07 are also relatively close to the hardstand area and (though not the main AFFF use area) which may have been periodically used for training activities. SB01 is located in this hardstand area and is noted to contain relatively high concentrations of PFAS (sum of total). Therefore, the surface impact observed at SB06 and SB07 may be derived from training activities on the hardstand area either through runoff from the hardstand and/or direct application of AFFF.

The pattern of decreasing PFAS with depth also suggests some physical attenuation of the vertical migration of PFAS. However, its presence at depths of up to 9 m (in MW01) suggests that this attenuation may be variable across the site. Samples analysed at greater than 9 m reported PFAS below the laboratory LOR, although all of these locations tended to have very low PFAS concentrations near the surface.

The concentration of PFAS was less than the nominated human health assessment criteria in all soil samples (current and historic) on site. This indicates that the soils on site are unlikely to pose a significant risk to human health of site workers. Humans take PFOS into their bodies through inhalation of dust or incidental ingestion. Dermal contact is not considered a significant exposure pathway. These exposure routes can be managed relatively simply by applying good housekeeping, hygiene practices and developing appropriate plans for any future soil disturbance.

Shallow soil onsite (surface to approximately 1 m bgl) at SB06, SB07 and MW04 contained concentrations of PFOS greater than the nominated agricultural assessment criteria. These ecological exceedances are unlikely to represent an unacceptable risk, as there are no agricultural receptors on site and this is not likely to be a land use in the foreseeable future.

The concentration of PFOS at SB06 (surface sample) also marginally exceeded the ecological criterion for commercial/industrial land use (0.177 mg/kg and 0.14 mg/kg respectively). The concentration of PFOS in soils at SB07 (adjacent to SB06) were marginally less than the commercial/industrial criterion (0.1 mg/kg, duplicate sample). Previous shallow soil samples from the former AFFF source zone (SB01 to SB04) also exceeded the ecological criterion for commercial/industrial land use. The most likely exposure scenario is terrestrial animals entering the site and being exposed to soils or food sources that have ingested PFAS e.g. grasses, prey species.

The pattern indicates a widespread but generally low level of PFAS impact across the site but generally with the highest concentrations near former training areas.

PFAS in soil off-site

There were no exceedances of the nominated ecological or human health assessment criterion in soils off-site (MW05 and MW06). The concentration of PFAS (sum of total) was less than the laboratory LOR or marginally greater than the LOR in all samples from MW05 and MW06.

We note however that these sample locations only represent two points rather than a significant area. Distribution of PFAS may have occurred aerially during deployment and therefore, diffuse concentrations may be present elsewhere, particularly in the direction of the prevailing wind direction. Experience has shown that these wider concentrations tend to be low.

PFAS in sediments

The concentration of PFAS was less than the nominated human health assessment criteria in all sediment samples (current and historic) both on and off-site. This indicates that the sediments on and off-site are unlikely to pose a significant risk to human health.

Sediment samples collected from the likely drainage area adjacent to former AFFF use area contained PFOS concentrations greater than the adopted ecological guidelines for a commercial/industrial land use (SS01 and SS02). No other sediment samples were found to exceed this guideline, including SS14 which is also located on site at the site boundary. As with the soil impact, the most likely exposure scenario is terrestrial animals being exposed to sediments or food sources that have ingested PFAS e.g. grasses, prey species.

Eleven sediment samples also exceeded the ecological assessment criterion for agricultural land use (summarised in Table 6-9). Key points relevant to the assessment of these locations with respect to potential agricultural land use or impact to ecological receptors include:

- Three locations were on site (SS01, SS02 and SS14) and are therefore not likely to represent an unacceptable risk, as there are no agricultural receptors on site.
- Samples SS04 and SS09 (located in the former drainage channel east of the site) are located in an area that is unlikely to be used for agricultural land uses.
- Samples SS05 and SS06 were collected from the drainage line which runs through the centre of the Rural Fire Service (RFS) property which is located immediately north of the site. The land is owned by Council but occupied by RFS. The land is currently subject to a proposed development application for re-development of the RFS facility. Exceedance of the agricultural guidance values is not considered a risk noting the intended land use for RFS purposes and absence of livestock on the site.

- The remaining sediment samples exceeding the agricultural ecological assessment criteria are each located along the current drainage line to the north of the site (including SS15, which may not be directly connected to this drainage line as discussed in Section 6.5.1). This location is situated immediately south of a property that contains a wheel wash process. Industrial cleaning processes have been shown to have used PFAS-containing products in the past. The land use across these properties is not fully understood although evidence of stock on these properties has been observed. Therefore, the exceedance at SS03, SS07, SS08 and SS15 may represent a potential risk to possible agricultural land use north of the site.
- PFAS attenuation is supported along the drainage channel to the east of the site. From SS10 eastwards, only PFOS was detected above the laboratory LOR (with a single exception of a minor detection of N-Ethyl perfluoro-octane sulphonamide-acetic acid in SS16).

PFAS (sum of total) was detected in concentrations greater than the laboratory LOR in all sediment samples collected from both drainage lines currently/historically extending from the site. These samples indicated that impacted sediments are somewhat mobile i.e. through surface water during rainfall events. However, other sources of PFAS from surrounding properties (such as Deniliquin Airport and the suspected wheel wash facility) are possible and may be contributing to the impact observed in these drainage lines.

The concentration of PFAS in off-site sediment samples was generally lower than sediment samples from within the FRNSW site, as shown in Chart 1 (Section 6.6.1). This suggests that there is some attenuation of PFAS impacted sediments within the drainage lines. The result for SS08 was slightly elevated compared to other off-site sediment samples. This location appears to be a 'sink' where drainage water may pond during significant rain events. It is possible that PFAS may have concentrated somewhat in this area. We also note that this area may be the discharge destination for surface water leaving the Deniliquin Freighters property to the north.

PFAS leachability from soils and sediments

Table 7-1 presents a comparison of total PFAS data and leachable PFAS data and the corresponding calculated percentage of PFAS in leachate. Where either the soil or leachate concentration of PFAS less than the laboratory LOR, the LOR was used to calculate the percentage. The average percentage of PFAS leaching under ASLP conditions is shown to somewhat inconsistent across the site for each matrix type and between each location. The large range in average percentage PFAS in leachate may be due to some PFAS concentrations being relatively small or lower than the LOR, therefore a small difference in concentration between the soil and the leachate results in a large calculated percentage. Additionally, variation in soil types is also likely to be responsible for the range of average PFAS leached, as geology plays an important role in the sorption of PFAS analytes (and subsequently their ability to leach PFAS back to the environment).

The presence of PFAS in leachate indicates that PFAS in soils and sediments may act as an ongoing source to groundwater and surface water across the site if they come into contact with infiltrating water. However, it is noted that the ASLP testing procedure is more vigorous than natural conditions for soils and most sediments. Therefore, the percentage of PFAS in leachate is likely to overestimate PFAS leachate occurring in natural conditions at the site.

It is also noteworthy that there appears to be a linear relationship between soil concentration and leachate concentration in soil samples. This relationship is not as clear in sediments. This may reflect the more heterogeneous nature of the sediment where sorption sites may vary depending on the sediment particle types.

Table 7-1 Leachability calculation of soils, concrete and sediment

Sample ID	Sample matrix type - soil description	PFAS (sum of total) concentration		% PFAS in leachate	Average % leaching
		Soils (mg/kg)	Leachate (mg/L)		
MW01_0.1	Soil – top soil	1.48	0.145	9.80%	9.70%
MW01_9.0	Soil – silty clay	0.0446	0.00428	9.60%	
MW02_1.0	Soil - clay	0.0045	0.00024	5.33%	-
MW03_0.1	Soil – top soil	0.0347	0.00065	1.87%	-
MW04_0.0-0.05	Soil – clay	0.0382	0.00219	5.73%	5.37%
MW04_11.3-11.35	Soil - sand	<0.0002	<0.00001	5.00%	
MW05_0.0-0.15	Soil - clay	0.0051	0.00033	6.47%	5.49%
MW05_11.0-11.1	Soil - sand	<0.0002	<0.00001	5.00%	
MW05_11.0-11.1 (QA04)		<0.0002	0.00001	5.00%	
MW06_0.0-0.05	Soil – top soil	0.0003	0.00005	16.67%	13.89%
MW06_0.0-0.05 (QA03)		<0.0002	0.00004	20.00%	
MW06_12.8-12.85	Soil - clay	<0.0002	<0.00001	5.00%	
SB01_0.1	Soil – gravelly clay	0.426	0.0202	4.74%	-
SB02_0.1	Soil – clayey sand	16.4	0.889	5.42%	-
SB03_0.1	Soil - sand	0.496	0.0181	3.65%	4.05%
SB03_1.0	Soil - clay	0.535	0.0238	4.45%	
SB04_0.15	Soil – clay	0.876	0.059	6.74%	-
SB05_0.1	Soil - clay	0.0121	0.00027	2.23%	-
SB06_0.0-0.05	Soil – clay	0.238	0.0119	5.00%	4.23%
SB06_1.0-1.05	Soil - clay	0.0469	0.00243	5.18%	
SB06_4.95-5.0	Soil - clay	0.002	0.00005	2.50%	
SB07_0.0-0.05	Soil - clay	0.0785	0.00826	10.52%	14.57%
SB07_0.0-0.05 (QA02)		0.107	0.00651	6.08%	
SB07_2.1-2.15	Soil - clay	0.0003	0.00011	36.67%	
SB07_4.95-5.0	Soil - clay	0.0002	0.00001	5.00%	
SS01	Sediment	0.34	0.0175	5.15%	6.70%
		0.0442	0.00365	8.26%	
SS02	Sediment	0.412	0.0329	7.99%	7.75%
		0.792	0.0537	6.78%	
		0.471	0.0399	8.47%	
SS03	Sediment	0.0112	0.00126	11.25%	7.72%
		0.0362	0.00152	4.20%	
SS04	Sediment	0.0329	0.00036	1.09%	1.99%
		0.009	0.00026	2.89%	
SS05	Sediment	0.0602	0.00171	2.84%	2.17%
		0.0654	0.00098	1.50%	
SS06	Sediment	0.0362	0.00229	6.33%	8.20%
		0.0154	0.00155	10.06%	

Sample ID	Sample matrix type - soil description	PFAS (sum of total) concentration		% PFAS in leachate	Average % leaching
		Soils (mg/kg)	Leachate (mg/L)		
SS07	Sediment	0.025	0.00126	5.04%	5.00%
		0.0139	0.00069	4.96%	
SS08	Sediment	0.125	0.00632	5.06%	-
SS09	Sediment	0.0581	0.00047	0.81%	-
SS10	Sediment	0.006	0.0001	1.67%	-
SS11	Sediment	0.0014	0.00012	8.57%	-
SS12	Sediment	0.0038	0.00009	2.37%	-
SS12	Sediment	0.0041	0.00008	1.95%	-
SS13	Sediment	0.0004	<0.00001	2.50%	-
SS14	Sediment	0.0682	0.00231	3.39%	-
SS15	Sediment	0.0126	0.0004	3.17%	-
SS16	Sediment	0.0046	0.00002	0.43%	-
SS17	Sediment	0.0002	<0.00001	5.00%	-
SS18	Sediment	0.0025	0.00002	0.80%	-

As with other sites in Australia, the relationship between soil concentration and leachate concentration appears to be linear. This is displayed graphically in Chart 2.

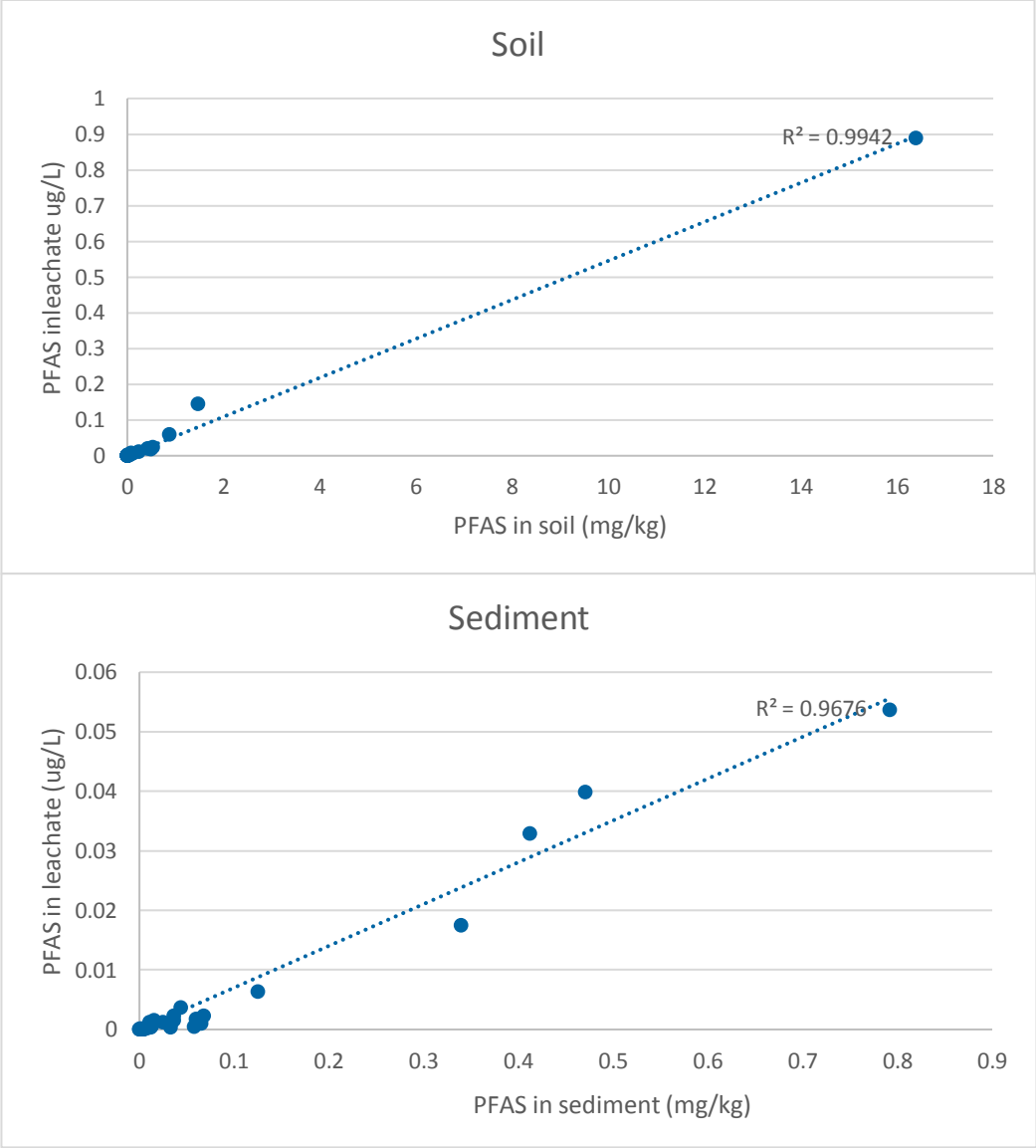

Chart 2 Soil vs leachate concentrations in soil and sediment

Such relationships may be used to predict the leachable levels of PFAS based on soil concentrations. It also suggests that leachability may be somewhat independent of the soil matrix based on the ASLP method utilised.

7.1.2 Groundwater

Groundwater contours indicated that the groundwater is flowing generally to the north and north-east. This aligns with the expected groundwater flow from the regional topography, geology and hydrogeology (Section 2.2), which indicated a north to north-east flow. However, there may be a westerly component to the regional groundwater flow (as discussed in Table 2-2) which would suggest that the Edward River is likely to be a losing river.

The concentration of PFAS (sum of total) was below the LOR at MW02, MW03, MW05 (primary and duplicate sample) and MW06. The lack of detectable PFAS at MW02, MW03 and MW05 indicated that there is likely to be limited migration of PFAS in groundwater to the west, north and east respectively of the firefighting training area. PFAS is present at MW04, which is

located north-east of training ground and east of the former AFFF storage shed. MW06 is located north-east of MW04 and does not contain PFAS above the LOR, therefore indicating that substantial migration of PFAS from the site towards the north-east is unlikely.

The concentration of PFOS at MW01 exceeded the ecological freshwater criterion. Possible discharge points for the groundwater from this location are Aljoes Creek (located 2.5 km east of the site) and/or Edward River (located approximately 2.8 km to the east and north of the site). The concentration of PFAS (sum of total) is noted to decrease from 12.2 ug/L at MW01 to <0.01 ug/L at MW03 to the north and 1.58 ug/L at MW04 to the north-east (95 m and 105 m separation distance respectively), both of which are below the adopted ecological assessment criterion. It is therefore unlikely that the exceedance noted at MW01 represents a risk to either Aljoes Creek or Edward River. In addition, the presence of Mulwala Canal is likely to influence groundwater flow patterns between the site and these potential discharge waterbodies. GHD understand that Mulwala Canal is unlined and therefore likely to lose water potentially creating a groundwater mound around the canal.

The adopted drinking water (human health) assessment criteria was exceeded at MW01 and MW04. Considering the likely attenuation discussed above and the lack of abstraction bores on site or in the surrounding area (confirmed through the water use surveys, closest abstraction bore is 1.7 km east), these exceedances are unlikely to represent a plausible risk to human health. The salinity of the groundwater is likely to preclude a potable water use scenario.

7.1.3 Surface water

All surface water samples exceeded the adopted ecological guidelines, except for SW11 and SW10. This indicated that there is a potential risk to freshwater aquatic receptors should the surface water reach an aquatic ecosystem and also to terrestrial animals access the water for drinking.

Additionally, all surface water samples (except for SW11) exceeded the adopted drinking water guidelines. The location of these sample points is in unlined drainage channels, which are unlikely to be used for drinking water purposes. These exceedances are therefore unlikely to represent an unacceptable risk to human health via use drinking water.

The concentration of PFAS (sum of total) is shown relative to the distance from the site in Chart 1. Considering the PFAS concentration in sediment samples was noted to decrease with distance from the site, and likely dilution of surface waters with increasing distance from the source, it would be expected that the concentration of PFAS in surface water samples would also decrease with distance from the site.

The extent of PFAS impact to the east of the site along the former drainage line is not fully delineated, despite the channel being followed and sampled for approximately 1.5 km. It is possible that PFAS extends further along this drainage line to the east, however it is possible other sources of PFAS from surrounding properties The current drainage line to the north was followed to its end point in the vacant portion of Deniliquin Freighters.

The highest surface water concentration of PFAS (sum of total) was at SW03 in the dam along the northern drainage line. The concentration in May 2017 was noted to be nearly double that of November 2016. The sample collected in November 2016 may have been diluted from floods occurring in the area in October 2016. This dam overflows via a spillway continuing north, and represents a secondary source of PFAS contamination to off-site properties. Mulwala Canal was also sampled during this investigation (SW11), however it was not observed to be directly linked to the drainage channels from the site (as discussed in Section 6.5.1). The concentration of PFAS (sum of total) was less than the laboratory LOR, suggesting that PFAS impact is unlikely in Mulwala Canal.

8. Updated conceptual site model

Based on the sampling analytical results, the preliminary CSM (GHD, 2016 and GHD, 2017) has been refined. The updated potential source-pathway-receptor linkages are summarised in Table 8-1, where the yellow shading indicates the updated linkages. Potential linkages involving non-PFAS COPC such as TRH, BTEX and PAHs have been removed from the table (refer to GHD, 2017).

Table 8-1 Updated CSM

Potential source	Primary pathway	Receptor	Pathway present?
Soils in firefighting training area (central to southern portion of the site) contaminated with PFAS	Direct contact	FRNSW commercial workers	Unlikely – PFAS impact detected in shallow soil samples from this area (SB01-SB04) however, impact below adopted human health assessment criteria.
		Intrusive maintenance workers	Unlikely – PFAS impact detected in shallow soil samples from this area (SB01-SB04) however, impact below adopted human health assessment criteria.
		On site ecology	Possible – shallow soil (SB06) and sediment (SS01 and SS02) samples exceed adopted ecological guidelines for commercial/ industrial land use.
	Vertical/horizontal migration of leachate through unsaturated zone	Groundwater – subsequent migration in groundwater (secondary)	Yes – PFAS impact reported in MW01 located in the training area and MW04, north-east of the main source zone.
	Surface runoff and sediment transport (including leachate – secondary source)	Surface waters (including drainage systems – secondary pathway) and associated aquatic ecosystems	Yes – PFAS detected in all surface water and some sediment samples from both drainage lines associated with the site in excess of the adopted ecological guidelines.
		Off-site rural commercial/ industrial properties, including human users and agricultural live stock	Yes – sediment samples along drainage line off-site contain PFAS in excess of the adopted agricultural ecology guidelines.
Contaminated groundwater	Vertical/horizontal migration	Down gradient surface waters recharged by groundwater	Unlikely – PFAS impact detected above adopted ecological assessment criteria in

Potential source	Primary pathway	Receptor	Pathway present?
			groundwater at MW01, however attenuation in the north-east direction, and a lack of impact in down gradient wells to the north, west and east of the site suggest that impacted groundwater migration to surface water receptors is unlikely.
		Abstraction bores (stock and/or domestic use)	Unlikely – PFAS impact detected above adopted drinking water assessment criteria in groundwater at MW01 and MW04. However, attenuation in the north-east direction, and a lack of beneficial use bores in the local area (closest registered bore 1.7 km east of the site, and water use surveys confirm no abstraction at four properties surrounding the site) suggest a impact is unlikely to reach a plausible receptor.
Site offices, including storage of AFFF	Dermal contact, Vertical/horizontal migration of leachate through unsaturated zone, And/or Surface runoff and sediment transport	FRNSW commercial workers, intrusive maintenance workers, groundwaters, surface waters, off-site rural commercial/ industrial properties (and possible residential), and off-site ecological (terrestrial and aquatic)	Possible – PFAS present in soil and groundwater at MW04, east of the AFFF storage area. However, no impact observed in down gradient monitoring well (MW06), therefore substantial migration to the north-east is unlikely.
Former pool area, now used for confined space training			Unlikely – PFAS concentration less than the LOR in deep soil samples from around the former pool (MW03, SB06 and SB07) suggesting that PFAS impact at these locations is likely to have been from surface activities and not the underground pool.

9. Conclusions and recommendations

9.1 Conclusions

The overall objective of this investigation is further assess the extent of the PFAS impacts identified during the ESA completed by GHD between November 2016 and April 2017 and to confirm surface water flow directions off-site. Based on the scope of works presented in Section 1.3 of this report, the findings of the investigation and subject to the limitations presented in Section 11, the following conclusions are made:

- The site contains contamination from historical use of AFFF products containing PFAS.
- The primary sources of the PFAS are no longer present on site
- Secondary sources include soil, drain sediment and surface water.
- Generally, soil and groundwater exceedances are highly localised to the site
- Risks to onsite and offsite human receptors from direct contact with impacted media are considered low. Consumption of impacted agricultural produce may pose a risk to human health but this has not been assessed and is considered an unlikely exposure route.
- The most significant risk appears to be to terrestrial animals and birds consuming soil, water or impacted prey species. The level of this risk has not been assessed.

9.2 Recommendations

Based on the findings of these works, the following recommendations are made:

- Further investigation into the land use of the surrounding properties to assess the potential for agricultural use (particularly stock for human consumption) and water use habits. If stock used for human consumption are determined to be present, a preliminary site specific risk assessment would be required, possibly including the derivation of soil assessment criterion for human health under a rural land use scenario (as recommended by OEH, 2017). Previously collected soil and sediment data from off-site monitoring investigation locations could be used for this risk assessment (if required).
- Further investigation of water use could be conducted to better characterise groundwater and surface water use at properties surrounding the site and along the drainage channel lines. This should include investigation into how often the final surface water dams along the drainage line would over top.
- Further investigation of other potential sources in the area e.g. Deniliquin Freighters and the airport.
- Consideration of institutional/management controls for adjacent properties to mitigate the risk posed by sediment exceeding the indirect agricultural guidelines. These controls could include minimising the use of vacant properties for stock/crops, and would be addressed as part of the remedial options appraisal for this site.

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US EPA, 2014; Emerging Contaminants – Perfluorooctane Sulfonate (PFOS) and *Perfluoroactanoic Acid (PFOA), Emerging Contaminants Fact Sheet – PFOS and PFOA*

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US EPA, 2014b; Health Effects Document for Perfluorooctane Sulfonate (PFOS); US EPA Washington DC, United States

11. Limitations

This report has been prepared by GHD for Fire & Rescue NSW and may only be used and relied on by Fire & Rescue NSW for the purpose agreed between GHD and the Fire & Rescue NSW as set out in this report.

GHD otherwise disclaims responsibility to any person other than Fire & Rescue NSW arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described throughout this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Where data supplied by Fire & Rescue NSW or other external sources, including previous site investigation data and site plans, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by GHD for incomplete or inaccurate data supplied by others.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

Appendices

Appendix A – Figures

LEGEND

- Site Boundary
- Cadastre
- Streets
- Major Waterways
- Minor Waterways

0 50 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

Fire & Rescue NSW
Deniliquin Site Investigation

Job Number 21-25583
Revision A
Date 28 Jun 2017

Site Location

Figure 1

G:\21\25583\GIS\Maps\Deliverables\Deniliquin\21_25583_Z001_Deniliquin_SiteLocation.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Data source: Imagery - Google Earth Pro; Streets, Waterways - NSW LPI 2012 DTDB. Created by:tnham

LEGEND

- Site Boundary
- Cadastre
- Streets
- Major Waterways
- Minor Waterways
- Surface Drainage

0 5 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

Fire & Rescue NSW
Deniliquin Site Investigation

Job Number 21-25583
Revision A
Date 28 Jun 2017

Site Layout

Figure 2

G:\21\25583\GIS\Maps\Deliverables\Deniliquin\21_25583_Z002_Deniliquin_SiteLayout.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Data source: Imagery - LPI; Streets, Waterways - NSW LPI 2012 DTDB. Created by:tnham

0 20 40 60 80 100
Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways
- Surface Drainage
- Surface Water Feature
- Previous Investigation / Location Not Sampled
- Groundwater Monitoring Well (GHD, 2016/2017)
- Soil Borehole (GHD, 2016/2017)
- Sediment Sample Location (GHD, 2016/2017)
- Surface Water Sample Location (GHD, 2016/2017)

Fire & Rescue NSW
Deniliquin Site Investigations

Job Number	21-25583
Revision	A
Date	28 Jun 2017

Investigation Locations

Figure 3

G:\21\25583\GIS\Maps\Deliverables\Deniliquin\21_25583_Z014_Deniliquin_Phase2_InvestigationLocations.mxd

Data source: Imagery - Google Earth Pro; Streets, Waterways - NSW LPI 2012 DTDB. Created by:tnham

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

LEGEND

- Groundwater Monitoring Well (GHD, 2016) (6)
- Soil Borehole (GHD, 2016) (7)
- Sediment Sample Location (GHD, 2016) (7)
- Surface Water Sample Location (GHD, 2016) (2)
- Interpolated Groundwater Contours (mAHD)
- Site Boundary
- Surface Drainage
- Streets

0 5 10 20 30 40 50
Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Fire & Rescue NSW
Deniliquin Site Investigation

Job Number 21-25583
Revision A
Date 13 Jul 2017

Groundwater Contours

Figure 4

\\ghdnet\ghd\AU\Sydney\Projects\21\25583\GIS\Maps\Deliverables\Deniliquin\21_25583_Z015_Deniliquin_Groundwater_Contours_May2017.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Data source: Imagery - Google Earth Pro; Streets, Waterways - NSW LPI 2012 DTDB. Created by:mking3

0 20 40 60 80 100
Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways
- Surface Drainage
- Surface Water Feature
- Previous Investigation / Location Not Sampled
- Groundwater Monitoring Well (GHD, 2016/2017)
- Soil Borehole (GHD, 2016/2017)
- Sediment Sample Location (GHD, 2016/2017)
- Surface Water Sample Location (GHD, 2016/2017)

Fire & Rescue NSW
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Soil Exceedances

Figure 5

G:\21\25583\GIS\Maps\Deliverables\Deniliquin\21_25583_Z016_Deniliquin_Soil_Exceedances_May2017.mxd

Data source: Imagery - Google Earth Pro; Streets, Waterways - NSW LPI 2012 DTDB. Created by:tnham

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

0 20 40 60 80 100
Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

- Site Boundary
- Streets
- Major Waterways
- Minor Waterways
- Surface Drainage
- Surface Water Feature
- Previous Investigation / Location Not Sampled
- Groundwater Monitoring Well (GHD, 2016/2017)
- Soil Borehole (GHD, 2016/2017)
- Sediment Sample Location (GHD, 2016/2017)
- Surface Water Sample Location (GHD, 2016/2017)

Fire & Rescue NSW
Deniliquin Site Investigations

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Date	28 Jun 2017

Groundwater and Surface Water Exceedances

Figure 6

G:\21\25583\GIS\Maps\Deliverables\Deniliquin\21_25583_Z017_Deniliquin_Groundwater_Exceedances_May2017.mxd

Data source: Imagery - Google Earth Pro; Streets, Waterways - NSW LPI 2012 DTDB. Created by:tnham

Level 15, 133 Castlereagh Street Sydney NSW 2000 **T** 61 2 9239 7100 **F** 61 2 9239 7199 **E** sydmail@ghd.com.au **W** www.ghd.com.au

Appendix B – Analytical results summary tables

					TOC	Inorganics						PFAS																				
					Total Organic Carbon	DENSITY	pH (Final)	pH (Initial)	Moisture	Moisture Content (dried @ 103°C)	pH (after HCL)	N-Ethyl perfluorooctane sulfonamidoacetic acid	Perfluorodecanesulfonic acid (PFDS)	Perfluoroheptane sulfonic acid	10:2 Fluorotelomer sulfonic acid	4:2 Fluorotelomer sulfonic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	PFHxS and PFOS (Sum of Total) - Lab Calc	Perfluorobutane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorodecane sulfonic acid	Perfluorododecanoic acid	Perfluoroheptanoic acid
					%	g/cm3	pH Units	pH Units	%	%	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL					0.02	0.01	0.1	0.1	1	1	0.1	0.0002	0.0002	0.0002	0.0005	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002
OEH/NSW Health 2017 Commercial/Industrial																		20										100					
EC 2017 indirect com/ind ecology																																	
EC 2017 indirect agricultural																																	
Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time																														
MW01_0.1	MW01	0.1	30/11/2016	0.26	2.64	4.9 - 7.6	8.4	10.4	-	1.8	<0.0002	-	0.016	<0.0005	<0.0005	<0.0002	1.36	0.0033	0.0466	0.003	0.0185	<0.0005	<0.0005	<0.0005	<0.0005	0.0362	0.0158	0.0036	<0.001	0.0014	0.0018	<0.0002	0.0028
MW01_9.0	MW01	9	30/11/2016	0.05	2.67	5.1 - 9.4	9.3	14.5	-	1.8	<0.0002	-	0.0003	<0.0005	<0.0005	<0.0002	0.0394	0.0007	0.0017	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	0.0005	0.0006	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
MW02_0.1	MW02	0.1	30/11/2016	0.3	2.67	8.6	-	17.8	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.0026	0.0005	0.0018	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	0.0009	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
MW02_13.5	MW02	13.5	30/11/2016	<0.02	2.63	-	-	12.9	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
MW02B_10.2-10.3	MW02	10.2-10.3	15/12/2016	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03_0.1	MW03	0.1	30/11/2016	0.47	2.67	6.9	-	11.2	-	-	0.0027	-	0.0002	<0.0005	<0.0005	0.0038	0.0163	<0.0002	0.002	0.0004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0067	<0.0002	<0.001	<0.0002	<0.0002	0.0003	0.0013
MW03_1.0	MW03	1	30/11/2016	0.16	2.68	-	-	14.1	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.0016	0.0006	0.0007	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0003
MW03B_13.8-13.9	MW03	13.8-13.9	15/12/2016	-	-	-	-	-	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04_0.0-0.05	MW04	0-0.05	16/05/2017	1.02	-	7.7	-	17.5	-	-	<0.0002	<0.0002	0.0003	<0.0005	<0.0005	<0.0002	0.0283	<0.0002	0.0034	0.0018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	<0.0002	<0.001	0.0003	-	<0.0002	0.0018
MW04_11.3-11.35	MW04	11.3-11.35	16/05/2017	<0.02	-	7	-	18.5	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
MW05_0.0-0.15	MW05	0-0.15	17/05/2017	0.83	-	7.5	-	4.1	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0051	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
MW05_11.0-11.1	MW05	11-11.1	17/05/2017	0.04	-	7.8	-	12.3	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
QA04	MW05	11-11.1	17/05/2017	1.19	-	8.3	-	9	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
MW06_0.0-0.05	MW06	0-0.05	17/05/2017	1.46	-	7.2	-	3.9	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
QA03	MW06	0-0.05	17/05/2017	2.3	-	7.2	-	6.2	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
MW06_12.8-12.85	MW06	12.8-12.85	17/05/2017	0.18	-	7.7	-	19.6	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SB01_0.1	SB01	0.1	30/11/2016	0.74	2.64	7.3	-	12.2	-	-	<0.0002	-	0.007	<0.0005	<0.0005	<0.0002	0.362	0.0046	0.0665	0.0043	0.0017	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0079	0.0045	<0.001	0.0004	<0.0002	<0.0002	0.0019
SB01_1.0	SB01	1	30/11/2016	0.36	2.68	-	-	19.2	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.0105	0.0045	0.0078	0.0038	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0006	0.003	<0.001	<0.0002	<0.0002	<0.0002	0.0006
FD02	SB01	1	30/11/2016	0.38	-	-	-	18.4	-	-	<0.0002	-	0.0003	<0.0005	<0.0005	<0.0002	0.0315	0.006	0.0192	0.0051	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.0009	0.0041	<0.001	<0.0002	<0.0002	<0.0002	0.0011
FS02	SB01	1	30/11/2016	0.2	-	-	-	-	15	-	-	<0.005	-	-	<0.005	-	-	<0.005	0.011	<0.005	<0.005	<0.01	-	<0.01	-	<0.01	<0.005	-	<0.005	<0.005	-	<0.005	<0.005
SB02_0.1	SB02	0.1	29/11/2016	0.32	2.69	8.9	-	21.7	-	-	<0.0002	-	0.309	0.0126	0.0234	<0.0002	12.8	0.343	2.15	0.165	0.154	<0.0005	<0.0005	<0.0005	<0.0005	1.29	0.232	0.306	0.06	0.0017	0.0068	0.0005	0.0407
SB02_1.0	SB02	1	29/11/2016	0.27	2.63	-	-	17.7	-	-	<0.0002	-	0.0024	<0.0005	0.008	<0.0002	0.29	0.0879	0.212	0.036	0.0011	<0.0005	<0.0005	<0.0005	<0.0005	0.0646	0.0113	0.066	<0.001	<0.0002	<0.0002	<0.0002	0.0148
SB03_0.1	SB03	0.1	29/11/2016	0.12	2.64	7.9	-	7.2	-	-	<0.0002	-	0.0013	0.0013	<0.0005	<0.0002	0.462	0.0007	0.0078	0.0006	0.0074	<0.0005	<0.0005	<0.0005	<0.0005	0.0076	0.0022	0.0008	<0.001	0.0004	0.0034	<0.0002	0.0005
SB03_1.0	SB03	1	29/11/2016	0.16	2.7	9	-	15.4	-	-	<0.0002	-	0.0011	<0.0005	<0.0005	<0.0002	0.206	0.048	0.169	0.0395	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0157	0.0148	0.0415	<0.001	<0.0002	0.0004	<0.0002	0.0267
SB04_0.15	SB04	0.15	30/11/2016	0.37	2.57	8.9	-	23.2	-	-	<0.0002	-	0.0185	<0.0005	<0.0005	<0.0002	0.749	0.0043	0.0578	0.0047	0.0044	<0.0005	<0.0005	<0.0005	<0.0005	0.0537	0.0143	0.0045	<0.001	<0.0002	0.0003	<0.0002	0.0025
SB04_2.0	SB04	2	30/11/2016	0.11	2.65	-	-	16.1	-	-	<0.0002	-	0.0003	<0.0005	<0.0005	<0.0002	0.0147	0.0084	0.0019	0.0037	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0002	0.0013	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
FD03	SB04	2	30/11/2016	0.08	-	-	-	15.3	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.0011	0.014	0.0003	0.0064	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	0.0088	<0.001	<0.0002	<0.0002	<0.0002	0.0004
FS03	SB04	2	30/11/2016	<0.1	-	-	-	-	16	-	-	<0.005	-	-	<0.005	-	-	0.012	<0.005	<0.005	<0.005	<0.01	-	<0.01	-	<0.01	<0.005	-	<0.005	<0.005	-	<0.005	<0.005
SB05_0.1	SB05	0.1	29/11/2016	0.52	2.61	7.3	-	17	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.0047	<0.0002	0.0009	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0035	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0013
SB05_1.0	SB05	1	29/11/2016	0.12	2.7	-	-	12.8	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SB06_0.0-0.05	SB06	0-0.05	16/05/2017	4	-	6.3	-	3.8	-	-	0.0113	0.0004	0.0039	<0.0005	<0.0005	0.0219	0.186	0.0003	0.0089	<0.0002	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0056	0.0004	<0.001	0.0008	-	<0.0002	0.0004
SB06_1.0-1.05	SB06	1-1.05	16/05/2017	0.86	-	7.8	-	11.6	-	-	0.0006	<0.0002	0.0005	<0.0005	<0.0005	0.0008	0.0288	0.0013	0.0063	<0.0002	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0039	0.0016	<0.001	<0.0002	-	<0.0002	0.003
SB06_4.95-5.0	SB06	4.95-5	16/05/2017	0.08	-	8	-	13	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SB07_0.0-0.05	SB07	0-0.05	16/05/2017	0.53	-	7.5	-	15.4	-	-	<0.0002	0.0014	0.0003	<0.0005	<0.0005	<0.0002	0.0742	0.0002	0.0027	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0003	<0.001	<0.0002	-	<0.0002	<0.0002
QA02	SB07	0-0.05	16/05/2017	0.45	-	7.6	-	17.5	-	-	<0.0002	0.0007	0.0004	<0.0005	<0.0005	<0.0002	0.103	0.0003	0.0029	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0004	<0.001	<0.0002	-	<0.0002	<0.0002
SB07_2.1-2.15	SB07	2.1-2.15	16/05/2017	0.03	-	7.9	-	6	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SB07_4.95-5.0	SB07	4.95-5	16/05/2017	0.04	-	9.5	-	18	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS01	SS01		29/11/2016	0.68	2.62	7	-	17.2	-	-	<0.0002	-	0.0006	0.0026	<0.0005	<0.0002	0.302	0.0003	0.0053	0.0015	0.0043	<0.0005	<0.0005	<0.0005	<0.0005	0.0164	0.0022	0.0003	<0.001	0.0011	0.0014	<0.0002	0.0011
SS01	SS01		18/05/2017	1.95	-	6.5	-	24.4	-	-	<0.0002	0.0008	<0.0002	<0.0005	<0.0005	<0.0002	0.0323	0.0015	0.0014	0.0055	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	0.0003	<0.0002	<0.001	0.0002	-	0.0002	<0.0002
SS02	SS02		29/11/2016	0.5	2.65	7.8	-	15.2	-	-	<0.0002	-	0.0008	0.0325	<0.0005	<0.0002	0.284	0.0004	0.0065	0.0014	0.0244	<0.0005	<0.0005	<0.0005	<0.0005	0.0364	0.0031	0.0006	<0.001	0.0032	0.0072	0.002	0.0008
SS02	SS02		18/05/2017	<0.02	-	7.1	-	15.8	-	-	<0.0002	0.0064	0.0009	0.0444	<0.0005	<0.0002	0.514	0.0027	0.0095	0.0499	0.0576	<0.0005	<0.0005	<0.0005	<0.0005	0.0514	0.0062	0.001	0.014	0.0034	-	0.0012	0.0025
SSQA01	SS02		18/05/2017	2.62	-	6.8	-	6	-	-	<0.0002	0.0059	0.0006	0.0401	<0.0005	<0.0002	0.267	0.0006	0.0064	0.0155	0.0388	<0.0005	<0.0005	<0.0005	<0.0005	0.0514	0.0035	0.0006	0.019	0.0016	-	0.0011	0.0014
SS03	SS03		29/11/2016	3.12	2.38	7	-	30.7	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.0098	<0.0002	0.0017	0.0004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SS03	SS03		18/05/2017	4.21	-	6.6	-	34.7	-	-	<0.0002	0.0004	0.0005	<0.0005	<0.0005	<0.0002	0.0297	<0.0002	0.0016	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	0.0014	<0.0002	<0.001	0.0003	-	0.0004	0.0004
SS04	SS04		29/11/2016	0.69	2.65	7.7	-	30.4	-	-	<0.0002	-	0.0003	<0.0005	<0.0005	<0.0002	0.0306	<0.0002	0.0012	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0003	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SS04	SS04		18/05/2017	0.7	-	6.6	-	35.4	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.009	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS05	SS05		29/11/2016	0.75	2.5	6.8	-	27.9	-	-	<0.0002	-	0.0004	<0.0005	<0.0005	<0.0002	0.043	<0.0002	0.0034	0.0014	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	0.0044	0.0032	0.0002	<0.001	<0.0002	0.0009	<0.0002	0.0019
SS05	SS05		18/05/2017	4.56	-	6.4	-	41.5	-	-	<0.0002	0.0018	0.0002	0.0006	<0.0005	<0.0002	0.0372	<0.0002	0.0022	<0.0002	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	0.0037	0.0038	<0.0002	<0.001	0.0005	-	0.0008	0.001
SS06	SS06		29/11/2016	0.61	2.65	7.6	-	27.3	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.0329	<0.0002	0.0004	0.0002	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	0.0002	<0.0002	<0.001	<0.0002	0.0002	<0.0002	<0.0002
SS06	SS06		18/05/2017	1.1	-	7	-	34.6	-	-	<0.0002	0.0003	<0.0002	<0.0005	<0.0005	<0.0002	0.0147	<0.0002	0.0003	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS07	SS07		29/11/2016	0.47	2.65	8.2	-	31	-	-	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.025	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002
SS07	SS07		18/05/2017	0.6	-	6.8	-	37.7	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0135	<0.0002	0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS08	SS08		18/05/2017	1.32	-	6.8	-	4.7	-	-	<0.0002	0.0003	0.0012	<0.0005	<0.0005	<0.0002	0.116	<0.0002	0.0031	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0027	0.0014	<0.0002	<0.001	0.0003	-	<0.0002	0.0005
SS09	SS09		18/05/2017	3.72	-	6.4	-	43.5	-	-	<0.0002	0.0008	<0.0002	<0.0005	<0.0005	<0.0002	0.049	<0.0002	0.0013	<0.0002	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	0.0004	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS10	SS10		18/05/2017	1	-	6.6	-	53.1	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.006	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS11	SS11		18/05/2017	0.51	-	7.4	-	20.1	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0014	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002

				TOC	Inorganics						PFAS																				
				Total Organic Carbon	DENSITY	pH (Final)	pH (Initial)	Moisture	Moisture Content (dried @ 103°C)	pH (after HCL)	N-Ethyl perfluorooctane sulfonamidoacetic acid	Perfluorodecanesulfonic acid (PFDS)	Perfluoroheptane sulfonic acid	10:2 Fluorotelomer sulfonic acid	4:2 Fluorotelomer sulfonic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	PFHxS and PFOS (Sum of Total) - Lab Calc	Perfluorobutane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorodecane sulfonic acid	Perfluorododecanoic acid	Perfluoroheptanoic acid
				%	g/cm3	pH Units	pH Units	%	%	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.02	0.01	0.1	0.1	1	1	0.1	0.0002	0.0002	0.0002	0.0005	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002
OEH/NSW Health 2017 Commercial/Industrial																	20										100					
EC 2017 indirect com/ind ecology																																
EC 2017 indirect agricultural																																
Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time																													
SS12	SS12		18/05/2017	1.9	-	6.9	-	43.4	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0038	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SSQA02	SS12		18/05/2017	1.82	-	7.1	-	47.4	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0041	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS13	SS13		18/05/2017	0.46	-	7.6	-	5.9	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS14	SS14		18/05/2017	9.66	-	6.2	-	8.8	-	-	<0.0002	0.0008	0.0002	0.0018	<0.0005	<0.0002	0.0581	0.0006	0.002	0.001	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	0.0005	<0.0002	<0.001	0.0009	-	0.0015	0.0005
SS15	SS15		18/05/2017	1.81	-	6.8	-	59.3	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0126	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS16	SS16		18/05/2017	2.82	-	6.9	-	41.8	-	-	0.0003	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0039	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	0.0004	<0.0002
SS17	SS17		18/05/2017	-	-	7.9	-	18.4	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
SS18	SS18		18/05/2017	-	-	6.4	-	42.5	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0025	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
Quality Assurance / Quality Control																																
TRIP BLANK			17/05/2017	-	-	-	-	6.7	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
TRIP BLANK			18/05/2017	-	-	-	-	24.7	-	-	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	-	<0.0002	<0.0002
RB02			17/05/2017	-	-	-	-	-	-	-	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02

Appendix B
Table A
Soil and sediment analytical results

	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002	0.0002	0.0002
OEH/NSW Health 2017 Commercial/Industrial									
EC 2017 indirect com/ind ecology			0.14						
EC 2017 indirect agricultural			0.01						
Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time									
MW01_0.1	MW01	0.1	30/11/2016	0.0202	0.0005	1.31	0.0014	<0.0005	<0.0002	<0.0002	1.48	1.46
MW01_9.0	MW01	9	30/11/2016	0.0017	<0.0002	0.0377	<0.0002	<0.0005	<0.0002	<0.0002	0.0446	0.0437
MW02_0.1	MW02	0.1	30/11/2016	0.0005	<0.0002	0.0008	<0.0002	<0.0005	<0.0002	<0.0002	0.0045	0.0036
MW02_13.5	MW02	13.5	30/11/2016	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
MW02B_10.2-10.3	MW02	10.2-10.3	15/12/2016	-	-	-	-	-	-	-	-	-
MW03_0.1	MW03	0.1	30/11/2016	0.001	0.0004	0.0143	0.0016	<0.0005	<0.0002	<0.0002	0.0347	0.0257
MW03_1.0	MW03	1	30/11/2016	0.0019	<0.0002	0.0009	<0.0002	<0.0005	<0.0002	<0.0002	0.0053	0.0051
MW03B_13.8-13.9	MW03	13.8-13.9	15/12/2016	-	-	-	-	-	-	-	-	-
MW04_0.0-0.05	MW04	0-0.05	16/05/2017	0.0024	0.0011	0.0249	<0.0002	<0.0005	<0.0002	<0.0002	0.0382	0.0365
MW04_11.3-11.35	MW04	11.3-11.35	16/05/2017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
MW05_0.0-0.15	MW05	0-0.15	17/05/2017	<0.0002	<0.0002	0.0051	<0.0002	<0.0005	<0.0002	<0.0002	0.0051	0.0051
MW05_11.0-11.1	MW05	11-11.1	17/05/2017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
QA04	MW05	11-11.1	17/05/2017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
MW06_0.0-0.05	MW06	0-0.05	17/05/2017	<0.0002	<0.0002	0.0003	<0.0002	<0.0005	<0.0002	<0.0002	0.0003	0.0003
QA03	MW06	0-0.05	17/05/2017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
MW06_12.8-12.85	MW06	12.8-12.85	17/05/2017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
SB01_0.1	SB01	0.1	30/11/2016	0.0186	<0.0002	0.295	0.0004	<0.0005	<0.0002	<0.0002	0.426	0.414
SB01_1.0	SB01	1	30/11/2016	0.0161	<0.0002	0.0027	<0.0002	<0.0005	<0.0002	<0.0002	0.0399	0.0369
FD02	SB01	1	30/11/2016	0.0233	<0.0002	0.0123	<0.0002	<0.0005	<0.0002	<0.0002	0.0741	0.0697
FS02	SB01	1	30/11/2016	0.015	<0.005	0.012	<0.01	<0.005	<0.005	<0.005	-	-
SB02_0.1	SB02	0.1	29/11/2016	0.608	0.0005	10.7	0.0156	<0.0005	<0.0002	<0.0002	16.4	15.7
SB02_1.0	SB02	1	29/11/2016	0.146	<0.0002	0.0778	<0.0002	<0.0005	<0.0002	<0.0002	0.728	0.652
SB03_0.1	SB03	0.1	29/11/2016	0.0041	<0.0002	0.454	0.0031	<0.0005	<0.0002	0.0012	0.496	0.485
SB03_1.0	SB03	1	29/11/2016	0.141	<0.0002	0.0371	<0.0002	<0.0005	<0.0002	<0.0002	0.535	0.492
SB04_0.15	SB04	0.15	30/11/2016	0.0192	<0.0002	0.691	0.0004	<0.0005	<0.0002	<0.0002	0.876	0.852
SB04_2.0	SB04	2	30/11/2016	0.0125	<0.0002	0.0128	<0.0002	<0.0005	<0.0002	<0.0002	0.0421	0.0405
FD03	SB04	2	30/11/2016	0.0394	<0.0002	0.0008	<0.0002	<0.0005	<0.0002	<0.0002	0.0701	0.0613
FS03	SB04	2	30/11/2016	0.033	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	-	-
SB05_0.1	SB05	0.1	29/11/2016	0.0015	<0.0002	0.0038	<0.0002	<0.0005	<0.0002	<0.0002	0.0121	0.0121
SB05_1.0	SB05	1	29/11/2016	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
SB06_0.0-0.05	SB06	0-0.05	16/05/2017	0.0007	0.0006	0.177	0.0054	<0.0005	<0.0002	<0.0002	0.238	0.194
SB06_1.0-1.05	SB06	1-1.05	16/05/2017	0.0062	<0.0002	0.0225	0.0002	<0.0005	<0.0002	<0.0002	0.0469	0.0432
SB06_4.95-5.0	SB06	4.95-5	16/05/2017	<0.0002	<0.0002	0.002	<0.0002	<0.0005	<0.0002	<0.0002	0.002	0.002
SB07_0.0-0.05	SB07	0-0.05	16/05/2017	0.0013	<0.0002	0.0715	<0.0002	<0.0005	<0.0002	<0.0002	0.0785	0.0765
QA02	SB07	0-0.05	16/05/2017	0.0013	<0.0002	0.1	<0.0002	<0.0005	<0.0002	<0.0002	0.107	0.106
SB07_2.1-2.15	SB07	2.1-2.15	16/05/2017	<0.0002	<0.0002	0.0003	<0.0002	<0.0005	<0.0002	<0.0002	0.0003	0.0003
SB07_4.95-5.0	SB07	4.95-5	16/05/2017	<0.0002	<0.0002	0.0002	<0.0002	<0.0005	<0.0002	<0.0002	0.0002	0.0002
SS01	SS01		29/11/2016	0.0038	0.0008	0.297	0.0009	<0.0005	<0.0002	<0.0002	0.34	0.332
SS01	SS01		18/05/2017	0.0006	<0.0002	0.0309	0.0014	<0.0005	<0.0002	<0.0002	0.0442	0.0416
SS02	SS02		29/11/2016	0.0063	0.0002	0.277	0.0076	<0.0005	<0.0002	0.0014	0.412	0.356
SS02	SS02		18/05/2017	0.0234	0.0007	0.504	0.0124	<0.0005	0.0002	0.0007	0.792	0.721
SSQA01	SS02		18/05/2017	0.0113	0.0004	0.261	0.0107	<0.0005	0.0002	0.0006	0.471	0.409
SS03	SS03		29/11/2016	0.001	<0.0002	0.0081	<0.0002	<0.0005	<0.0002	<0.0002	0.0112	0.0112
SS03	SS03		18/05/2017	<0.0002	0.0004	0.0281	0.002	<0.0005	<0.0002	<0.0002	0.0362	0.0322
SS04	SS04		29/11/2016	0.0004	<0.0002	0.0294	<0.0002	<0.0005	<0.0002	<0.0002	0.0329	0.0326
SS04	SS04		18/05/2017	<0.0002	<0.0002	0.009	<0.0002	<0.0005	<0.0002	<0.0002	0.009	0.009
SS05	SS05		29/11/2016	0.0031	0.0004	0.0396	0.0006	<0.0005	<0.0002	<0.0002	0.0602	0.0577
SS05	SS05		18/05/2017	0.0003	0.0008	0.035	0.0138	<0.0005	<0.0002	<0.0002	0.0654	0.0469
SS06	SS06		29/11/2016	0.0003	<0.0002	0.0325	0.0005	<0.0005	<0.0002	<0.0002	0.0362	0.0355
SS06	SS06		18/05/2017	0.0002	<0.0002	0.0144	0.0002	<0.0005	<0.0002	<0.0002	0.0154	0.0149
SS07	SS07		29/11/2016	<0.0002	<0.0002	0.025	<0.0002	<0.0005	<0.0002	<0.0002	0.025	0.025
SS07	SS07		18/05/2017	0.0002	<0.0002	0.013	<0.0002	<0.0005	<0.0002	<0.0002	0.0139	0.0139
SS08	SS08		18/05/2017	0.0003	0.0022	0.113	0.0002	<0.0005	<0.0002	<0.0002	0.125	0.121
SS09	SS09		18/05/2017	<0.0002	<0.0002	0.0477	0.0066	<0.0005	<0.0002	<0.0002	0.0581	0.0507
SS10	SS10		18/05/2017	<0.0002	<0.0002	0.006	<0.0002	<0.0005	<0.0002	<0.0002	0.006	0.006
SS11	SS11		18/05/2017	<0.0002	<0.0002	0.0014	<0.0002	<0.0005	<0.0002	<0.0002	0.0014	0.0014

Appendix B
Table A
Soil and sediment analytical results

				Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002	0.0002	0.0002
OEH/NSW Health 2017 Commercial/Industrial												
EC 2017 indirect com/ind ecology						0.14						
EC 2017 indirect agricultural						0.01						
Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time									
SS12	SS12		18/05/2017	<0.0002	<0.0002	0.0038	<0.0002	<0.0005	<0.0002	<0.0002	0.0038	0.0038
SSQA02	SS12		18/05/2017	<0.0002	<0.0002	0.0041	<0.0002	<0.0005	<0.0002	<0.0002	0.0041	0.0041
SS13	SS13		18/05/2017	<0.0002	<0.0002	0.0004	<0.0002	<0.0005	<0.0002	<0.0002	0.0004	0.0004
SS14	SS14		18/05/2017	0.0005	0.0003	0.0561	<0.0002	<0.0005	<0.0002	<0.0002	0.0682	0.0627
SS15	SS15		18/05/2017	<0.0002	<0.0002	0.0126	<0.0002	<0.0005	<0.0002	<0.0002	0.0126	0.0126
SS16	SS16		18/05/2017	<0.0002	<0.0002	0.0039	<0.0002	<0.0005	<0.0002	<0.0002	0.0046	0.0039
SS17	SS17		18/05/2017	<0.0002	<0.0002	0.0002	<0.0002	<0.0005	<0.0002	<0.0002	0.0002	0.0002
SS18	SS18		18/05/2017	<0.0002	<0.0002	0.0025	<0.0002	<0.0005	<0.0002	<0.0002	0.0025	0.0025
Quality Assurance / Quality Control												
TRIP BLANK			17/05/2017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
TRIP BLANK			18/05/2017	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
RB02			17/05/2017	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01

							PFAS																				
							N-Ethyl perfluorooctane sulfonamidoacetic acid	Perfluorodecanesulfonic acid (PFDS)	Perfluoroheptane sulfonic acid	10:2 Fluorotelomer sulfonic acid	4:2 Fluorotelomer sulfonic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	PFHxS and PFOS (Sum of Total) - Lab Calc	Perfluorobutane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorododecanoic acid	Perfluoroheptanoic acid	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)
							µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL							0.02	0.02	0.02	0.05	0.05	0.02	0.01	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.02	0.1	0.02	0.02	0.02	0.02	0.02	0.01
Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time	Matrix_Type																											
MW01_0.1	MW01	0.1	30/11/2016	soil ASLP	<0.02	<0.02 - 0.07	1.43 - 1.73	<0.05	<0.05	<0.02	111 - 137	0.38 - 0.56	3.49 - 4.72	0.29 - 0.45	0.33 - 1.76	<0.05	<0.05	<0.05	<0.05	0.97 - 1.54	0.77 - 0.9	0.26 - 0.37	<0.1	0.05 - 0.08	<0.02	0.12 - 0.13	0.96 - 1.62	0.07 - 0.11	106 - 134
MW01_9.0	MW01	9	30/11/2016	soil ASLP	<0.02	<0.02	0.02 - 0.04	<0.05	<0.05	<0.02	2.08 - 3.43	0.15 - 0.16	0.25 - 0.27	0.11	<0.05 - 0.06	<0.05	<0.05	<0.05	<0.05	<0.05 - 0.09	0.02 - 0.04	0.06 - 0.08	<0.1	<0.02	<0.02	<0.02 - 0.02	0.25 - 0.28	<0.02	1.83 - 3.16
MW02_0.1	MW02	0.1	30/11/2016	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.18	0.02	0.12	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.02	<0.1	<0.02	<0.02	<0.02	0.02	<0.02	0.06
MW03_0.1	MW03	0.1	30/11/2016	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.39	<0.02	0.08	0.03	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	<0.02	<0.1	<0.02	<0.02	0.03	0.04	<0.02	0.31
MW04_0.0-0.05	MW04	0-0.05	16/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	2.03	<0.02	0.12	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.04	<0.02	<0.1	<0.02	<0.02	0.05	0.04	0.03	1.91
MW04_11.3-11.35	MW04	11.3-11.35	16/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01
MW05_0.0-0.15	MW05	0-0.15	17/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.33	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.33
MW05_11.0-11.1	MW05	11-11.1	17/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01
QA04	MW05	11-11.1	17/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.01
MW06_0.0-0.05	MW06	0-0.05	17/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
QA03	MW06	0-0.05	17/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.04	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.04
MW06_12.8-12.85	MW06	12.8-12.85	17/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01
SB01_0.1	SB01	0.1	30/11/2016	soil ASLP	<0.02	<0.02	0.35	<0.05	<0.05	<0.02	17	0.43	4.29	0.35	0.08	<0.05	<0.05	<0.05	<0.05	0.45	0.32	0.35	<0.1	<0.02	<0.02	0.1	0.8	<0.02	12.7
SB02_0.1	SB02	0.1	29/11/2016	soil ASLP	<0.2	<0.2	15.8	<0.5	0.54	<0.2	756	11.3	84.7	5.21	8.63	<0.5	<0.5	<0.5	<0.5	45.9	9.88	9.11	4.4	<0.2	<0.2	2.31	18.2	<0.2	671
SB03_0.1	SB03	0.1	29/11/2016	soil ASLP	<0.02	0.11	0.06	<0.05	<0.05	<0.02	17	0.05	0.44	0.06	0.15	<0.05	<0.05	<0.05	<0.05	0.12	0.09	0.04	<0.1	<0.02	<0.02	0.03	0.19	<0.02	16.6
SB03_1.0	SB03	1	29/11/2016	soil ASLP	<0.02	<0.02	0.03	<0.05	<0.05	<0.02	6.05	4.09	5.13	3.14	<0.05	<0.05	<0.05	<0.05	<0.05	0.19	0.29	2.28	0.8	<0.02	<0.02	0.88	6.02	<0.02	0.92
SB04_0.15	SB04	0.15	30/11/2016	soil ASLP	<0.02	<0.02	1.78	<0.05	<0.05	<0.02	51.7	0.43	6.02	0.21	0.17	<0.05	<0.05	<0.05	<0.05	2.72	0.8	0.41	<0.1	<0.02	<0.02	0.15	0.62	<0.02	45.7
SB05_0.1	SB05	0.1	29/11/2016	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.18	<0.02	0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.13
SB06_0.0-0.05	SB06	0-0.05	16/05/2017	soil ASLP	<0.02	<0.02	0.29	<0.05	<0.05	<0.02	11.2	<0.02	0.61	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.22	0.03	<0.1	0.02	<0.02	0.02	0.04	0.03	10.6
SB06_1.0-1.05	SB06	1-1.05	16/05/2017	soil ASLP	<0.02	<0.02	0.04	<0.05	<0.05	<0.02	1.54	0.11	0.36	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	0.11	<0.1	<0.02	<0.02	0.12	0.3	<0.02	1.18
SB06_4.95-5.0	SB06	4.95-5	16/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.05	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.05
SB07_0.0-0.05	SB07	0-0.05	16/05/2017	soil ASLP	<0.02	0.14	0.04	<0.05	<0.05	<0.02	7.92	0.03	0.19	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.03	<0.1	<0.02	<0.02	<0.02	0.05	<0.02	7.73
QA02	SB07	0-0.05	16/05/2017	soil ASLP	<0.02	0.07	0.03	<0.05	<0.05	<0.02	6.29	0.02	0.15	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.04	0.02	<0.1	<0.02	<0.02	<0.02	0.04	<0.02	6.14
SB07_2.1-2.15	SB07	2.1-2.15	16/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.11	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.11
SB07_4.95-5.0	SB07	4.95-5	16/05/2017	soil ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.01
SS01	SS01		29/11/2016	sediment ASLP	<0.02	<0.02	0.05	<0.05	<0.05	<0.02	16.2	0.07	0.31	0.09	0.28	<0.05	<0.05	<0.05	<0.05	0.31	0.12	0.04	<0.1	0.04	<0.02	0.03	0.16	0.05	15.9
SS01	SS01		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	1.3	0.22	0.1	0.43	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.01	0.03	1.5	<0.02	<0.02	<0.02	0.09	<0.02	1.2
SS02	SS02		29/11/2016	sediment ASLP	<0.02	0.26	0.05	0.3	<0.05	<0.02	29	0.04	0.26	0.11	1.26	<0.05	<0.05	<0.05	<0.05	0.54	0.11	0.02	<0	0.3	0.04	0.04	0.2	<0.02	28.7
SS02	SS02		18/05/2017	sediment ASLP	<0.02	0.32	0.13	0.14	<0.05	<0.02	41	0.33	0.89	3.2	2.88	<0.05	<0.05	<0.05	<0.05	2.16	0.31	0.1	1	0.16	<0.02	0.15	1.57	0.06	40.1
SSQA01	SS02		18/05/2017	sediment ASLP	<0.02	0.36	0.12	0.22	<0.05	<0.02	30.1	0.24	0.72	1.82	2.53	<0.05	<0.05	<0.05	<0.05	1.77	0.25	0.1	0.8	0.15	0.02	0.14	1.05	0.04	29.4
SS03	SS03		29/11/2016	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	1.22	<0.02	0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.02	<0.02	<0	<0.02	<0.02	<0.02	0.02	<0.02	1.17
SS03	SS03		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	1.38	<0.02	0.12	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.02	<0.1	<0.02	<0.02	0.02	0.04	<0.02	1.26
SS04	SS04		29/11/2016	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.36	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0	<0.02	<0.02	<0.02	<0.02	<0.02	0.36
SS04	SS04		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.26	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.26
SS05	SS05		29/11/2016	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	1.41	<0.02	0.09	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	<0.02	<0	<0.02	<0.02	0.05	0.07	<0.02	1.32
SS05	SS05		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.81	<0.02	0.08	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	<0.02	<0.1	<0.02	<0.02	0.04	<0.02	0.02	0.73
SS06	SS06		29/11/2016	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	2.27	<0.02	0.03	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0	<0.02	<0.02	<0.02	0.02	<0.02	2.24
SS06	SS06		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	1.51	<0.02	0.03	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.01	<0.02	<0.1	<0.02	<0.02	<0.02	0.03	<0.02	1.48
SS07	SS07		29/11/2016	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	1.26	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0	<0.02	<0.02	<0.02	<0.02	<0.02	1.26
SS07	SS07		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.69	<0.02	0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.67
SS08	SS08		18/05/2017	sediment ASLP	<0.02	<0.02	0.1	<0.05	<0.05	<0.02	5.88	<0.02	0.3	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.08	<0.02	<0.1	<0.02	<0.02	0.05	0.05	0.1	5.58
SS09	SS09		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.46	<0.02	0.04	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.42
SS10	SS10		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.1	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.1
SS11	SS11		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.12	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.12
SS12	SS12		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.09	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.09
SSQA02	SS12		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.08	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.08
SS13	SS13		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01
SS14	SS14		18/05/2017	sediment ASLP	<0.02	<0.02	0.05	<0.05	<0.05	<0.02	1.99	0.04	0.31	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.04	0.04	<0.1	<0.02	<0.02	<0.02	0.08	<0.02	1.68
SS15	SS15		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.4	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.4
SS16	SS16		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
SS17	SS17		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01
SS18	SS18		18/05/2017	sediment ASLP	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	0.02

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Appendix B
Table B
ASLP analytical results

					Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					0.02	0.05	0.02	0.02	0.01	0.01
Field_ID	Location_Code	Sample_Depth_Range	Sampled_Date_Time	Matrix_Type						
MW01_0.1	MW01	0.1	30/11/2016	soil ASLP	<0.02 - 0.12	<0.05	<0.02	<0.02	118 - 145	116 - 143
MW01_9.0	MW01	9	30/11/2016	soil ASLP	<0.02	<0.05	<0.02	<0.02	2.72 - 4.28	2.62 - 4.18
MW02_0.1	MW02	0.1	30/11/2016	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.24	0.22
MW03_0.1	MW03	0.1	30/11/2016	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.65	0.65
MW04_0.0-0.05	MW04	0-0.05	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	2.19	2.16
MW04_11.3-11.35	MW04	11.3-11.35	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
MW05_0.0-0.15	MW05	0-0.15	17/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.33	0.33
MW05_11.0-11.1	MW05	11-11.1	17/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
QA04	MW05	11-11.1	17/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.01	0.01
MW06_0.0-0.05	MW06	0-0.05	17/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.05	0.05
QA03	MW06	0-0.05	17/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.04	0.04
MW06_12.8-12.85	MW06	12.8-12.85	17/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
SB01_0.1	SB01	0.1	30/11/2016	soil ASLP	<0.02	<0.05	<0.02	<0.02	20.2	19.5
SB02_0.1	SB02	0.1	29/11/2016	soil ASLP	2.01	<0.5	<0.2	<0.2	889	862
SB03_0.1	SB03	0.1	29/11/2016	soil ASLP	0.13	<0.05	<0.02	<0.02	18.1	17.7
SB03_1.0	SB03	1	29/11/2016	soil ASLP	<0.02	<0.05	<0.02	<0.02	23.8	21.5
SB04_0.15	SB04	0.15	30/11/2016	soil ASLP	<0.02	<0.05	<0.02	<0.02	59	56.8
SB05_0.1	SB05	0.1	29/11/2016	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.27	0.27
SB06_0.0-0.05	SB06	0-0.05	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	11.9	11.5
SB06_1.0-1.05	SB06	1-1.05	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	2.43	2.28
SB06_4.95-5.0	SB06	4.95-5	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.05	0.05
SB07_0.0-0.05	SB07	0-0.05	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	8.26	8.05
QA02	SB07	0-0.05	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	6.51	6.39
SB07_2.1-2.15	SB07	2.1-2.15	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.11	0.11
SB07_4.95-5.0	SB07	4.95-5	16/05/2017	soil ASLP	<0.02	<0.05	<0.02	<0.02	0.01	0.01
SS01	SS01		29/11/2016	sediment ASLP	0.06	<0.05	<0.02	<0.02	17.5	17.3
SS01	SS01		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	3.65	3.62
SS02	SS02		29/11/2016	sediment ASLP	0.59	<0.05	<0.02	0.11	32.9	31.3
SS02	SS02		18/05/2017	sediment ASLP	0.15	<0.05	<0.02	0.04	53.7	52.6
SSQA01	SS02		18/05/2017	sediment ASLP	0.15	<0.05	<0.02	0.03	39.9	38.7
SS03	SS03		29/11/2016	sediment ASLP	<0.02	<0.05	<0.02	<0.02	1.26	1.26
SS03	SS03		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	1.52	1.52
SS04	SS04		29/11/2016	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.36	0.36
SS04	SS04		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.26	0.26
SS05	SS05		29/11/2016	sediment ASLP	<0.02	<0.05	<0.02	<0.02	1.71	1.71
SS05	SS05		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.98	0.96
SS06	SS06		29/11/2016	sediment ASLP	<0.02	<0.05	<0.02	<0.02	2.29	2.29
SS06	SS06		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	1.55	1.55
SS07	SS07		29/11/2016	sediment ASLP	<0.02	<0.05	<0.02	<0.02	1.26	1.26
SS07	SS07		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.69	0.69
SS08	SS08		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	6.32	6.12
SS09	SS09		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.47	0.47
SS10	SS10		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.1	0.1
SS11	SS11		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.12	0.12
SS12	SS12		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.09	0.09
SSQA02	SS12		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.08	0.08
SS13	SS13		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
SS14	SS14		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	2.31	2.22
SS15	SS15		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.4	0.4
SS16	SS16		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.02	0.02
SS17	SS17		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
SS18	SS18		18/05/2017	sediment ASLP	<0.02	<0.05	<0.02	<0.02	0.02	0.02

Env Stds Comments

Appendix B
Table C
Groundwater and surface water analytical results

Field_ID	Location_Code	Sampled_Date_Time	Field Parameters: DO (mg/L) (Field)	Electrical conductivity (field)	pH (Field)	Redox (Field)	Temperature (Field)	Inorganics: pH (Lab)	Total Dissolved Solids	Total Dissolved Solids (Filtered)	Total Suspended Solids
			mg/L	µS/cm	pH Units	mV	°C	pH Units	mg/L	mg/L	mg/L
EQL								0.01	10	10	5
Commonwealth (Draft) Env. Mgmt. Guidance on PFOS and PFOA - FW 95%											
FSANZ - PFAS Drinking water quality guideline											
MW01	MW01	24/01/2017	5.72	1826	7.51	-28.4	21.1	7.77	-	1670	-
FD01	MW01	24/01/2017	-	-	-	-	-	7.79	-	1020	-
FS01	MW01	24/01/2017	-	-	-	-	-	8.3	1000	-	-
MW01	MW01	2/06/2017	6.72	1507	7.57	102.1	19.3	-	-	982	-
MW02	MW02	24/01/2017	5.66	1757	7.22	-48.7	21.4	7.8	-	1150	-
MW02	MW02	2/06/2017	4.81	1570	7.6	103.3	18.9	-	-	1070	-
MW03	MW03	24/01/2017	1.98	2599	7.73	-75.5	21.5	7.71	-	1700	-
MW03	MW03	2/06/2017	8.02	2561	7.65	99.4	19	-	-	1540	-
MW04	MW04	1/06/2017	0.53	4551	7.14	1.9	17.9	-	-	2870	-
MW05	MW05	1/06/2017	5.71	2567	7.1	80.1	19.3	-	-	1800	-
FD01	MW05	1/06/2017	-	-	-	-	-	-	-	-	-
MW06	MW06	1/06/2017	2.48	8104	7.06	103.2	18.4	-	-	5320	-
SW01	SW01	29/11/2016	-	-	-	-	-	7.29	-	250	-
SW02	SW02	29/11/2016	-	-	-	-	-	6.87	-	158	-
SW02	SW02	18/05/2017	8.93	79.1	8.82	114.3	17.5	-	-	-	83
SW03	SW03	29/11/2016	-	-	-	-	-	7.01	-	176	-
FD01	SW03	29/11/2016	-	-	-	-	-	7.05	-	162	-
FS01	SW03	29/11/2016	-	-	-	-	-	7.7	150	-	-
SW03	SW03	18/05/2017	6.21	254.7	8.06	149.8	13.5	-	-	-	26
SWQA01	SW03	18/05/2017	-	-	-	-	-	-	-	-	18
SW04	SW04	18/05/2017	-	-	-	-	-	-	-	-	397
SW06	SW06	18/05/2017	0.84	175.4	7.35	181.3	13.5	-	-	-	28
SW08	SW08	18/05/2017	6.94	132.2	7.73	166.5	15.4	-	-	-	64
SW10	SW10	18/05/2017	5.47	216.3	7.57	165.8	14.8	-	-	-	<5
SW11	SW11	18/05/2017	-	-	-	-	-	-	-	-	24
SWQA02	SW11	18/05/2017	-	-	-	-	-	-	-	-	19
Quality Assurance / Quality Control											
RB01		24/01/2017	-	-	-	-	-	-	-	-	-

Field_ID	Location_Code	Sampled_Date_Time	PFAS: N-Ethyl perfluorooctane sulfonamidoacetic acid	Perfluorodecanesulfonic acid (PFDS)	Perfluoroheptane sulfonic acid	10:2 Fluorotelomer sulfonic acid	4:2 Fluorotelomer sulfonic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	PFHxS and PFOS (Sum of Total) - Lab Calc	Perfluorobutane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			0.02	0.02	0.02	0.05	0.05	0.02	0.01	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05
Commonwealth (Draft) Env. Mgmt. Guidance on PFOS and PFOA - FW 95%																		
FSANZ - PFAS Drinking water quality guideline									*0.07*									
MW01	MW01	24/01/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.88	0.14	0.24	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
FD01	MW01	24/01/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.86	0.15	0.26	0.12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
FS01	MW01	24/01/2017	<0.05	<0.01	-	-	<0.01	<0.05	-	0.08	0.13[#1]	0.06[#1]	<0.01	-	-	-	-	<0.05
MW01	MW01	2/06/2017	<0.02	<0.02	0.08	<0.05	<0.05	<0.02	11.1	0.07	0.4	0.08	0.1	<0.05	<0.05	<0.05	<0.05	0.32
MW02	MW02	24/01/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW02	MW02	2/06/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW03	MW03	24/01/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW03	MW03	2/06/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW04	MW04	1/06/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.23	0.25	0.18	0.35	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW05	MW05	1/06/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
FD01	MW05	1/06/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MW06	MW06	1/06/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SW01	SW01	29/11/2016	<0.02	-	0.02	<0.05	<0.05	<0.02	2.4	0.07	0.39	0.21	<0.05	<0.05	<0.05	<0.05	<0.05	0.13
SW02	SW02	29/11/2016	<0.02	-	<0.02	<0.05	<0.05	<0.02	0.2	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SW02	SW02	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.76	0.05	0.2	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SW03	SW03	29/11/2016	<0.02	-	<0.02	<0.05	<0.05	<0.02	1.63	0.06	0.31	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	0.09
FD01	SW03	29/11/2016	<0.02	-	<0.02	<0.05	<0.05	<0.02	1.48	0.06	0.24	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
FS01	SW03	29/11/2016	-	<0.01	-	-	<0.01	-	-	0.03	0.18[#1]	0.08	<0.01	<0.05	-	<0.05	-	0.05
SW03	SW03	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	2.67	0.09	0.58	0.35	<0.05	<0.05	<0.05	<0.05	<0.05	0.25
SWQA01	SW03	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	3.01	0.08	0.55	0.31	<0.05	<0.05	<0.05	<0.05	<0.05	0.21
SW04	SW04	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.26	<0.02	<0.02	<0.02	<0.05	<0.05	0.08	<0.05	<0.05	<0.05
SW06	SW06	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.24	<0.02	0.08	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SW08	SW08	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.31	0.03	0.12	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SW10	SW10	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	0.09	<0.02	0.04	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SW11	SW11	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
SWQA02	SW11	18/05/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RB01		24/01/2017	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Field_ID	Location_Code	Sampled_Date_Time	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorodecane sulfonic acid	Perfluorododecanoic acid	Perfluoroheptanoic acid	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL			0.01	0.02	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.05	0.02	0.02	0.01	0.01
Commonwealth (Draft) Env. Mgmt. Guidance on PFOS and PFOA - FW 95%			**220**									**0.13**						
FSANZ - PFAS Drinking water quality guideline			*0.56*															
MW01	MW01	24/01/2017	0.03	0.08	<0.1	<0.02	-	<0.02	0.04	0.33	<0.02	**0.64**	<0.02	<0.05	<0.02	<0.02	1.63	1.55
FD01	MW01	24/01/2017	0.03	0.08	<0.1	<0.02	-	<0.02	0.06	0.32	<0.02	**0.6**	<0.02	<0.05	<0.02	<0.02	1.62	1.54
FS01	MW01	24/01/2017	0.01[#1]	-	<0.05	<0.01	-	<0.01	0.03[#1]	0.16[#1]	<0.01	**0.35[#1]**	<0.05	<0.01	<0.01	<0.01	-	-
MW01	MW01	2/06/2017	0.12	0.07	<0.1	<0.02	-	<0.02	0.04	0.2	0.02	**10.7**	<0.02	<0.05	<0.02	<0.02	12.2	12
MW02	MW02	24/01/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02
MW02	MW02	2/06/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
MW03	MW03	24/01/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02
MW03	MW03	2/06/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
MW04	MW04	1/06/2017	0.03	0.23	<0.1	<0.02	-	<0.02	0.08	0.41	<0.02	0.05	<0.02	<0.05	<0.02	<0.02	1.58	1.35
MW05	MW05	1/06/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
FD01	MW05	1/06/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
MW06	MW06	1/06/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
SW01	SW01	29/11/2016	0.06	0.06	<0.1	<0.02	<0.02	<0.02	0.04	0.19	<0.02	**2.01**	<0.02	<0.05	<0.02	<0.02	3.18	3.1
SW02	SW02	29/11/2016	<0.01	<0.02	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.2**	<0.02	<0.05	<0.02	<0.02	0.2	0.2
SW02	SW02	18/05/2017	0.01	0.04	<0.1	<0.02	-	<0.02	<0.02	0.03	<0.02	**0.56**	<0.02	<0.05	<0.02	<0.02	0.89	0.85
SW03	SW03	29/11/2016	0.05	0.07	<0.1	<0.02	<0.02	<0.02	0.02	0.4	<0.02	**1.32**	<0.02	<0.05	<0.02	<0.02	2.52	2.45
FD01	SW03	29/11/2016	<0.01	0.08	<0.1	<0.02	<0.02	<0.02	0.04	0.39	<0.02	**1.24**	<0.02	<0.05	<0.02	<0.02	2.25	2.17
FS01	SW03	29/11/2016	0.04[#1]	-	0.07	<0.01	-	<0.01	0.03	0.15[#1]	0.02	**1.1[#1]**	<0.05	<0.01	<0.01	<0.01	-	-
SW03	SW03	18/05/2017	0.09	0.1	<0.1	<0.02	-	<0.02	0.14	0.33	0.04	**2.09**	<0.02	<0.05	<0.02	<0.02	4.06	3.92
SWQA01	SW03	18/05/2017	0.09	0.09	<0.1	<0.02	-	<0.02	0.13	0.31	0.04	**2.46**	<0.02	<0.05	<0.02	<0.02	4.27	4.14
SW04	SW04	18/05/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	0.03	<0.02	<0.02	**0.26**	<0.02	<0.05	<0.02	<0.02	0.37	0.29
SW06	SW06	18/05/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	0.02	<0.02	**0.16**	<0.02	<0.05	<0.02	<0.02	0.26	0.26
SW08	SW08	18/05/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	0.03	<0.02	**0.19**	<0.02	<0.05	<0.02	<0.02	0.37	0.37
SW10	SW10	18/05/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	<0.05	<0.02	<0.02	0.09	0.09
SW11	SW11	18/05/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
SWQA02	SW11	18/05/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01
RB01		24/01/2017	<0.01	<0.02	<0.1	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02

Latest sample

Appendix C – Field Sampling Sheets and equipment calibration certificates

Purging and Sampling Record

Bore ID: MW01

Job Information	Sampling Information	Bore Information
Client: Fire and Rescue NSW	**Purge Method:** low flow	**SWL(mbTOC):** 11.300 m **Logic Check:** Y
Project: June 2017 GME	**Sample Method:** low flow	**Screen:** From: – to: – m **Stick Up:** – m
Proj. No.: 21 25583 15	**WQ Meter Type:** YSI Pro Plus	**NAPL Check:** None **Bore Diam.:** 50 mm
Sampler: Mariah Murphy	**Flow Cell:** Y / N **Pump Depth:** 12.326 m	**Ref.datum:** – **Well Cap Secure?** Y
Date: ~~/04/2017~~ 2/6/17	**WLevel Meter Type:** Dip / Fox / Int.Fce / Gge	**Bore Depth:** 14.066 m
Round: Jun-17	**Field Filtered?** Y / N (filter vessel, disposable filter, filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	EPM (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):	-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*			
~~11:42~~	~~0.5~~	~~18.9~~	~~7.63~~	~~1532~~	~~6.20~~	~~106.0~~	11.275	~~11.275~~	With pump
11:42	0.5	18.9	7.63	1532	6.20	106.0	11.519	4	Cloudy highly turbid, white-yellow suspended sediments (very fine)
11:45	1.0	19.2	7.58	1564	6.31	104.3	" "	3	" "
11:47	1.5	19.3	7.57	1573	6.13	103.4	" "	" "	" "
11:47	2.0	19.4	7.57	1544	6.38	103.2	" "	" "	" "
11:48	2.5	19.4	7.57	1582	6.40	102.9	" "	" "	" "
~~11:50~~	3.0	19.4	7.56	~~1425~~	6.54	102.7	" "	" "	" "
11:49									
11:51	3.5	19.6	7.56	1463	6.61	102.4	" "	" "	" "
11:52	4.0	19.3	7.57	1507	6.72	102.1	" "	" "	" "
				Parameters	stabilised	began			
				sampling	at	11:55			

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N

Decontamination as per GHD procedure? Y / N

Was sampling equipment pre-cleaned? Y / N

COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: MW02

Job Information	Sampling Information	Bore Information
Client: Fire and Rescue NSW	**Purge Method:** low flow	**SWL(mbTOC):** 11.148 m — **Logic Check:** Y
Project: June 2017 GME	**Sample Method:** low flow	**Screen:** From: — to: — m — **Stick Up:** — m
Proj. No.: 21 25583 15	**WQ Meter Type:** YSI Professional Plus	**NAPL Check:** — — **Bore Diam.:** 50 mm
Sampler: Mariah Murphy	**Flow Cell:** (Y) / N — **Pump Depth:** 11.85 m	**Ref.datum:** — — **Well Cap Secure?** Y
Date: ~~04/2017~~ 02/06/17	**WLevel Meter Type:** Dip / Fox / Int.Fce / Gge	**Bore Depth:** 12.735 m
Round: Jun-17	**Field Filtered?** Y / N (filter vessel, disposable filter, filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	(CPM) (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):	-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*			
							11.165	—	with pump
9:20	0.5	18.5	7.74	1613	2.80	119.1	11.205	4	Brown and milky/cloudy, very high turbidity, no odour/sheen, no SS.
9:22	1.0	18.9	7.69	1593	3.46	110.4	11.300	4	" "
9:23	1.5	18.8	7.66	1575	4.06	107.5	11.255	3	" "
9:25	2.0	18.8	7.63	1568	4.36	104.8	11.253	" "	moderate turbidity weaker brown milky, no odour/sheen/SS.
9:27	2.5	18.8	7.62	1570	4.85	103.9	" "	" "	" "
9:28	3.0	18.9	7.61	1571	4.82	103.5	" "	" "	" "
9:28	3.5	18.9	7.60	1570	4.81	103.3	" "	" "	" "
				Parameters stabilised began sampling at			9:30		

Field QA Checks:

Air bubbles in vials? Y / N — Any violent reactions? Y / N

Decontamination as per GHD procedure? Y / N *

Was sampling equipment pre-cleaned? Y / N

COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: MW03

Job Information	Sampling Information	Bore Information
Client: Fire and Rescue NSW	**Purge Method:** low flow	**SWL(mbTOC):** 12.190 m **Logic Check:** Y
Project: June 2017 GME	**Sample Method:** low flow	**Screen:** From: – to: – m **Stick Up:** – m
Proj. No.: 21 25583 15	**WQ Meter Type:** YSI Pro Plus	**NAPL Check:** – **Bore Diam.:** 49.50 mm
Sampler: Mariah Murphy	**Flow Cell** (Y) / N **Pump Depth:** 15.415 m	**Ref.datum:** – **Well Cap Secure?** Y
Date: ~~04/2017~~ 02/05/17	**WLevel Meter Type:** Dip / Fox / (Int.Fce) / Gge	**Bore Depth:** 17.073 m
Round: Jun-17	**Field Filtered? Y / N** (filter vessel, disposable filter, filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (mS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	CPM	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):	-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*			
							12.205		with pump
10:33	0.5	17.9	7.47	2853	2.09	104.9	12.290	3	moderate turbidity, brown-grey
									no sediments, no odour or sheen
10:33	1.0	18.5	7.46	2984	1.96	102.0	"	"	"
10:35	1.5	18.7	7.48	1865	2.81	99.9	"	"	"
10:36	2.0	18.7	7.50	2796	3.71	98.7	"	"	"
10:37	2.5	18.8	7.51	2671	3.57	98.8	"	"	"
10:39	3.0	18.9	7.51	2738	4.26	98.4	"	"	"
10:40	3.5	18.9	7.57	2691	6.44	97.7	"	"	"
10:43	4.0	18.9	7.61	2617	7.46	98.2	"	"	"
10:44	4.5	19.0	7.62	2593	7.54	98.5	"	"	"
10:45	5.0	19.0	7.64	2569	7.82	98.9	"	"	"
10:47	5.5	19.0	7.65	2561	8.02	99.4			
			Parameters		Stabilised		began		
			sampling		at		10:58		

Field QA Checks:

Air bubbles in vials? Y / (N) Any violent reactions? Y / (N)

Decontamination as per GHD procedure? Y / (N) *

Was sampling equipment pre-cleaned? (Y) / N

COC updated? (Y) / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: MW04

Job Information
- Client: Fire and Rescue NSW
- Project: June 2017 GME
- Proj. No.: 21 25583 15
- Sampler: Mariah Murphy
- Date: ~~10~~/06/2017
- Round: Jun-17

Sampling Information
- Purge Method: low flow
- Sample Method: low flow
- WQ Meter Type: YSI Professional
- Flow Cell: (Y) / N Pump Depth: 12.65 m
- WLevel Meter Type: Dip / Fox / Int.Fce / Gge
- Field Filtered? Y / (N) (filter vessel, disposable filter, filter/syringe)

Bore Information
- SWL(mbTOC): 12.023 m Logic Check: Y
- Screen: From: ..... to ..... m Stick Up: 0.70 m
- NAPL Check: — Bore Diam.: ~~8~~ 50 mm
- Ref.datum: — Well Cap Secure? Y
- Bore Depth: 13.665 m

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	(CPM)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):	-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*			
~~15:31~~	~~0~~						11.984	~~1 CPM~~ 0	with pump
								3	
15:31	0.5	18.6	6.86	4653	1.35	121.4	12.202	3	cloudy; moderate turbidity
15:36	1.5	17.8	7.00	4283	0.95	94.3	12.302	1	white - yellow, low SS
15:41	2.0	18.2	7.04	4343	1.10	72.1	12.375	2	clear, yellow-brown, no suspended
~~15:42~~	~~2.5~~	~~19.0~~	~~7.06~~	~~4231~~	~~0.64~~	~~52.7~~	~~12.440~~	~~1~~	~~sediments, no odour/sheen~~
15:42	2.5	19.0	7.06	4231	0.64	52.7	12.440	"	sediments, no odour/sheen
15:44	3.0	18.9	7.08	4125	0.52	26.7	12.585	"	"
15:46	3.5	19.0	7.09	4116	0.88	13.7	12.627	"	Clear, no odour/sheen (turbidity/SS
15:51	4.0	17.7	7.11	4948	0.65	3.7	12.679	1	"
15:55	4.5	17.6	7.12	4324	0.53	3.5	12.736	"	"
16:02	5.0	17.7	7.14	4495	0.52	2.8	12.806	"	"
16:04	5.5	17.9	7.14	4551	0.53	1.9	12.859	"	"
				Parameters	stabilised	began	sampling		
				at		14:05			

Field QA Checks:
- Air bubbles in vials? Y / (N) Any violent reactions? Y / (N)
- Decontamination as per GHD procedure? Y / (N) ~~N~~ A
- Was sampling equipment pre-cleaned? (Y) / N
- COC updated? (Y) / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: MW05

Job Information	Sampling Information	Bore Information
Client: Fire and Rescue NSW	**Purge Method:** low flow sampling	**SWL(mbTOC):** 12.222 m — **Logic Check:** y
Project: June 2017 GME	**Sample Method:** low flow sampling	**Screen:** From: — to: — m — **Stick Up:** 0.7 m
Proj. No.: 21 25583 15	**WQ Meter Type:** YSI Pro Plus	**NAPL Check:** — — **Bore Diam.:** 50 mm
Sampler: Mariah Murphy	**Flow Cell:** (Y) / N — **Pump Depth:** 12.325 m	**Ref.datum:** — — **Well Cap Secure?** y
Date: 01/06/2017	**WLevel Meter Type:** Dip / Fox / Int.Fce / Gge	**Bore Depth:** 13.40 m
Round: Jun-17	**Field Filtered?** Y / (N) (filter vessel, disposable filter, filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (mS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	FPM (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):	-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*			
							12.221		with pump. Tried to lower pump and decrease SWL felt pump touch bottom of well. Not enough water column.
									pump depth = 12.194
13:55							12.225		with pump.
14:27	0.5	18.1	6.83	2659	6.67	90.0	"	4	green brown high turbidity no odour,
14:29	1.0	19.3	6.93	2720	6.50	85.3	"	3	no sheen, low sediments
14:31	1.5	19.3	6.95	2707	6.45	84.4	"	"	"
14:33	2.0	19.2	6.99	2682	6.33	82.8	"	"	Moderate turbidity As above.
14:34	2.5	19.2	7.05	2636	6.42	81.5	"	"	Clear. yellow - orange colour.
14:36	3.0	19.3	7.09	2534	6.04	80.2	"	"	no sediments, no sheen or odour.
14:37	3.5	19.3	7.08	2581	5.78	80.3	"	"	"
14:38	4.0	19.3	7.10	2567	5.71	80.1	"	"	"

Field QA Checks:
Air bubbles in vials? Y / (N) Any violent reactions? Y / (N)
Decontamination as per GHD procedure? Y / (N) *
Was sampling equipment pre-cleaned? (Y) / N
COC updated? (Y) / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc
collected FD01

Purge Volumes
Casing Int. Dia (mm) 50 100 150
Vol (L/m of casing) 2.0 7.9 17.7
*Double for gravel pack

GHD | MANAGEMENT ENGINEERING ENVIRONMENT

Purging and Sampling Record

MW05

Time (..........)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (..........)	Dis.Oxygen (..........)	Ox-Red Pt. (± mV)	SWL (m)	(..........)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate purged dry?
Stable when (3 consecutive readings):		-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*		
				Parameters stabilised at 14:39					began sampling

Purging and Sampling Record

Bore ID: MW06

Job Information	Sampling Information	Bore Information
Client: Fire and Rescue NSW	**Purge Method:** ~~low~~ low flow	**SWL(mbTOC):** 12.274 m — **Logic Check:** Y
Project: June 2017 GME	**Sample Method:** low flow	**Screen:** From: — to: — m — **Stick Up:** 0.07 m
Proj. No.: 21 25583 15	**WQ Meter Type:** ~~Pro~~ YSI Professional Plus	**NAPL Check:** — **Bore Diam.:** 50.9 mm
Sampler: Mariah Murphy	**Flow Cell:** Y / N — **Pump Depth:** 12.463 m	**Ref.datum:** — **Well Cap Secure?** Y
Date: ~~04~~/06/2017	**WLevel Meter Type:** Dip / Fox / Int.Fce / Gge	**Bore Depth:** 13.467 m
Round: Jun-17	**Field Filtered? Y / N** (filter vessel, disposable filter, filter/syringe)	

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	CPM (.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):	-	*+/- 0.05 pH*	*+/- 3%*	*+/- 10%*	*+/- 10 mV*	*stable*			
~~16:57~~	~~0.5~~	~~16.3~~	~~6.97~~	~~8049~~	~~2.91~~	~~117.9~~	12.281	~~123~~	with pump
16:57	0.5	16.3	6.97	8049	2.91	117.9	12.301	~~12301~~ 13	brown, turbid, no odour/sheen
									low SS.
16:58	1.0	17.8	7.03	8258	2.95	110.1	12.310	" "	" "
~~16~~17:00	1.5	18.2	7.05	8292	2.55	106.5	12.305	" "	" "
17:02	2.0	18.3	7.05	8255	2.49	105.0	" "	" "	" "
17:03	2.5	18.4	7.06	8171	2.51	104.0	" "	" "	* Clear - brown moderate turbidity, no odour/sheen. " "
17:05	3.0	18.4	7.06	8104	2.48	103.2	" "	" "	" "
				Parameters stabilised					began
				sampling at				17:05	

Field QA Checks:

Air bubbles in vials? Y / N — Any violent reactions? Y / N

Decontamination as per GHD procedure? Y / N *SA QAP

Was sampling equipment pre-cleaned? Y / N

COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Collect RBO(* Decontamination as per SA QAP, based on PFAS analysis

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Client	FRNSW	Contractor		Groundwater Strike - m bgl		Logged By	AW
Project	Deniliquin						
Project No.		Level (m AHD)		Groundwater Level (after 20 mins) - mbgl		GHD Level 15, 133 Castlereagh Street, Sydney, NSW 2000	
Location		Co-ordinates	E				
Date Drilled	18/05/17		N				

Location No.: Sediment samples

Depth From (m bgl) / Surface water?	Depth To (mbgl)	Sample Depth From (m bgl)	Sample Depth To (m bgl)	Sample Type	PID (ppm)	Natural / Fill	Secondary Composition: gravelly / sandy / silty / clayey etc.	Primary Composition: BOUNDER/ COBBLE/ GRAVEL/ SAND/ SILT/ CLAY/ ORGANIC	Colour: black / white / grey / red / brown / orange / yellow / green / blue Include: pale, dark or mottled	Cohesive Soils (e.g. Clays) Plasticity: low plasticity, medium plasticity, high plasticity	Cohesive Soils (e.g. Clays) Consistency: Very Soft, Soft, Firm, Stiff, Very Stiff, Hard	Granular Soils (e.g. Gravels) Particle Size: Fine, Medium, Coarse	Granular Soils (e.g. Gravels) Particle Characteristics: Well Graded / Poorly Graded / Gap Graded / Uniform	Particle Shape: Rounded / Sub-rounded / Sub-angular / angular	Composition (e.g. Sandstone, Quartz, Organic etc.)	Consistency: Very loose, Loose, Medium Dense, Dense, Very Dense)	Moisture: Dry / Slightly Moist / Moist / Very Moist / Wet	Zoning: lens / layers / pockets / Cemented	Fill Materials e.g. glass, metal, ash, brick, asbestos, concrete etc. / comments	Odours: (Description & Strength) / PSH
LOCATION																				
dry	SS02	35° 33.178' S 144° 56.760' E					some gravels	clay	brown	low	soft-firm	f-m	poor/gap	ang			D		in drainage basin	SSQA01
dry	SS01	35° 33.185 S 144° 56.759 E						clay	brown	low	soft-firm						D		adjacent to fence, behind tree south of SS02	
dry	SS04	35° 33.150' S 144° 56.795' E					~~trace~~ sand + gravels	clay	brown	low	soft-firm				organic debris		D		in concrete drainage channel adjacent to MW04, on site boundary	
dry	SS05	35° 33.137' S 144° 56.839' E						clay	dark brown	med	soft				organic debris		VM		corner of drainage line (not concrete lined)	
dry	SS03	35° 33.155' S 144° 56.836' E						clay	dark brown	med	soft				organics		M		in concrete drainage channel, upgradient of join to dirt drainage lines parallel to Macknight drive.	
dry no SWD	SS06	35° 33.066' S 144° 56.859' E						clay	pale brown	low-med	very soft				organics		W		northern end of drainage line on lot 49, before culvert	
SWD3 SWD2	SS07	35° 33.035' S 144° 56.851' E					trace f gravels/ c sand	clay	pale brown	low-med	very soft						W to (saturated)		north west corner of dam	

Investigation Method	Solid Flight Auger	(mm)	Hollow Flight Auger	(mm)	Hand Auger	(mm)		Push Tube	(mm)	Test Pit	m by m	Other					
Investigation Abandonment	Backfill and Compact - Y / N		Monitoring Well - Y / N		Termination Depth (m)				Termination Reason:		Refusal / Proposed Depth / Instability / Water Ingress / Other:						
Well Construction Details	Well Diameter (mm)		Depth (m)		Screen From (m)		Screen To (m)		Casing From (m)		Casing To (m)		Well Cover:	Gatic / Monument / Other			
					Gravel / Sand From (m)		Gravel / Sand To (m)		Bentonite Seal From (m)		Bentonite Seal To (m)						
Additional Comments																	

pg 2

Client	FRNSW	Contractor		Groundwater Strike - m bgl		Logged By	AW
Project	Deniliquin						
Project No.		Level (m AHD)		Groundwater Level (after 20 mins) - mbgl		GHD	Level 15, 133 Castlereagh Street, Sydney, NSW 2000
Location		Co-ordinates	E				
Date Drilled	18/05/17		N				

Location No.: sediment samples

~~Depth From (m bgl)~~ surface water	Depth To (mbgl)	~~Sample Depth From (m bgl) / Sample Depth To (m bgl) / Sample Type / PID (ppm) / Natural / Fill~~ LOCATION	Secondary Composition: gravelly / sandy / silty / clayey etc.	Primary Composition: BOULDER/ COBBLE/ GRAVEL/ SAND/ SILT/ CLAY/ ORGANIC	Colour: black / white / grey / red / brown / orange / yellow / green / blue Include: pale, dark or mottled	Cohesive Soils (e.g. Clays): Plasticity: low plasticity, medium plasticity, high plasticity	Cohesive Soils (e.g. Clays): Consistency: Very Soft, Soft, Firm, Stiff, Very Stiff, Hard	Granular Soils (e.g. Gravels): Particle Size: Fine, Medium, Coarse	Granular Soils (e.g. Gravels): Particle Characteristics: Well Graded / Poorly Graded / Gap Graded / Uniform	Particle Shape: Rounded / Sub rounded / Sub-angular / angular	Composition (e.g. Sandstone, Quartz, Organic etc.)	Consistency: Very loose, Loose, Medium Dense, Dense, Very Dense)	Moisture: Dry / Slightly Moist / Moist / Very Moist / Wet	Zoning: lens / layers / pockets / Cemented	Fill Materials e.g. glass, metal, ash, brick, asbestos, concrete etc. comments	Odours: (Description & Strength) / PSH
GL dry [illegible]	SS08	35° 32.962'S 144°56.877'E		clay	brown	low/ med	soft-firm						D		In low point ~ 15m past end of channel on Deni Freighters property.	
SW04	SS15	35° 32.926'S 144° 56.833'E		clay	brown	med	soft						W		in wheelwash drainage/evap basin on Deni Freighters	
SW02	SS04	35° 33.158'S 144° 56.949'E	some & gravel	clay	greyish-brown	med	soft						W		in drainage channel near SES building, between 2 outlet pipes.	
Dry no SW05	SS09	35°33.181'S 144°57.051'E	organics	clay	dark brown	low	soft				organics		VM-W		in drainage line ~~east~~ east of SES and gravel driveway. organic decay odour	
SW06	SS10	35°33.171'S 144°57.158'E	organics	clay	brown	low	soft				organics		W		in drainage line half way after turn East of SS09 and neighbouring property	
Dry no SW07	SS11	35° 33.138'S 144°57.354 E		clay	pale brown	high	soft						M		half way along trench to cobb Hwy	
SSQA02 SW08	SS12	35° 33.144'S 144°57.429' E											W		At bend next to cobb Highway	

Investigation Method	Solid Flight Auger	(mm)	Hollow Flight Auger	(mm)	Hand Auger	(mm)	Push Tube	(mm)	Test Pit	m by m	Other
Investigation Abandonment	Backfill and Compact - Y / N	Monitoring Well - Y / N	Termination Depth (m)		Termination Reason:	Refusal / Proposed Depth / Instability / Water Ingress / Other:					
Well Construction Details	Well Diameter (mm)	Depth (m)	Screen From (m)	Screen To (m)	Casing From (m)	Casing To (m)	Well Cover: Gatic / Monument / Other				
			Gravel / Sand From (m)	Gravel / Sand To (m)	Bentonite Seal From (m)	Bentonite Seal To (m)					
Additional Comments											

Client		Contractor		Groundwater Strike - m bgl		Logged By	AW
Project							
Project No.		Level (m AHD)		Groundwater Level (after 20 mins) - mbgl		GHD Level 15, 133 Castlereagh Street, Sydney, NSW 2000	
Location		Co-ordinates	E				
Date Drilled	18/05/17		N				

Location No.: Sediment samples

Depth From (m bgl) / Depth To (mbgl) / ID (surface water?)	Sample Depth From (m bgl) / Sample Depth To (m bgl) / Sample Type / LOCATION	PID (ppm)	Natural / Fill	Secondary Composition: gravelly / sandy / silty / clayey etc.	Primary Composition: BOULDER/ COBBLE/ GRAVEL/ SAND/ SILT/ CLAY/ ORGANIC	Colour: black / white / grey / red / brown / orange / yellow / green / blue Include: pale, dark or mottled	Cohesive Soils (e.g. Clays): Plasticity: low plasticity, medium plasticity, high plasticity	Cohesive Soils (e.g. Clays): Consistency: Very Soft, Soft, Firm, Stiff, Very Stiff, Hard	Granular Soils (e.g. Gravels): Particle Size: Fine, Medium, Coarse	Granular Soils (e.g. Gravels): Particle Characteristics: Well Graded / Poorly Graded / Gap Graded / Uniform	Particle Shape: Rounded / Sub-rounded / Sub-angular / angular	Composition (e.g. Sandstone, Quartz, Organic etc.)	Consistency: Very loose, Loose, Medium Dense, Dense, Very Dense)	Moisture: Dry / Slightly Moist / Moist / Very Moist / Wet	Zoning: lens / layers / pockets / Cemented	Fill Materials e.g. glass, metal, ash, brick, asbestos, concrete etc. / COMMENTS	Odours: (Description & Strength) / PSH
GL Dry no sweep SS13	35° 33.043' S 144° 57.451' E			clay gravel	SAND	orange brown			f fine gravels	well	ang			D		possible fill ~~site~~ south of culvert on cobb Hwy	
SW10 SS16	35° 32.955' S 144° 57.462' E				Clay	dark brown	low	soft				organics		W		in drainage line north of sales yard road	
PFAS only dry SS17	35° 33.038' S 144° 57.480 E				clay	dark brown	high	soft-firm						D-SM		eastern side of culvert under cobb highway.	
dry SS18	35° 32.992' S 144° 57.458 E				clay	dark brown	low-med	soft				organics		M		southern side of salesyard lane intersection	

Investigation Method	Solid Flight Auger	(mm)	Hollow Flight Auger	(mm)	Hand Auger	(mm)		Push Tube	(mm)	Test Pit	m by m	Other			
Investigation Abandonment	Backfill and Compact - Y / N		Monitoring Well - Y / N	Termination Depth (m)					Termination Reason:		Refusal / Proposed Depth / Instability / Water Ingress / Other:				
Well Construction Details	Well Diameter (mm)		Depth (m)	Screen From (m)		Screen To (m)		Casing From (m)		Casing To (m)			Well Cover:	Gatic / Monument / Other	
				Gravel / Sand From (m)		Gravel / Sand To (m)		Bentonite Seal From (m)		Bentonite Seal To (m)					
Additional Comments															

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 10E101053

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. D.O		0 ppm		1608226559	0 ppm
2. Conductivity		2760uS		295604	2760uS
3. pH7		pH 7.00		290453	pH 7.00
4. pH4		pH 4.00		288384	pH 4.00
5. ORP mV		234.44		NI 1033/1034	234.44
7. Temp °C		19.8		Hanna- 163377	19.8

Calibrated by: Shenalie Fernando

Calibration date: 26-May-17

Next calibration due: 22-Nov-17

Oil / Water Interface Meter

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument Interface Meter (30M)
Serial No. 288223

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
	above 7.9V	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Tested by: Hayden Riley

Test date: 17/05/2017

Next Test due: 13/11/2017

Oil / Water Interface Meter

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Instrument Geotech Interface Meter (30M)
Serial No. 3908

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: Meixi Huo

Calibration date: 10/05/2017

Next calibration due: 9/07/2017

PID Calibration Certificate

Instrument PhoCheck Tiger
Serial No. T-105429

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm		
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:	Flowrate					

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		98ppm Isobutylene	NATA	SY137		97.9ppm

Calibrated by: Joanna Wong

Calibration date: 10/05/2017

Next calibration due: 9/06/2017

Appendix D – Borehole Logs

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW04

Client Fire and Rescue NSW
Project Deniliquin FRNSW - Phase 2
Project No. 212558315
Site Deniliquin Airport
Location Deniliquin Airport, NSW 2710
Date Drilled 16/05/2017 - 16/05/2017

Drill Co. Terratest
Driller Pat and Kevin
Rig Type Geoprobe (truck mounted)
Drill Method Push tube and solid flight auger
Total Depth (m) 13.5
Diameter (mm) 150

Easting, Northing 144.56796, -35.33147
Grid Ref GDA94_MGA_zone_55
Elevation
Collar RL -
Logged By AW
Checked By

B.C.L No. N/A **Casing** PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Monument

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	0.9	MW04_0.0_0.05_376				CLAY, medium plasticity, brown (NATURAL - SOIL)	D	S	no odour, no staining staining	0
0.5		0.1	MW04_0.5_0.55_377								-0.5
1		0.1	MW04_0.95_1_378				Sandy CLAY, low plasticity, pale yellow-brown, subangular, fine to coarse, well graded sand (NATURAL - SOIL)	SM	ST	no odour, no staining staining	-1
1.5	PT	0.1	MW04_1.5_1.55_379				CLAY, low plasticity, grey mottled yellow-brown, trace sand (NATURAL - SOIL)	SM	F	no odour, no staining staining	-1.5
2											-2
2.5		0.1	MW04_2.5_2.55_380				CLAY, medium plasticity, grey (NATURAL - SOIL)	SM		no odour, no staining staining	-2.5
3											-3
3.5											-3.5
4		0.2	MW04_4.0_4.05_381		Grout						-4
4.5											-4.5
5		0.2	MW04_5.15_5.2_382				Sandy CLAY, low plasticity, grey mottled red- brown, subangular, fine, poorly graded sand (NATURAL - SOIL)	D	S	no odour, no staining staining	-5
5.5											-5.5
6							CLAY, low plasticity, grey (NATURAL - SOIL)	SM	ST	no odour, no staining staining	-6
6.5		0.2	MW04_6.5_6.55_383								-6.5
7											-7
7.5											-7.5
8		0	MW04_7.9_7.95_384				Sandy CLAY, low plasticity, grey mottled red- brown, subangular, fine, poorly graded sand (NATURAL - SOIL)	SM		no odour, no staining staining	-8
8.5							Clayey SAND, fine to coarse, well graded, angular, orange and pale yellow-grey (NATURAL - SOIL)	D		no odour, no staining staining	-8.5
9		0	MW04_9.0_9.05_385 (QA01)		Bentonite						-9
9.5					Sand		SAND, fine to coarse, well graded, angular, pale grey, some fine gravel, trace clay (NATURAL - SOIL)	SM		no odour, no staining staining	-9.5
10		0.2	MW04_10.0_10.05_386								-10

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW04

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
10.5											-10.5
11											-11
11.5		0.1	MW04_11.3_11.35_387		Sand		SAND, fine to medium, well graded, subangular, orange, trace clay, trace fine gravel (NATURAL - SOIL)	W		no odour, no staining staining	-11.5
12	SFA						SAND, fine to coarse, well graded, subangular, pale brown, some clay, some fine gravel (NATURAL - SOIL)	W		no odour, no staining staining	-12
12.5											-12.5
13		0	MW04_12.95_13		Wall collapse						-13
13.5							Termination Depth at: 13.50 m. Target depth achieved.				-13.5
14											-14
14.5											-14.5
15											-15
15.5											-15.5
16											-16
16.5											-16.5
17											-17
17.5											-17.5
18											-18
18.5											-18.5
19											-19
19.5											-19.5
20											-20
20.5											-20.5
21											-21
21.5											-21.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW05

Client Fire and Rescue NSW
Project Deniliquin FRNSW - Phase 2
Project No. 212558315
Site Deniliquin Airport
Location Deniliquin Airport, NSW 2710
Date Drilled 17/05/2017 - 17/05/2017

Drill Co. Terratest
Driller Pat and Kevin
Rig Type Geoprobe (truck mounted)
Drill Method Push tube and solid flight auger
Total Depth (m) 15
Diameter (mm) 150

Easting, Northing ,
Grid Ref GDA94_MGA_zone_55
Elevation
Collar RL -
Logged By AW
Checked By

B.C.L No. N/A **Casing** PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Monument

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	0.1	MW05_0.0_0.05				CLAY, low plasticity, brown (NATURAL - SOIL)	D	F	no odour, no staining staining	0
0.5		0.1	MW05_0.5_1.05_402								-0.5
1		0.1	MW05_1.0_1.05_403				CLAY, low plasticity, brown with mottled grey- orange, trace fine to medium gravel (NATURAL - SOIL)	D	S	no odour, no staining staining	-1
1.5	PT						CLAY, low plasticity, grey mottled orange-brown, trace sand, trace fine gravel (NATURAL - SOIL)	D	F	no odour, no staining staining	-1.5
2											-2
2.5		0.2	MW05_2.5_2.55_404								-2.5
3											-3
3.5							CLAY, low plasticity, grey (NATURAL - SOIL)	D	VST	no odour, no staining staining	-3.5
4		0.2	MW05_4.0_4.05_405		Grout						-4
4.5							CLAY, low plasticity, grey mottled orange-brown, trace sand, trace fine gravel (NATURAL - SOIL)	D	F	no odour, no staining staining	-4.5
5							Sandy CLAY, low plasticity, grey mottled orange, angular, fine, poorly graded sand (NATURAL - SOIL)	D	F	no odour, no staining staining	-5
5.5		0.1	MW05_5.4_5.45_406								-5.5
6							CLAY, low plasticity, pale grey (NATURAL - SOIL)	D	VST	no odour, no staining staining	-6
6.5											-6.5
7											-7
7.5		0.1	MW05_7.6_7.65_407								-7.5
8							SAND, fine to coarse, well graded, subangular, pale grey with yellow- orange (NATURAL - SOIL)	D		no odour, no staining staining	-8
8.5					Bentonite		CLAY, low plasticity, pale grey (NATURAL - SOIL)	D	H	no odour, no staining staining	-8.5
9							SAND, fine to medium, well graded, subangular, orange (NATURAL - SOIL)	D		no odour, no staining staining	-9
9.5		0.1	MW05_9.6_9.65_408		Sand						-9.5

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW05

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
10.5							SAND, fine to coarse, well graded, subangular, pale grey (NATURAL - SOIL)	D		no odour, no staining staining	-10.5
11		0.1	MW05_11.0_11.1_409 (QA04)	▽			SAND, fine to coarse, well graded, subangular, pale yellow (NATURAL - SOIL)	D		no odour, no staining staining	-11
11.5					Sand		SAND, medium to coarse, poorly graded, subangular, grey- brown, some fine gravel (NATURAL - SOIL)	W		no odour, no staining staining	-11.5
12	SFA										-12
12.5											-12.5
13											-13
13.5											-13.5
14					Wall collapse						-14
14.5											-14.5
15							Termination Depth at: 15.00 m. Target depth achieved.				-15
15.5											-15.5
16											-16
16.5											-16.5
17											-17
17.5											-17.5
18											-18
18.5											-18.5
19											-19
19.5											-19.5
20											-20
20.5											-20.5
21											-21
21.5											-21.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW06

Client Fire and Rescue NSW
Project Deniliquin FRNSW - Phase 2
Project No. 212558315
Site Deniliquin Airport
Location Deniliquin Airport, NSW 2710
Date Drilled 17/05/2017 - 17/05/2017

Drill Co. Terratest
Driller Pat and Kevin
Rig Type Geoprobe (truck mounted)
Drill Method Push tube and solid flight auger
Total Depth (m) 15
Diameter (mm) 150

Easting, Northing ,
Grid Ref GDA94_MGA_zone_55
Elevation
Collar RL -
Logged By AW
Checked By

B.C.L No. N/A **Casing** PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Monument

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	0.1	MW06_0.0_0.05_389 (QA03)				TOPSOIL			staining staining	0
0.5		0	MW06_0.5_0.55_390				CLAY, medium plasticity, brown (NATURAL - SOIL)	D	F	no odour, no staining staining	-0.5
1		0	MW06_1.0_1.05_391				CLAY, low to medium plasticity, pale brown- yellow, trace sand (NATURAL - SOIL)	D		no odour, no staining staining	-1
1.5	PT						CLAY, low plasticity, brown- yellow mottled grey (NATURAL - SOIL)	SM	ST	no odour, no staining staining	-1.5
2											-2
2.5		0	MW06_2.5_2.55_392								-2.5
3							CLAY, medium plasticity, grey (NATURAL - SOIL)	SM	VST	no odour, no staining staining	-3
3.5		0.1	MW06_3.3_3.35_393								-3.5
4					Grout						-4
4.5							Gravelly CLAY, low plasticity, white and pale grey, angular, fine to medium, poorly graded gravel (NATURAL - SOIL)	SM	F	no odour, no staining staining	-4.5
5		0	MW06_5.0_5.05_394				Sandy CLAY, low plasticity, grey mottled brown- red, subangular, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	S	no odour, no staining staining	-5
5.5											-5.5
6											-6
6.5											-6.5
7											-7
7.5		0	MW06_7.5_7.55_395				Sandy CLAY, low plasticity, grey mottled brown, subangular, fine to medium, poorly graded sand (NATURAL - SOIL)	D	S	no odour, no staining staining	-7.5
8		0	MW06_8.1_8.15_396				SAND, fine, poorly graded, angular, pale grey, some clay (NATURAL - SOIL)	D	L	no odour, no staining staining	-8
8.5					Bentonite						-8.5

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW06

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
9.5		0	MW06_9.8_9.85_397		Bentonite		SAND, fine to medium, poorly graded, angular, grey and orange (NATURAL - SOIL)	D		no odour, no staining staining	-9.5
10							CLAY, low plasticity, pale grey (NATURAL - SOIL)	SM		no odour, no staining staining	-10
10.5											-10.5
11				▽			Clayey SAND, fine to coarse, well graded, angular, pale grey (NATURAL - SOIL)	SM		no odour, no staining staining	-11
11.5		0	MW06_11.45_11.5_398		Sand		CLAY, medium to high plasticity, orange and grey (NATURAL - SOIL)	W	S	no odour, no staining staining	-11.5
12											-12
12.5		0	MW06_12.8_12.85								-12.5
13	SFA	0	MW06_12.95_13				SAND, fine to coarse, well graded, subangular, pale grey- orange, some fine gravel (NATURAL - SOIL)	W		no odour, no staining staining	-13
13.5											-13.5
14					Wall collapse						-14
14.5											-14.5
15							Termination Depth at: 15.00 m. Target depth achieved.				-15
15.5											-15.5
16											-16
16.5											-16.5
17											-17
17.5											-17.5
18											-18
18.5											-18.5
19											-19
19.5											-19.5

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB06

Client Fire and Rescue NSW
Project Deniliquin FRNSW - Phase 2
Project No. 212558315
Site Deniliquin Airport
Location Deniliquin Airport, NSW 2710
Date Drilled 16/05/2017 - 16/05/2017

Drill Co. Terratest
Driller Pat and Kevin
Rig Type Geoprobe (truck mounted)
Drill Method Push tube
Total Depth (m) 5
Diameter (mm) 100

Easting 144.56
Northing -35.33
Grid Ref GDA94_MGA_zone_55
Elevation
Logged By AW
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	0.1	SB06_0.0_0.05_410			CLAY, low plasticity, brown (possible FILL)	D	F	no odour, no staining staining	0
0.5		0.1	SB06_0.5_0.55							-0.5
1		0.1	SB06_1.0_1.05_412							-1
1.5	PT									-1.5
2		0.1	SB06_2.2_2.25_413			CLAY, low plasticity, grey mottled orange- brown, trace fine to medium gravel (NATURAL - SOIL)	D	VST	no odour, no staining staining	-2
2.5										-2.5
3										-3
3.5		0.1	SB06_3.5_3.55_414							-3.5
4										-4
4.5										-4.5
5		0	SB06_4.95_5			Termination Depth at: 5.00 m. Target depth achieved.				-5
5.5										-5.5
6										-6
6.5										-6.5
7										-7
7.5										-7.5
8										-8
8.5										-8.5
9										-9
9.5										-9.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE SB07

Client Fire and Rescue NSW
Project Deniliquin FRNSW - Phase 2
Project No. 212558315
Site Deniliquin Airport
Location Deniliquin Airport, NSW 2710
Date Drilled 16/05/2017 - 16/05/2017

Drill Co. Terratest
Driller Pat and Kevin
Rig Type Geoprobe (truck mounted)
Drill Method Push tube
Total Depth (m) 5
Diameter (mm) 100

Easting 144.56759
Northing -35.33139
Grid Ref GDA94_MGA_zone_55
Elevation
Logged By AW
Checked By

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	0	SB07_0.0_0.05_416 (QA02)			CLAY, medium plasticity, brown (possible FILL)	D	F	no odour, no staining staining	0
0.5		0	SB07_0.5_0.55_417							-0.5
1		0.1	SB07_1.0_1.05_418							-1
1.5	PT									-1.5
2		0.1	SB07_2.1_2.15_419			CLAY, low plasticity, grey mottled orange- brown, trace fine to medium gravel (NATURAL - SOIL)	D	VST	no odour, no staining staining	-2
2.5										-2.5
3										-3
3.5		0.1	SB07_3.8_3.85_420							-3.5
4										-4
4.5										-4.5
5		0.1	SB07_4.95_5							-5
5						Termination Depth at: 5.00 m. Target depth achieved.				-5
5.5										-5.5
6										-6
6.5										-6.5
7										-7
7.5										-7.5
8										-8
8.5										-8.5
9										-9
9.5										-9.5

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

Appendix E – NATA accredited laboratory reports and chain of custody documentation

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1707154**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ALICE WALKER	Contact	: Shirley LeCornu
Address	: LEVEL 8, 180 LONSDALE ST MELBOURNE VIC, AUSTRALIA 3001	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 02 9239 7100	Telephone	: +61-3-8549 9630
Project	: 212558313	Date Samples Received	: 02-Jun-2017 17:41
Order number	: ----	Date Analysis Commenced	: 05-Jun-2017
C-O-C number	: ----	Issue Date	: 13-Jun-2017 15:29
Sampler	: MM		
Site	: ----		
Quote number	: SY/143/17		
No. of samples received	: 11		
No. of samples analysed	: 9		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 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.

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

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

Analytical Results

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

Compound	CAS Number	LOR	Unit	Client sample ID	MW05	MW06	MW04	MW02	MW03
				Client sampling date / time	01-Jun-2017 00:00	01-Jun-2017 00:00	01-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00
					EM1707154-001	EM1707154-002	EM1707154-003	EM1707154-004	EM1707154-005
					Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**1800**	**5320**	**2870**	**1070**	**1540**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	**0.25**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	**0.23**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	**0.18**	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	**0.05**	<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	**0.35**	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	**0.41**	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	**0.08**	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	**0.03**	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW05	MW06	MW04	MW02	MW03
				Client sampling date / time	01-Jun-2017 00:00	01-Jun-2017 00:00	01-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00
Compound	CAS Number	LOR	Unit		EM1707154-001	EM1707154-002	EM1707154-003	EM1707154-004	EM1707154-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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	**1.58**	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	**0.23**	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	**1.35**	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**99.8**	**98.3**	**104**	**103**	**102**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW01	RB01	TB01	FD01	----
				Client sampling date / time	02-Jun-2017 00:00	[02-Jun-2017]	[02-Jun-2017]	[01-Jun-2017]	----
Compound	CAS Number	LOR	Unit		EM1707154-006	EM1707154-007	EM1707154-008	EM1707154-010	--------
					Result	Result	Result	Result	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**982**	<10	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.07**	<0.02	<0.02	<0.02	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.07**	<0.02	<0.02	<0.02	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.40**	<0.02	<0.02	<0.02	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.08**	<0.02	<0.02	<0.02	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**10.7**	<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		**0.08**	<0.02	<0.02	<0.02	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.20**	<0.02	<0.02	<0.02	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.04**	<0.02	<0.02	<0.02	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.12**	<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	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW01	RB01	TB01	FD01	----
				Client sampling date / time	02-Jun-2017 00:00	[02-Jun-2017]	[02-Jun-2017]	[01-Jun-2017]	----
Compound	CAS Number	LOR	Unit		EM1707154-006	EM1707154-007	EM1707154-008	EM1707154-010	--------
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**0.32**	<0.05	<0.05	<0.05	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		**0.10**	<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		**12.2**	<0.01	<0.01	<0.01	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**11.1**	<0.01	<0.01	<0.01	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**12.0**	<0.01	<0.01	<0.01	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**102**	**102**	**104**	**103**	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM1707154**	Page	: 1 of 7
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ALICE WALKER	Contact	: Shirley LeCornu
Address	: LEVEL 8, 180 LONSDALE ST MELBOURNE VIC, AUSTRALIA 3001	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 02 9239 7100	Telephone	: +61-3-8549 9630
Project	: 212558313	Date Samples Received	: 02-Jun-2017
Order number	: ----	Date Analysis Commenced	: 05-Jun-2017
C-O-C number	: ----	Issue Date	: 13-Jun-2017
Sampler	: MM		
Site	: ----		
Quote number	: SY/143/17		
No. of samples received	: 11		
No. of samples analysed	: 9		

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

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

This Quality Control Report contains the following information:

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

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 925850)									
EM1707142-020	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	<10	0.00	No Limit
EM1707154-007	RB01	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	<10	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 930269)									
EM1707154-001	MW05	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EM1707178-002	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.04	0.05	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.04	0.04	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.08	0.08	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 930269)									
EM1707154-001	MW05	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 930269) - continued									
EM1707154-001	MW05	EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EM1707178-002	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	0.03	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.03	0.03	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.02	0.03	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 930269)									
EM1707154-001	MW05	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EM1707178-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 930269)									
EM1707154-001	MW05	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EM1707178-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 930269)									
EM1707154-001	MW05	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
EM1707178-002	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.24	0.26	8.00	0% - 20%

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

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

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 925850)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	101	96	106
				<10	293 mg/L	101	96	106
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 930269)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	90.4	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	97.4	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	90.4	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	98.0	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	97.4	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	99.4	70	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 930269)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	86.4	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	91.6	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	91.6	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	90.8	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	106	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	98.8	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	101	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	99.8	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	103	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	104	70	124
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 930269)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	89.8	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	97.8	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	104	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	97.9	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	117	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	92.6	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	99.4	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 930269)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 930269) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	97.4	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	111	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	97.8	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	97.0	70	130

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 930269)							
EM1707154-001	MW05	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	101	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	120	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	95.8	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	125	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	111	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	103	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 930269)							
EM1707154-001	MW05	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	117	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	113	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	95.4	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	111	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	129	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	103	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	104	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	103	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	108	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	125	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	119	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 930269)							
EM1707154-001	MW05	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	124	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	114	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	118	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	122	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 930269) - continued							
EM1707154-001	MW05	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	124	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	81.8	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	93.0	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 930269)							
EM1707154-001	MW05	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	126	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	108	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	107	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	112	50	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM1707154**	Page	: 1 of 5
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: ALICE WALKER	Telephone	: +61-3-8549 9630
Project	: 212558313	Date Samples Received	: 02-Jun-2017
Site	: ----	Issue Date	: 13-Jun-2017
Sampler	: MM	No. of samples received	: 11
Order number	: ----	No. of samples analysed	: 9

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) MW05, MW06, MW04	**01-Jun-2017**	**----**	----	----	**05-Jun-2017**	08-Jun-2017	✓
Clear Plastic Bottle - Natural (EA015H) MW02, MW03, MW01, RB01	**02-Jun-2017**	**----**	----	----	**05-Jun-2017**	09-Jun-2017	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) MW05, MW06, MW04, FD01	**01-Jun-2017**	**----**	----	----	**08-Jun-2017**	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW02, MW03, MW01, RB01, TB01	**02-Jun-2017**	**----**	----	----	**08-Jun-2017**	29-Nov-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) MW05, MW06, MW04, FD01	**01-Jun-2017**	**----**	----	----	**08-Jun-2017**	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW02, MW03, MW01, RB01, TB01	**02-Jun-2017**	**----**	----	----	**08-Jun-2017**	29-Nov-2017	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) MW05, MW06, MW04, FD01	**01-Jun-2017**	**----**	----	----	**08-Jun-2017**	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW02, MW03, MW01, RB01, TB01	**02-Jun-2017**	**----**	----	----	**08-Jun-2017**	29-Nov-2017	✓

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) MW05, MW06, MW04, FD01	**01-Jun-2017**	**----**	----	----	**08-Jun-2017**	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW02, MW03, MW01, RB01, TB01	**02-Jun-2017**	**----**	----	----	**08-Jun-2017**	29-Nov-2017	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) MW05, MW06, MW04, FD01	**01-Jun-2017**	**----**	----	----	**08-Jun-2017**	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW02, MW03, MW01, RB01, TB01	**02-Jun-2017**	**----**	----	----	**08-Jun-2017**	29-Nov-2017	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	10	**20.00**	**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
Total Dissolved Solids (High Level)	EA015H	2	10	**20.00**	**10.00**	✓	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
Total Dissolved Solids (High Level)	EA015H	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

CHAIN OF CUSTODY RECORD

GHD

Melbourne Office Address
180 Lonsdale Street, Melbourne 3000
Telephone: 613 8687 8000 Fax: 613 8687 8111

Completion Date / Turnaround: Standard 5 TAT

Quote # / GHD Reference: SY-143-17 V2 GHD

Job Number: 21255831 S	GHD Contact: MARIAH MURPHY
Project: June 2017 GME	
GHD Project Manager: Alice Walker	GHD Contact: MARIAH MURPHY
GHD PM email: Alice.Walker@ghd.com	GHD Contact email: mariah.murphy@ghd.com

Laboratory: ALS Laboratory Springvale

Address:

Laboratory Contact: Shirley LeCornu

COURIER AND LABORATORY INSTRUCTIONS:
Sign **white copy** on receipt and release of samples.
Samples are to be delivered to the Laboratory Address.
On receipt of samples, **the laboratory contact** to sign white copy and fax/email to GHD Contact.
On completion of analyses please **return white** copy with results.
Pink copy is returned to the sampler once the courier has signed for the samples.
E-mail results to the **GHD Project Manager** and **GHD Contact** with the GHD Job Number in the e-mail subject line.

Note email format: firstname.lastname@ghd.com

Results to be provided in ESDAT compatible format

Sample I.D.	ALS	Date	Time	Composite Sample	Sample Matrix: S-Soil, SL-Sludge, W-Water, A-Air, GW-Groundwater	Container: Type: J-Soil Jar, B-bag, V-vial, G-glass bottle, P-plastic bottle	Container: Number	Container: Volume (mL)	Analyses Required: PFAS Suite	TDS	HOLD	SAMPLE COMMENTS
MW05	1	1/6/17	PM		GW	P	2		X	X		FD01 collected from a primary sample assume most conservative holding time
MW06	2	1/6/17	PM		GW	P	2		X	X		
MW04	3	1/6/17	PM		GW	P	2		X	X		
MW02	4	2/6/17	AM		GW	P	2		X	X		
MW03	5	2/6/17	AM		GW	P	2		X	X		
MW01	6	2/6/17	PM		GW	P	2		X	X		
RB01	7	—			QA	P	2		X	X		
TB01	8	—			QA	P	1		X			
TB02	9	—			QA						X	
FD01	10	—			QA				X			
FS01	11	—			QA						X	

Environmental Division
Melbourne
Work Order Reference
EM1707154

Telephone : +61-3-8549 9600

TOTAL NUMBER OF SAMPLES:

TOTAL NUMBER OF ESKIES:

SAMPLES/ESKY CHILLED? Y / N

GENERAL COMMENTS:

CUSTODY DETAILS:

	Name	Date/Time Received	Date/Time Relinquished
SAMPLER	MARIAH MURPHY	2/6/17	2/6/17 17:30
~~GHD SERVICE CENTRE~~			
~~COURIER~~		Jansia of ALS on 2/6@17:14	
LABORATORY			

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1712409**	Page	: 1 of 47
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: FRNSW DENILIQUIN	Date Samples Received	: 22-May-2017 13:45
Order number	: 21 25583 15	Date Analysis Commenced	: 23-May-2017
C-O-C number	: ----	Issue Date	: 31-May-2017 13:52
Sampler	: ALICE WALKER		
Site	: ----		
Quote number	: SY/143/17		
No. of samples received	: 87		
No. of samples analysed	: 51		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Andrew Epps	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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 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.

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

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

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	MW04_0.0-0.05	MW04_11.3-11.35	SB07_0.0-0.05	SB07_2.1-2.15	SB07_4.95-5.0
				Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-001	ES1712409-012	ES1712409-017	ES1712409-020	ES1712409-022
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	**0.03**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	**0.03**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.12**	<0.02	**0.19**	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	**0.04**	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**1.91**	<0.01	**7.73**	**0.11**	**0.01**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	**0.14**	<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		**0.04**	<0.02	**0.05**	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.05**	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.04**	<0.01	**0.05**	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		**0.03**	<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: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	MW04_0.0-0.05	MW04_11.3-11.35	SB07_0.0-0.05	SB07_2.1-2.15	SB07_4.95-5.0
				Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-001	ES1712409-012	ES1712409-017	ES1712409-020	ES1712409-022
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**2.19**	<0.01	**8.26**	**0.11**	**0.01**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**2.03**	<0.01	**7.92**	**0.11**	**0.01**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**2.16**	<0.01	**8.05**	**0.11**	**0.01**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**85.3**	**93.9**	**96.0**	**99.6**	**94.8**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	QA02	SB06_0.0-0.05	SB06_1.0-1.05	SB06_4.95-5.0	MW06_0.0-0.05
				Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-023	ES1712409-024	ES1712409-026	ES1712409-029	ES1712409-030
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.02**	<0.02	**0.11**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.02**	**0.03**	**0.11**	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.15**	**0.61**	**0.36**	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.03**	**0.29**	**0.04**	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**6.14**	**10.6**	**1.18**	**0.05**	**0.05**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		**0.07**	<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	**0.11**	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.04**	**0.04**	**0.30**	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	**0.02**	**0.12**	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.04**	**0.22**	**0.10**	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	**0.03**	<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: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	QA02	SB06_0.0-0.05	SB06_1.0-1.05	SB06_4.95-5.0	MW06_0.0-0.05
				Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-023	ES1712409-024	ES1712409-026	ES1712409-029	ES1712409-030
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**6.51**	**11.9**	**2.43**	**0.05**	**0.05**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**6.29**	**11.2**	**1.54**	**0.05**	**0.05**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**6.39**	**11.5**	**2.28**	**0.05**	**0.05**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**101**	**97.1**	**91.7**	**94.7**	**97.2**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	MW06_12.8-12.85	QA03	MW05_0.0-0.15	MW05_11.0-11.1	QA04
				Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-040	ES1712409-042	ES1712409-047	ES1712409-055	ES1712409-056
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	**0.04**	**0.33**	<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: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	MW06_12.8-12.85	QA03	MW05_0.0-0.15	MW05_11.0-11.1	QA04
				Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-040	ES1712409-042	ES1712409-047	ES1712409-055	ES1712409-056
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	**0.04**	**0.33**	<0.01	**0.01**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	**0.04**	**0.33**	<0.01	**0.01**
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	**0.04**	**0.33**	<0.01	**0.01**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**93.0**	**94.9**	**93.8**	**98.3**	**91.6**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS02	SSQA01	SS01	SS14	SS05
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-057	ES1712409-058	ES1712409-059	ES1712409-060	ES1712409-061
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.33**	**0.24**	**0.22**	**0.04**	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.10**	**0.10**	**0.03**	**0.04**	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.89**	**0.72**	**0.10**	**0.31**	**0.08**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		**0.13**	**0.12**	<0.02	**0.05**	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**40.1**	**29.4**	**1.20**	**1.68**	**0.73**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		**0.32**	**0.36**	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		**1.0**	**0.8**	**1.5**	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		**3.20**	**1.82**	**0.43**	**0.07**	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**1.57**	**1.05**	**0.09**	**0.08**	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.15**	**0.14**	<0.02	<0.02	**0.04**
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.31**	**0.25**	<0.01	**0.04**	**0.11**
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		**0.06**	**0.04**	<0.02	<0.02	**0.02**
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		**0.16**	**0.15**	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		**0.04**	**0.03**	<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		**0.15**	**0.15**	<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: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS02	SSQA01	SS01	SS14	SS05
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-057	ES1712409-058	ES1712409-059	ES1712409-060	ES1712409-061
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**2.16**	**1.77**	**0.08**	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		**2.88**	**2.53**	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		**0.14**	**0.22**	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**53.7**	**39.9**	**3.65**	**2.31**	**0.98**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**41.0**	**30.1**	**1.30**	**1.99**	**0.81**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**52.6**	**38.7**	**3.62**	**2.22**	**0.96**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**96.8**	**98.7**	**96.7**	**93.5**	**98.1**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS03	SS06	SS07	SS08	SS15
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-062	ES1712409-063	ES1712409-064	ES1712409-065	ES1712409-066
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.12**	**0.03**	**0.02**	**0.30**	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	**0.10**	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**1.26**	**1.48**	**0.67**	**5.58**	**0.40**
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		**0.04**	**0.03**	<0.02	**0.05**	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		**0.02**	<0.02	<0.02	**0.05**	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		**0.08**	**0.01**	<0.01	**0.08**	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	**0.10**	<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: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS03	SS06	SS07	SS08	SS15
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-062	ES1712409-063	ES1712409-064	ES1712409-065	ES1712409-066
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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	**0.06**	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		**1.52**	**1.55**	**0.69**	**6.32**	**0.40**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**1.38**	**1.51**	**0.69**	**5.88**	**0.40**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**1.52**	**1.55**	**0.69**	**6.12**	**0.40**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**116**	**107**	**103**	**108**	**104**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS04	SS09	SS10	SS11	SS12
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-067	ES1712409-068	ES1712409-069	ES1712409-070	ES1712409-071
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	**0.04**	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.26**	**0.42**	**0.10**	**0.12**	**0.09**
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: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS04	SS09	SS10	SS11	SS12
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-067	ES1712409-068	ES1712409-069	ES1712409-070	ES1712409-071
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**0.26**	**0.47**	**0.10**	**0.12**	**0.09**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.26**	**0.46**	**0.10**	**0.12**	**0.09**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.26**	**0.47**	**0.10**	**0.12**	**0.09**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**96.8**	**105**	**106**	**104**	**109**

Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SSQA02	SS13	SS16	SS17	SS18
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-072	ES1712409-073	ES1712409-074	ES1712409-075	ES1712409-076
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		**0.08**	<0.01	**0.02**	<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: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SSQA02	SS13	SS16	SS17	SS18
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-072	ES1712409-073	ES1712409-074	ES1712409-075	ES1712409-076
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**0.08**	<0.01	**0.02**	<0.01	**0.02**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.08**	<0.01	**0.02**	<0.01	**0.02**
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.08**	<0.01	**0.02**	<0.01	**0.02**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**108**	**110**	**110**	**110**	**115**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	MW04_0.0-0.05	MW04_11.3-11.35	WC01	SB07_0.0-0.05	SB07_2.1-2.15
			Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit	ES1712409-001	ES1712409-012	ES1712409-015	ES1712409-017	ES1712409-020
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	17.5	18.5	8.8	15.4	6.0
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	6	----	----
Cadmium	7440-43-9	1	mg/kg	----	----	<1	----	----
Chromium	7440-47-3	2	mg/kg	----	----	12	----	----
Copper	7440-50-8	5	mg/kg	----	----	8	----	----
Lead	7439-92-1	5	mg/kg	----	----	6	----	----
Nickel	7440-02-0	2	mg/kg	----	----	10	----	----
Zinc	7440-66-6	5	mg/kg	----	----	22	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	<0.1	----	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	----	----	8.9	----	----
After HCl pH	----	0.1	pH Unit	----	----	1.8	----	----
Extraction Fluid Number	----	1	-	----	----	1	----	----
Final pH	----	0.1	pH Unit	----	----	4.9	----	----
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	7.7	7.0	----	7.5	7.9
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	1.02	<0.02	----	0.53	0.03
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	----	----	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	----	----	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	----	----	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	----	----	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	<0.5	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW04_0.0-0.05	MW04_11.3-11.35	WC01	SB07_0.0-0.05	SB07_2.1-2.15
				Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-001	ES1712409-012	ES1712409-015	ES1712409-017	ES1712409-020
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	**0.6**	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	**1.2**	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		----	----	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		----	----	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		----	----	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		----	----	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	----	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	<50	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		----	----	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		----	----	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		----	----	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW04_0.0-0.05	MW04_11.3-11.35	WC01	SB07_0.0-0.05	SB07_2.1-2.15
				Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-001	ES1712409-012	ES1712409-015	ES1712409-017	ES1712409-020
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**0.0003**	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		**0.0034**	<0.0002	**0.0003**	**0.0027**	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		**0.0003**	<0.0002	<0.0002	**0.0003**	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0249**	<0.0002	**0.0005**	**0.0715**	**0.0003**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**0.0014**	<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		**0.0018**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0024**	<0.0002	<0.0002	**0.0013**	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		**0.0018**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		**0.0022**	<0.0002	<0.0002	**0.0008**	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		**0.0011**	<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		<0.0002	<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
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)	2448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW04_0.0-0.05	MW04_11.3-11.35	WC01	SB07_0.0-0.05	SB07_2.1-2.15
				Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-001	ES1712409-012	ES1712409-015	ES1712409-017	ES1712409-020
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
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		**0.0382**	<0.0002	**0.0008**	**0.0785**	**0.0003**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0283**	<0.0002	**0.0008**	**0.0742**	**0.0003**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0365**	<0.0002	**0.0008**	**0.0765**	**0.0003**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	**80.2**	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	**78.1**	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	**59.3**	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	**77.2**	----	----
Anthracene-d10	1719-06-8	0.5	%		----	----	**76.7**	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	**82.6**	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	**97.4**	----	----
Toluene-D8	2037-26-5	0.2	%		----	----	**99.8**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	**88.2**	----	----
EP231S: PFAS Surrogate									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW04_0.0-0.05	MW04_11.3-11.35	WC01	SB07_0.0-0.05	SB07_2.1-2.15
				Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-001	ES1712409-012	ES1712409-015	ES1712409-017	ES1712409-020
					Result	Result	Result	Result	Result
EP231S: PFAS Surrogate - Continued									
13C4-PFOS	----	0.0002	%		119	104	103	119	103

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB07_4.95-5.0	QA02	SB06_0.0-0.05	SB06_1.0-1.05	SB06_4.95-5.0
			Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit	ES1712409-022	ES1712409-023	ES1712409-024	ES1712409-026	ES1712409-029
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	18.0	17.5	3.8	11.6	13.0
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	9.5	7.6	6.3	7.8	8.0
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.04	0.45	4.00	0.86	0.08
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0003	0.0003	0.0013	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.0004	0.0004	0.0016	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0029	0.0089	0.0063	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.0004	0.0039	0.0005	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0002	0.100	0.177	0.0225	0.0020
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0007	0.0004	<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	0.0013	0.0007	0.0062	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0004	0.0030	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0010	0.0056	0.0039	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0006	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0008	<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								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB07_4.95-5.0	QA02	SB06_0.0-0.05	SB06_1.0-1.05	SB06_4.95-5.0
			Client sampling date / time	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]	[16-May-2017]
Compound	CAS Number	LOR	Unit	ES1712409-022	ES1712409-023	ES1712409-024	ES1712409-026	ES1712409-029
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	**0.0054**	**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
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)	2448-09-7	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	**0.0219**	**0.0008**	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	**0.0113**	**0.0006**	<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	**0.0006**	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0002**	**0.107**	**0.238**	**0.0469**	**0.0020**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0002**	**0.103**	**0.186**	**0.0288**	**0.0020**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0002**	**0.106**	**0.194**	**0.0432**	**0.0020**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**126**	**91.7**	**91.0**	**111**	**90.7**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	MW06_0.0-0.05	MW06_12.8-12.85	WC02	QA03	WC03
			Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit	ES1712409-030	ES1712409-040	ES1712409-041	ES1712409-042	ES1712409-046
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	3.9	19.6	13.6	6.2	5.4
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	9	----	<5
Cadmium	7440-43-9	1	mg/kg	----	----	<1	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	10	----	4
Copper	7440-50-8	5	mg/kg	----	----	9	----	<5
Lead	7439-92-1	5	mg/kg	----	----	8	----	<5
Nickel	7440-02-0	2	mg/kg	----	----	10	----	3
Zinc	7440-66-6	5	mg/kg	----	----	28	----	8
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	<0.1	----	<0.1
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	----	----	8.3	----	7.9
After HCl pH	----	0.1	pH Unit	----	----	1.8	----	1.8
Extraction Fluid Number	----	1	-	----	----	1	----	1
Final pH	----	0.1	pH Unit	----	----	4.9	----	4.9
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	7.2	7.7	----	7.2	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	1.46	0.18	----	2.30	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	<0.5	----	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	<0.5	----	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	----	<0.5	----	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	----	<0.5	----	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	----	<0.5	----	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	----	<0.5	----	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	----	<0.5	----	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	----	<0.5	----	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	<0.5	----	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	----	<0.5	----	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	<0.5	----	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	<0.5	----	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	<0.5	----	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW06_0.0-0.05	MW06_12.8-12.85	WC02	QA03	WC03
				Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-030	ES1712409-040	ES1712409-041	ES1712409-042	ES1712409-046
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	<0.5	----	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	<0.5	----	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	<0.5	----	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	**0.6**	----	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	**1.2**	----	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		----	----	<10	----	<10
C10 - C14 Fraction	----	50	mg/kg		----	----	<50	----	<50
C15 - C28 Fraction	----	100	mg/kg		----	----	<100	----	<100
C29 - C36 Fraction	----	100	mg/kg		----	----	<100	----	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	<50	----	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		----	----	<10	----	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		----	----	<10	----	<10
>C10 - C16 Fraction	----	50	mg/kg		----	----	<50	----	<50
>C16 - C34 Fraction	----	100	mg/kg		----	----	<100	----	<100
>C34 - C40 Fraction	----	100	mg/kg		----	----	<100	----	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	<50	----	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	<50	----	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		----	----	<0.2	----	<0.2
Toluene	108-88-3	0.5	mg/kg		----	----	<0.5	----	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		----	----	<0.5	----	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		----	----	<0.5	----	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		----	----	<0.5	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg		----	----	<0.2	----	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		----	----	<0.5	----	<0.5
Naphthalene	91-20-3	1	mg/kg		----	----	<1	----	<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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW06_0.0-0.05	MW06_12.8-12.85	WC02	QA03	WC03
				Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-030	ES1712409-040	ES1712409-041	ES1712409-042	ES1712409-046
					Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0003**	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
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)	2448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW06_0.0-0.05	MW06_12.8-12.85	WC02	QA03	WC03
				Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-030	ES1712409-040	ES1712409-041	ES1712409-042	ES1712409-046
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0003**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0003**	<0.0002	<0.0002	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0003**	<0.0002	<0.0002	<0.0002	<0.0002
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	**80.0**	----	**82.1**
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	**72.6**	----	**74.9**
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	**55.7**	----	**56.4**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	**75.5**	----	**78.3**
Anthracene-d10	1719-06-8	0.5	%		----	----	**73.7**	----	**76.2**
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	**79.6**	----	**81.4**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	**103**	----	**110**
Toluene-D8	2037-26-5	0.2	%		----	----	**102**	----	**110**
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	**92.6**	----	**100.0**
EP231S: PFAS Surrogate									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW06_0.0-0.05	MW06_12.8-12.85	WC02	QA03	WC03
				Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]	[17-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-030	ES1712409-040	ES1712409-041	ES1712409-042	ES1712409-046
					Result	Result	Result	Result	Result
EP231S: PFAS Surrogate - Continued									
13C4-PFOS	----	0.0002	%		82.7	98.9	101	94.7	98.3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	MW05_0.0-0.15	MW05_11.0-11.1	QA04	SS02	SSQA01
			Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit	ES1712409-047	ES1712409-055	ES1712409-056	ES1712409-057	ES1712409-058
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	**4.1**	**12.3**	**9.0**	**15.8**	**6.0**
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	**7.5**	**7.8**	**8.3**	**7.1**	**6.8**
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**0.83**	**0.04**	**1.19**	<0.02	**2.62**
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0027**	**0.0006**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0010**	**0.0006**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0095**	**0.0064**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0009**	**0.0006**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	**0.0051**	<0.0002	<0.0002	**0.504**	**0.261**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0064**	**0.0059**
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	**0.014**	**0.019**
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0499**	**0.0155**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0234**	**0.0113**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0025**	**0.0014**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0062**	**0.0035**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0007**	**0.0004**
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0034**	**0.0016**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0007**	**0.0006**
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	**0.0012**	**0.0011**
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								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW05_0.0-0.15	MW05_11.0-11.1	QA04	SS02	SSQA01
				Client sampling date / time	[17-May-2017]	[17-May-2017]	[17-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-047	ES1712409-055	ES1712409-056	ES1712409-057	ES1712409-058
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**0.0124**	**0.0107**
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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	**0.0514**	**0.0514**
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	**0.0576**	**0.0388**
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	**0.0444**	**0.0401**
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0051**	<0.0002	<0.0002	**0.792**	**0.471**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0051**	<0.0002	<0.0002	**0.514**	**0.267**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0051**	<0.0002	<0.0002	**0.721**	**0.409**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**97.4**	**86.3**	**94.9**	**78.8**	**71.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS01	SS14	SS05	SS03	SS06
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-059	ES1712409-060	ES1712409-061	ES1712409-062	ES1712409-063
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		**24.4**	**8.8**	**41.5**	**34.7**	**34.6**
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit		**6.5**	**6.2**	**6.4**	**6.6**	**7.0**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**1.95**	**9.66**	**4.56**	**4.21**	**1.10**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		**0.0015**	**0.0006**	<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		**0.0014**	**0.0020**	**0.0022**	**0.0016**	**0.0003**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	**0.0002**	**0.0002**	**0.0005**	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0309**	**0.0561**	**0.0350**	**0.0281**	**0.0144**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		**0.0008**	**0.0008**	**0.0018**	**0.0004**	**0.0003**
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		**0.0055**	**0.0010**	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		**0.0006**	**0.0005**	**0.0003**	<0.0002	**0.0002**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	**0.0005**	**0.0010**	**0.0004**	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		**0.0003**	**0.0005**	**0.0038**	**0.0014**	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	**0.0003**	**0.0008**	**0.0004**	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		**0.0002**	**0.0009**	**0.0005**	**0.0003**	<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**	**0.0015**	**0.0008**	**0.0004**	<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									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS01	SS14	SS05	SS03	SS06
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-059	ES1712409-060	ES1712409-061	ES1712409-062	ES1712409-063
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		**0.0014**	<0.0002	**0.0138**	**0.0020**	**0.0002**
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**0.0014**	**0.0009**	**0.0037**	**0.0007**	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	**0.0006**	**0.0009**	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	**0.0018**	**0.0006**	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		**0.0442**	**0.0682**	**0.0654**	**0.0362**	**0.0154**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0323**	**0.0581**	**0.0372**	**0.0297**	**0.0147**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0416**	**0.0627**	**0.0469**	**0.0322**	**0.0149**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**106**	**103**	**108**	**104**	**103**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SS07	SS08	SS15	SS04	SS09
			Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit	ES1712409-064	ES1712409-065	ES1712409-066	ES1712409-067	ES1712409-068
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	37.7	4.7	59.3	35.4	43.5
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	6.8	6.8	6.8	6.6	6.4
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.60	1.32	1.81	0.70	3.72
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	0.0005	0.0031	<0.0002	<0.0002	0.0013
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.0012	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0130	0.113	0.0126	0.0090	0.0477
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0003	<0.0002	<0.0002	0.0008
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0002	0.0003	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.0005	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0002	0.0014	<0.0002	<0.0002	0.0004
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.0022	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.0003	<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								

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS07	SS08	SS15	SS04	SS09
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-064	ES1712409-065	ES1712409-066	ES1712409-067	ES1712409-068
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	<0.0002	**0.0066**
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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	**0.0027**	<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	**0.0008**
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		**0.0139**	**0.125**	**0.0126**	**0.0090**	**0.0581**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0135**	**0.116**	**0.0126**	**0.0090**	**0.0490**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0139**	**0.121**	**0.0126**	**0.0090**	**0.0507**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**103**	**104**	**106**	**109**	**105**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS10	SS11	SS12	SSQA02	SS13
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-069	ES1712409-070	ES1712409-071	ES1712409-072	ES1712409-073
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		**53.1**	**20.1**	**43.4**	**47.4**	**5.9**
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit		**6.6**	**7.4**	**6.9**	**7.1**	**7.6**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**1.00**	**0.51**	**1.90**	**1.82**	**0.46**
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		**0.0060**	**0.0014**	**0.0038**	**0.0041**	**0.0004**
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									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS10	SS11	SS12	SSQA02	SS13
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-069	ES1712409-070	ES1712409-071	ES1712409-072	ES1712409-073
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
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
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)	2448-09-7	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		**0.0060**	**0.0014**	**0.0038**	**0.0041**	**0.0004**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0060**	**0.0014**	**0.0038**	**0.0041**	**0.0004**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0060**	**0.0014**	**0.0038**	**0.0041**	**0.0004**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**103**	**104**	**103**	**107**	**106**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS16	SS17	SS18	TRIP BLANK	TRIP BLANK
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[17-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-074	ES1712409-075	ES1712409-076	ES1712409-086	ES1712409-087
					Result	Result	Result	Result	Result
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%		**41.8**	**18.4**	**42.5**	**6.7**	**24.7**
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit		**6.9**	**7.9**	**6.4**	**----**	**----**
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		**2.82**	**----**	**----**	**----**	**----**
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		**0.0039**	**0.0002**	**0.0025**	<0.0002	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		**0.0004**	<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									

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS16	SS17	SS18	TRIP BLANK	TRIP BLANK
				Client sampling date / time	[18-May-2017]	[18-May-2017]	[18-May-2017]	[17-May-2017]	[18-May-2017]
Compound	CAS Number	LOR	Unit		ES1712409-074	ES1712409-075	ES1712409-076	ES1712409-086	ES1712409-087
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
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
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)	2448-09-7	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		**0.0003**	<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		**0.0046**	**0.0002**	**0.0025**	<0.0002	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0039**	**0.0002**	**0.0025**	<0.0002	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		**0.0039**	**0.0002**	**0.0025**	<0.0002	<0.0002
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**111**	**104**	**107**	**104**	**103**

Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)				Client sample ID	WC01	WC02	WC03	----	----
				Client sampling date / time	[16-May-2017]	[17-May-2017]	[17-May-2017]	----	----
Compound	CAS Number	LOR	Unit		ES1712409-015	ES1712409-041	ES1712409-046	--------	--------
					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	0.02	µg/L		**0.04**	<0.02	<0.02	----	----
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		**0.06**	<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: TCLP LEACHATE (Matrix: WATER)				Client sample ID	WC01	WC02	WC03	----	----
				Client sampling date / time	[16-May-2017]	[17-May-2017]	[17-May-2017]	----	----
Compound	CAS Number	LOR	Unit		ES1712409-015	ES1712409-041	ES1712409-046	--------	--------
					Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**0.10**	<0.01	<0.01	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.10**	<0.01	<0.01	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.10**	<0.01	<0.01	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**70.3**	**72.1**	**87.5**	----	----

Analytical Results

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

Compound	CAS Number	LOR	Unit	Client sample ID	RB01	RB02	SW03	SWQA01	SW04
				Client sampling date / time	16-May-2017 00:00	17-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00
					ES1712409-016	ES1712409-045	ES1712409-077	ES1712409-078	ES1712409-079
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**----**	**----**	**26**	**18**	**397**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	**0.09**	**0.08**	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	**0.10**	**0.09**	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	<0.02	**0.58**	**0.55**	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	**2.09**	**2.46**	**0.26**
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	**0.35**	**0.31**	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	**0.33**	**0.31**	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	**0.14**	**0.13**	**0.03**
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	**0.09**	**0.09**	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	**0.04**	**0.04**	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RB01	RB02	SW03	SWQA01	SW04
				Client sampling date / time	16-May-2017 00:00	17-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00
Compound	CAS Number	LOR	Unit		ES1712409-016	ES1712409-045	ES1712409-077	ES1712409-078	ES1712409-079
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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	**0.08**
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	**0.25**	**0.21**	<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	**4.06**	**4.27**	**0.37**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	**2.67**	**3.01**	**0.26**
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	**3.92**	**4.14**	**0.29**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**95.9**	**96.4**	**81.1**	**81.7**	**85.9**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW02	SW06	SW08	SW10	SW11
				Client sampling date / time	18-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00
Compound	CAS Number	LOR	Unit		ES1712409-080	ES1712409-081	ES1712409-082	ES1712409-083	ES1712409-084
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**83**	**28**	**64**	<5	**24**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		**0.05**	<0.02	**0.03**	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		**0.04**	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		**0.20**	**0.08**	**0.12**	**0.04**	<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		**0.56**	**0.16**	**0.19**	**0.05**	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		**0.03**	**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	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW02	SW06	SW08	SW10	SW11
				Client sampling date / time	18-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00	18-May-2017 00:00
Compound	CAS Number	LOR	Unit		ES1712409-080	ES1712409-081	ES1712409-082	ES1712409-083	ES1712409-084
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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		**0.89**	**0.26**	**0.37**	**0.09**	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		**0.76**	**0.24**	**0.31**	**0.09**	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		**0.85**	**0.26**	**0.37**	**0.09**	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**89.1**	**84.2**	**90.4**	**88.0**	**90.8**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWQA02	----	----	----	----
				Client sampling date / time	18-May-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1712409-085	--------	--------	--------	--------
					Result	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**19**	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L		<0.02	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SWQA02	----	----	----	----
				Client sampling date / time	18-May-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1712409-085	--------	--------	--------	--------
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	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	%		**90.9**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **DI WATER LEACHATE**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130

Sub-Matrix: **TCLP LEACHATE**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1712409**	Page	: 1 of 35
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: FRNSW DENILIQUIN	Date Samples Received	: 22-May-2017
Order number	: 21 25583 15	Date Analysis Commenced	: 23-May-2017
C-O-C number	: ----	Issue Date	: 31-May-2017
Sampler	: ALICE WALKER		
Site	: ----		
Quote number	: SY/143/17		
No. of samples received	: 87		
No. of samples analysed	: 51		

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

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

This Quality Control Report contains the following information:

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

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*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Andrew Epps	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (QC Lot: 909142)									
ES1712409-015	WC01	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	8.8	8.9	1.31	No Limit
ES1712409-042	QA03	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	6.2	5.5	12.0	No Limit
EA055: Moisture Content (QC Lot: 909143)									
ES1712409-061	SS05	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	41.5	40.4	2.67	0% - 20%
ES1712409-072	SSQA02	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	47.4	47.4	0.00	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 912327)									
ES1712281-030	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	10	9	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	2	2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	13	12	11.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	8	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	12	14	12.2	No Limit
ES1712599-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	43	43	0.00	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	17	17	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	20	20	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	12	12	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	34	34	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 912328)									
ES1712281-030	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1712599-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 913735)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 913735) - continued									
ES1712409-001	MW04_0.0-0.05	EP003: Total Organic Carbon	----	0.02	%	1.02	0.96	5.85	0% - 20%
ES1712409-040	MW06_12.8-12.85	EP003: Total Organic Carbon	----	0.02	%	0.18	0.21	19.6	0% - 50%
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 913736)									
ES1712409-062	SS03	EP003: Total Organic Carbon	----	0.02	%	4.21	4.32	2.64	0% - 20%
ES1712409-072	SSQA02	EP003: Total Organic Carbon	----	0.02	%	1.82	1.81	0.00	0% - 20%
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 902986)									
ES1712402-104	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1712409-041	WC02	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 902986) - continued									
ES1712409-041	WC02	EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 902699)									
ES1712372-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EW1702271-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 902985)									
ES1712402-104	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1712409-041	WC02	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 902699)									
ES1712372-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EW1702271-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 902985)									
ES1712402-104	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1712409-041	WC02	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 902699)									
ES1712372-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EW1702271-002	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 902699) - continued									
EW1702271-002	Anonymous	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 902542)									
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0034	0.0031	7.60	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0003	0.0003	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0249	0.0252	1.19	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
ES1712409-030	MW06_0.0-0.05	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0003	0.0003	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 902546)									
ES1712409-059	SS01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0015	0.0016	9.68	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0014	0.0012	11.2	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0309	0.0322	3.98	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0008	0.0007	0.00	No Limit
ES1712409-069	SS10	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0060	0.0055	9.84	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 902542)									
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0018	0.0019	6.30	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0024	0.0023	0.00	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0018	0.0017	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0022	0.0023	6.47	0% - 50%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0011	0.0014	23.3	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0003	0.0004	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 902542) - continued									
ES1712409-030	MW06_0.0-0.05	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 902546)									
ES1712409-059	SS01	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0055	0.0061	11.1	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0006	0.0006	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0003	0.0003	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0002	0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0002	0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
ES1712409-069	SS10	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 902542)									
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 902542) - continued									
ES1712409-001	MW04_0.0-0.05	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1712409-030	MW06_0.0-0.05	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 902546)									
ES1712409-059	SS01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	0.0014	0.0014	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1712409-069	SS10	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 902546) - continued									
ES1712409-069	SS10	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 902542)									
ES1712409-001	MW04_0.0-0.05	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1712409-030	MW06_0.0-0.05	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 902546)									
ES1712409-059	SS01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	0.0014	0.0017	16.9	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1712409-069	SS10	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 902546) - continued									
ES1712409-069	SS10	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 903887)									
ES1711366-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	12	7	53.2	No Limit
ES1712409-077	SW03	EA025H: Suspended Solids (SS)	----	5	mg/L	26	17	38.6	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 902539)									
ES1712409-016	RB01	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1712409-085	SWQA02	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 913071)									
ES1712409-015	WC01	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.06	0.05	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.04	0.03	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1712440-033	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 915130)									
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.91	1.89	1.11	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.12	0.11	9.78	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 915130) - continued									
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1712409-040	MW06_12.8-12.85	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 915132)									
ES1712409-062	SS03	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.26	1.27	1.11	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.12	0.12	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 916500)									
ES1712409-068	SS09	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.42	0.45	5.50	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.04	0.05	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1712664-015	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	45.6	45.0	1.30	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	0.04	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.78	0.73	6.89	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.45	0.45	0.00	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.11	0.08	28.6	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 902539)									
ES1712409-016	RB01	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1712409-085	SWQA02	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 902539) - continued									
ES1712409-085	SWQA02	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 913071)									
ES1712409-015	WC01	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1712440-033	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 915130)									
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.04	0.04	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.04	0.04	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.05	0.05	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.03	0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 915130) - continued									
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1712409-040	MW06_12.8-12.85	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 915132)									
ES1712409-062	SS03	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.08	0.08	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.04	0.04	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.02	0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 916500)									
ES1712409-068	SS09	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 916500) - continued									
ES1712664-015	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.33	0.32	3.99	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.18	0.17	5.81	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.06	0.06	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.03	0.03	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 902539)									
ES1712409-016	RB01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1712409-085	SWQA02	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 913071)									
ES1712409-015	WC01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 913071) - continued									
ES1712409-015	WC01	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1712440-033	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 915130)									
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1712409-040	MW06_12.8-12.85	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 915130) - continued									
ES1712409-040	MW06_12.8-12.85	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 915132)									
ES1712409-062	SS03	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 916500)									
ES1712409-068	SS09	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1712664-015	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.18	0.17	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 916500) - continued									
ES1712664-015	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 902539)									
ES1712409-016	RB01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1712409-085	SWQA02	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 913071)									
ES1712409-015	WC01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1712440-033	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 913071) - continued									
ES1712440-033	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 915130)									
ES1712409-001	MW04_0.0-0.05	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1712409-040	MW06_12.8-12.85	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 915132)									
ES1712409-062	SS03	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 916500)									
ES1712409-068	SS09	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 916500) - continued									
ES1712664-015	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	4.20	4.04	4.10	0% - 20%
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	3.77	3.66	2.99	0% - 20%
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 902539)									
ES1712409-016	RB01	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
ES1712409-085	SWQA02	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 913071)									
ES1712409-015	WC01	EP231X: Sum of PFAS	----	0.01	µg/L	0.10	0.08	22.2	0% - 50%
ES1712440-033	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 915130)									
ES1712409-001	MW04_0.0-0.05	EP231X: Sum of PFAS	----	0.01	µg/L	2.19	2.15	1.84	0% - 20%
ES1712409-040	MW06_12.8-12.85	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 915132)									
ES1712409-062	SS03	EP231X: Sum of PFAS	----	0.01	µg/L	1.52	1.55	1.95	0% - 20%
EP231P: PFAS Sums (QC Lot: 916500)									
ES1712409-068	SS09	EP231X: Sum of PFAS	----	0.01	µg/L	0.47	0.51	8.16	0% - 20%
ES1712664-015	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	55.7	54.8	1.77	0% - 20%

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 912327)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	104	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	100	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	104	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	106	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	107	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	109	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 912328)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	75.6	70	105
EN33: TCLP Leach (QCLot: 910686)								
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 913735)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	108	70	130
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 913736)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	99.6	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 902986)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	91.1	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	88.2	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	88.1	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	85.0	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	81.3	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	78.1	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	78.8	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	78.6	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	86.6	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	89.1	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	86.3	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	88.8	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	85.6	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	70.2	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	67.9	62	118

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 902986) - continued								
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	67.2	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 902699)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	91.8	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 902985)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	109	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	108	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	106	71	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 902699)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	92.5	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 902985)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	111	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	105	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	102	63	131
EP080: BTEXN (QCLot: 902699)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	84.0	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	85.7	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	79.4	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	80.4	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	79.4	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	96.4	63	119
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 902542)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	57	121
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	101	55	125
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.2	52	126
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	54	123
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	107	55	127
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	54	125
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 902546)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.2	57	121
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.0	55	125
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.3	52	126
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.8	54	123
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.7	55	127
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.0	54	125
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 902542)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	93.1	52	128
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.1	54	129

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 902542) - continued								
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.5	58	127
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	57	128
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	116	60	134
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	113	63	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	55	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	109	62	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	53	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.3	49	129
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	100	59	129
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 902546)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	75.2	52	128
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.3	54	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.9	58	127
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	57	128
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	111	60	134
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	63	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.6	55	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	78.9	62	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.2	53	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	49	129
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	104	59	129
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902542)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	112	52	132
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.1	65	126
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.9	64	126
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	108	63	124
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	102	58	125
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	107	61	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	111	55	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902546)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.0	52	132
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	83.2	65	126
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	84.7	64	126
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.0	63	124

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902546) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	104	58	125
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	101	61	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.3	55	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 902542)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	108	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	120	61	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	113	62	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	102	60	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 902546)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	84.8	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	104	61	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	124	62	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	116	60	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 903887)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	98.0	83	129
				<5	1000 mg/L	94.8	82	110
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 902539)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	78.8	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	100	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	87.8	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	90.6	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	87.0	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	87.2	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 913071)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	86.2	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	95.6	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	106	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	81.4	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	86.2	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	73.0	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 915130)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	85.0	70	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 915130) - continued								
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	97.0	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	84.8	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	105	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	90.4	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	103	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 915132)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	104	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	106	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	110	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	113	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	116	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 916500)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	79.8	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	83.0	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	87.4	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	90.0	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	84.8	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 902539)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	91.8	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	76.8	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	84.6	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	99.4	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	103	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	101	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	103	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	105	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	88.2	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	112	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	102	70	124
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 913071)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	103	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	93.0	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	97.8	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	74.6	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	85.8	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	94.2	70	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 913071) - continued								
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	99.8	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	74.2	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	126	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	77.0	70	124
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 915130)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	88.6	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	96.0	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	85.4	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	104	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	92.2	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	91.4	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	95.4	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	121	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	117	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	95.2	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	86.6	70	124
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 915132)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	92.8	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	105	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	121	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	110	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	116	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	118	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	119	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	108	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	93.4	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	104	70	124
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 916500)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	90.0	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	79.8	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	83.0	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	80.6	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	95.6	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	98.0	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	95.0	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	102	70	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 916500) - continued								
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	71.4	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	101	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	99.7	70	124
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902539)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	75.6	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	106	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	114	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	106	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	112	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	111	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	111	70	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 913071)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	77.0	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	120	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	126	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	102	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	114	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	121	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	106	70	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 915130)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	88.0	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	111	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	99.3	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	102	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	90.0	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	97.4	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	113	70	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 915132)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	118	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	106	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	107	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	92.6	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	110	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	121	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	120	70	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 916500)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	93.4	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	101	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	100	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	84.4	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	91.6	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	93.4	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	100	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 902539)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	92.8	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	103	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	115	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	85.4	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 913071)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	79.8	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	74.8	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	77.4	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	75.2	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 915130)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	91.4	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	104	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	92.2	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	91.2	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 915132)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 915132) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	118	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	123	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	121	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	102	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 916500)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	84.8	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	92.8	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	112	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	129	70	130

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	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 912327)							
ES1712281-030	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	88.6	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	102	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	96.5	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	100	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	103	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	99.2	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	103	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 912328)							
ES1712281-030	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	92.2	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 902986)							
ES1712402-104	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	74.4	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	71.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 902699)							
ES1712372-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	90.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 902985)							
ES1712402-104	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	82.0	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	93.6	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	103	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 902699)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 902699) - continued							
ES1712372-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	87.2	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 902985)							
ES1712402-104	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	84.9	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	98.9	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	93.5	52	132
EP080: BTEXN (QCLot: 902699)							
ES1712372-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	75.8	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	75.5	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	71.8	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	71.0	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	73.2	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	74.5	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 902542)							
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	78.0	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	71.2	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	72.8	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	73.6	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	91.2	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 902546)							
ES1712409-059	SS01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	79.6	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	67.2	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	97.7	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	73.6	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	76.4	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 902542)							
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	85.8	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	126	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	82.8	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	74.4	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	87.2	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	89.6	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	92.0	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	98.0	50	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 902542) - continued							
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	81.6	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	74.8	30	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	78.4	30	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 902546)							
ES1712409-059	SS01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	68.3	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	126	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	102	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	86.8	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	78.9	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	73.8	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	84.5	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	69.8	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	79.4	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	111	30	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	83.5	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902542)							
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	77.6	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	76.4	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	68.9	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	65.1	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	77.2	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	93.6	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	91.6	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902546)							
ES1712409-059	SS01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	114	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	90.0	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	78.9	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	64.4	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	93.7	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	109	30	130

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902546) - continued							
ES1712409-059	SS01	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	103	30	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 902542)							
ES1712409-001	MW04_0.0-0.05	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	77.2	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	113	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	91.2	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	105	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 902546)							
ES1712409-059	SS01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	68.2	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	92.5	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	66.8	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	77.3	50	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 902539)							
ES1712409-016	RB01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	69.6	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	90.6	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	80.4	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	83.6	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	78.6	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	74.2	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 913071)							
ES1712409-015	WC01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	76.2	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	86.2	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	105	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	52.0	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	82.4	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	52.6	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 915130)							
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	81.2	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	111	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	79.4	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	120	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	88.4	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	105	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 915132)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 915132) - continued							
ES1712409-062	SS03	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	101	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	104	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	103	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	107	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	85.4	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	121	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 916500)							
ES1712409-068	SS09	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	78.2	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	93.8	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	98.8	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	94.4	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	103	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	101	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 902539)							
ES1712409-016	RB01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	78.6	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	86.6	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	77.6	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	89.6	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	91.8	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	87.0	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	91.0	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	92.2	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	77.6	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	97.4	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	89.1	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 913071)							
ES1712409-015	WC01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	106	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	96.2	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	90.6	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	50.4	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	63.8	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	91.2	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	90.4	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	56.8	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	106	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	105	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	63.8	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 915130)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 915130) - continued							
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	100	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	118	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	83.4	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	102	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	72.6	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	85.8	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	79.8	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	116	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	98.8	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	89.0	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	61.7	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 915132)							
ES1712409-062	SS03	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	87.2	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	103	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	116	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	103	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	110	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	120	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	116	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	116	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	114	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	89.0	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	101	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 916500)							
ES1712409-068	SS09	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	81.9	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	90.4	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	89.4	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	91.8	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	103	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	96.4	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	87.6	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	108	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	80.6	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	103	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	86.1	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902539)							
ES1712409-016	RB01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	68.2	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 902539) - continued							
ES1712409-016	RB01	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	95.3	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	100	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	107	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	91.0	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	99.8	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	93.4	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 913071)							
ES1712409-015	WC01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	54.2	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	119	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	128	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	107	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	126	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	113	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	115	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 915130)							
ES1712409-001	MW04_0.0-0.05	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	75.4	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	111	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	101	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	104	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	107	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	70.0	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	112	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 915132)							
ES1712409-062	SS03	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	125	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 915132) - continued							
ES1712409-062	SS03	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	108	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	98.3	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	85.9	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	100	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	122	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	112	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 916500)							
ES1712409-068	SS09	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	84.4	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	102	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	114	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	93.2	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	107	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	108	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	96.4	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 902539)							
ES1712409-016	RB01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	84.2	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	94.2	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	104	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	73.0	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 913071)							
ES1712409-015	WC01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	55.4	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	56.0	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	50.4	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	61.0	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 915130)							
ES1712409-001	MW04_0.0-0.05	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	123	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	120	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	117	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 915130) - continued							
ES1712409-001	MW04_0.0-0.05	EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	124	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 915132)							
ES1712409-062	SS03	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	115	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	116	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	123	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	113	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 916500)							
ES1712409-068	SS09	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	95.0	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	88.4	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	110	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	62.6	50	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1712409**	Page	: 1 of 19
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Telephone	: +61-2-8784 8555
Project	: FRNSW DENILIQUIN	Date Samples Received	: 22-May-2017
Site	: ----	Issue Date	: 31-May-2017
Sampler	: ALICE WALKER	No. of samples received	: 87
Order number	: 21 25583 15	No. of samples analysed	: 51

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	ES1712409--001	MW04_0.0-0.05	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EP231A: Perfluoroalkyl Sulfonic Acids	ES1712409--059	SS01	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
HDPE Soil Jar (EA055-103)								
MW04_0.0-0.05,	MW04_11.3-11.35,	**16-May-2017**	**----**	----	----	**25-May-2017**	30-May-2017	✓
SB07_0.0-0.05,	SB07_2.1-2.15,							
SB07_4.95-5.0,	QA02,							
SB06_0.0-0.05,	SB06_1.0-1.05,							
SB06_4.95-5.0								
HDPE Soil Jar (EA055-103)								
MW06_0.0-0.05,	MW06_12.8-12.85,	**17-May-2017**	**----**	----	----	**25-May-2017**	31-May-2017	✓
QA03,	MW05_0.0-0.15,							
MW05_11.0-11.1,	QA04							
HDPE Soil Jar (EA055-103)								
SS02,	SSQA01,	**18-May-2017**	**----**	----	----	**25-May-2017**	01-Jun-2017	✓
SS01,	SS14,							
SS05,	SS03,							
SS06,	SS07,							
SS08,	SS15,							
SS04,	SS09,							
SS10,	SS11,							
SS12,	SSQA02,							
SS13,	SS16,							
SS17,	SS18							

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content - Continued							
Soil Glass Jar - Unpreserved (EA055-103) WC01	**16-May-2017**	**----**	----	----	**25-May-2017**	30-May-2017	✓
Soil Glass Jar - Unpreserved (EA055-103) WC02, WC03, TRIP BLANK	**17-May-2017**	**----**	----	----	**25-May-2017**	31-May-2017	✓
Soil Glass Jar - Unpreserved (EA055-103) TRIP BLANK	**18-May-2017**	**----**	----	----	**25-May-2017**	01-Jun-2017	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) WC01	**16-May-2017**	**27-May-2017**	12-Nov-2017	✓	**29-May-2017**	12-Nov-2017	✓
Soil Glass Jar - Unpreserved (EG005T) WC02, WC03	**17-May-2017**	**27-May-2017**	13-Nov-2017	✓	**29-May-2017**	13-Nov-2017	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) WC01	**16-May-2017**	**27-May-2017**	13-Jun-2017	✓	**29-May-2017**	13-Jun-2017	✓
Soil Glass Jar - Unpreserved (EG035T) WC02, WC03	**17-May-2017**	**27-May-2017**	14-Jun-2017	✓	**29-May-2017**	14-Jun-2017	✓
EN33: TCLP Leach							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN33a) WC01	**16-May-2017**	**26-May-2017**	30-May-2017	✓	**----**	----	----
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN33a) WC02, WC03	**17-May-2017**	**26-May-2017**	31-May-2017	✓	**----**	----	----

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
EN60: Bottle Leaching Procedure							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-Dla) MW04_0.0-0.05, MW04_11.3-11.35, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0	**16-May-2017**	**27-May-2017**	30-May-2017	✓	**----**	----	----
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-Dla) QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0	**16-May-2017**	**28-May-2017**	30-May-2017	✓	**----**	----	----
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-Dla) MW06_0.0-0.05, MW06_12.8-12.85, QA03, MW05_0.0-0.15, MW05_11.0-11.1, QA04	**17-May-2017**	**28-May-2017**	31-May-2017	✓	**----**	----	----
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-Dla) SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04	**18-May-2017**	**28-May-2017**	01-Jun-2017	✓	**----**	----	----
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-Dla) SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**18-May-2017**	**29-May-2017**	01-Jun-2017	✓	**----**	----	----

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
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag (EP003) MW04_0.0-0.05, MW04_11.3-11.35, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0, QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0	**16-May-2017**	**29-May-2017**	13-Jun-2017	✓	**29-May-2017**	13-Jun-2017	✓
Pulp Bag (EP003) MW06_0.0-0.05, MW06_12.8-12.85, QA03, MW05_0.0-0.15, MW05_11.0-11.1, QA04	**17-May-2017**	**29-May-2017**	14-Jun-2017	✓	**29-May-2017**	14-Jun-2017	✓
Pulp Bag (EP003) SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04, SS09, SS10, SS11, SS12, SSQA02, SS13, SS16	**18-May-2017**	**29-May-2017**	15-Jun-2017	✓	**29-May-2017**	15-Jun-2017	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) WC01	**16-May-2017**	**25-May-2017**	30-May-2017	✓	**25-May-2017**	04-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) WC02, WC03	**17-May-2017**	**25-May-2017**	31-May-2017	✓	**25-May-2017**	04-Jul-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) WC01	**16-May-2017**	**25-May-2017**	30-May-2017	✓	**25-May-2017**	30-May-2017	✓
Soil Glass Jar - Unpreserved (EP080) WC02, WC03	**17-May-2017**	**25-May-2017**	31-May-2017	✓	**25-May-2017**	31-May-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) WC01	**16-May-2017**	**25-May-2017**	30-May-2017	✓	**25-May-2017**	30-May-2017	✓
Soil Glass Jar - Unpreserved (EP080) WC02, WC03	**17-May-2017**	**25-May-2017**	31-May-2017	✓	**25-May-2017**	31-May-2017	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) WC01	**16-May-2017**	**25-May-2017**	30-May-2017	✓	**25-May-2017**	30-May-2017	✓
Soil Glass Jar - Unpreserved (EP080) WC02, WC03	**17-May-2017**	**25-May-2017**	31-May-2017	✓	**25-May-2017**	31-May-2017	✓

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
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X)							
MW04_0.0-0.05, MW04_11.3-11.35, WC01, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0, QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0	**16-May-2017**	**24-May-2017**	12-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
MW06_0.0-0.05, MW06_12.8-12.85, WC02, QA03, WC03, MW05_0.0-0.15, MW05_11.0-11.1, QA04	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04, SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
MW04_0.0-0.05, MW04_11.3-11.35, WC01, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0, QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0	**16-May-2017**	**24-May-2017**	12-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
MW06_0.0-0.05, MW06_12.8-12.85, WC02, QA03, WC03, MW05_0.0-0.15, MW05_11.0-11.1, QA04	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04, SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X)							
MW04_0.0-0.05, MW04_11.3-11.35, WC01, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0, QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0	**16-May-2017**	**24-May-2017**	12-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
MW06_0.0-0.05, MW06_12.8-12.85, WC02, QA03, WC03, MW05_0.0-0.15, MW05_11.0-11.1, QA04	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04, SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓

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
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X)							
MW04_0.0-0.05, MW04_11.3-11.35, WC01, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0, QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0	**16-May-2017**	**24-May-2017**	12-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
MW06_0.0-0.05, MW06_12.8-12.85, WC02, QA03, WC03, MW05_0.0-0.15, MW05_11.0-11.1, QA04	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04, SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓

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)							
MW04_0.0-0.05, MW04_11.3-11.35, WC01, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0, QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0	**16-May-2017**	**24-May-2017**	12-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
MW06_0.0-0.05, MW06_12.8-12.85, WC02, QA03, WC03, MW05_0.0-0.15, MW05_11.0-11.1, QA04	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
HDPE Soil Jar (EP231X)							
SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04, SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**17-May-2017**	**24-May-2017**	13-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X)							
TRIP BLANK	**18-May-2017**	**24-May-2017**	14-Nov-2017	✓	**24-May-2017**	03-Jul-2017	✓

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
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
SW03, SWQA01, SW04, SW02, SW06, SW08, SW10, SW11, SWQA02	**18-May-2017**	**----**	----	----	**23-May-2017**	25-May-2017	✓

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) RB01	**16-May-2017**	**----**	----	----	**24-May-2017**	12-Nov-2017	✓
HDPE (no PTFE) (EP231X) RB02	**17-May-2017**	**----**	----	----	**24-May-2017**	13-Nov-2017	✓
HDPE (no PTFE) (EP231X) SW03, SWQA01, SW04, SW02, SW06, SW08, SW10, SW11, SWQA02	**18-May-2017**	**----**	----	----	**24-May-2017**	14-Nov-2017	✓
HDPE (no PTFE) (EP231X) WC01, WC02, WC03	**26-May-2017**	**----**	----	----	**29-May-2017**	22-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW04_0.0-0.05, MW04_11.3-11.35, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0	**27-May-2017**	**----**	----	----	**30-May-2017**	23-Nov-2017	✓
HDPE (no PTFE) (EP231X) QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0, MW06_0.0-0.05, MW06_12.8-12.85, QA03, MW05_0.0-0.15, MW05_11.0-11.1, QA04, SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04	**28-May-2017**	**----**	----	----	**30-May-2017**	24-Nov-2017	✓
HDPE (no PTFE) (EP231X) SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**29-May-2017**	**----**	----	----	**30-May-2017**	25-Nov-2017	✓

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) RB01	**16-May-2017**	**----**	----	----	**24-May-2017**	12-Nov-2017	✓
HDPE (no PTFE) (EP231X) RB02	**17-May-2017**	**----**	----	----	**24-May-2017**	13-Nov-2017	✓
HDPE (no PTFE) (EP231X) SW03, SWQA01, SW04, SW02, SW06, SW08, SW10, SW11, SWQA02	**18-May-2017**	**----**	----	----	**24-May-2017**	14-Nov-2017	✓
HDPE (no PTFE) (EP231X) WC01, WC02, WC03	**26-May-2017**	**----**	----	----	**29-May-2017**	22-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW04_0.0-0.05, MW04_11.3-11.35, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0	**27-May-2017**	**----**	----	----	**30-May-2017**	23-Nov-2017	✓
HDPE (no PTFE) (EP231X) QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0, MW06_0.0-0.05, MW06_12.8-12.85, QA03, MW05_0.0-0.15, MW05_11.0-11.1, QA04, SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04	**28-May-2017**	**----**	----	----	**30-May-2017**	24-Nov-2017	✓
HDPE (no PTFE) (EP231X) SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**29-May-2017**	**----**	----	----	**30-May-2017**	25-Nov-2017	✓

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) RB01	**16-May-2017**	**----**	----	----	**24-May-2017**	12-Nov-2017	✓
HDPE (no PTFE) (EP231X) RB02	**17-May-2017**	**----**	----	----	**24-May-2017**	13-Nov-2017	✓
HDPE (no PTFE) (EP231X) SW03, SWQA01, SW04, SW02, SW06, SW08, SW10, SW11, SWQA02	**18-May-2017**	**----**	----	----	**24-May-2017**	14-Nov-2017	✓
HDPE (no PTFE) (EP231X) WC01, WC02, WC03	**26-May-2017**	**----**	----	----	**29-May-2017**	22-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW04_0.0-0.05, MW04_11.3-11.35, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0	**27-May-2017**	**----**	----	----	**30-May-2017**	23-Nov-2017	✓
HDPE (no PTFE) (EP231X) QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0, MW06_0.0-0.05, MW06_12.8-12.85, QA03, MW05_0.0-0.15, MW05_11.0-11.1, QA04, SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04	**28-May-2017**	**----**	----	----	**30-May-2017**	24-Nov-2017	✓
HDPE (no PTFE) (EP231X) SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**29-May-2017**	**----**	----	----	**30-May-2017**	25-Nov-2017	✓

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) RB01	**16-May-2017**	**----**	----	----	**24-May-2017**	12-Nov-2017	✓
HDPE (no PTFE) (EP231X) RB02	**17-May-2017**	**----**	----	----	**24-May-2017**	13-Nov-2017	✓
HDPE (no PTFE) (EP231X) SW03, SWQA01, SW04, SW02, SW06, SW08, SW10, SW11, SWQA02	**18-May-2017**	**----**	----	----	**24-May-2017**	14-Nov-2017	✓
HDPE (no PTFE) (EP231X) WC01, WC02, WC03	**26-May-2017**	**----**	----	----	**29-May-2017**	22-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW04_0.0-0.05, MW04_11.3-11.35, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0	**27-May-2017**	**----**	----	----	**30-May-2017**	23-Nov-2017	✓
HDPE (no PTFE) (EP231X) QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0, MW06_0.0-0.05, MW06_12.8-12.85, QA03, MW05_0.0-0.15, MW05_11.0-11.1, QA04, SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04	**28-May-2017**	**----**	----	----	**30-May-2017**	24-Nov-2017	✓
HDPE (no PTFE) (EP231X) SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**29-May-2017**	**----**	----	----	**30-May-2017**	25-Nov-2017	✓

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) RB01	**16-May-2017**	**----**	----	----	**24-May-2017**	12-Nov-2017	✓
HDPE (no PTFE) (EP231X) RB02	**17-May-2017**	**----**	----	----	**24-May-2017**	13-Nov-2017	✓
HDPE (no PTFE) (EP231X) SW03, SWQA01, SW04, SW02, SW06, SW08, SW10, SW11, SWQA02	**18-May-2017**	**----**	----	----	**24-May-2017**	14-Nov-2017	✓
HDPE (no PTFE) (EP231X) WC01, WC02, WC03	**26-May-2017**	**----**	----	----	**29-May-2017**	22-Nov-2017	✓
HDPE (no PTFE) (EP231X) MW04_0.0-0.05, MW04_11.3-11.35, SB07_0.0-0.05, SB07_2.1-2.15, SB07_4.95-5.0	**27-May-2017**	**----**	----	----	**30-May-2017**	23-Nov-2017	✓
HDPE (no PTFE) (EP231X) QA02, SB06_0.0-0.05, SB06_1.0-1.05, SB06_4.95-5.0, MW06_0.0-0.05, MW06_12.8-12.85, QA03, MW05_0.0-0.15, MW05_11.0-11.1, QA04, SS02, SSQA01, SS01, SS14, SS05, SS03, SS06, SS07, SS08, SS15, SS04	**28-May-2017**	**----**	----	----	**30-May-2017**	24-Nov-2017	✓
HDPE (no PTFE) (EP231X) SS09, SS10, SS11, SS12, SSQA02, SS13, SS16, SS17, SS18	**29-May-2017**	**----**	----	----	**30-May-2017**	25-Nov-2017	✓

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	EA055-103	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	1	11	**9.09**	**9.09**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**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*	

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	9	62	**14.52**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	5	62	**8.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	5	62	**8.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	5	62	**8.06**	**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	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automaticaly measured by infra-red detector.
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-House. A portion of soil is extracted with MTBE. The extract is taken to dryness, made up in mobile phase. Analysis is by LC/MSMS, ESI Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

Preparation Methods	Method	Matrix	Method Descriptions
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
Deionised Water Leach	EN60-Dla	SOIL	In house QWI-EN/60 referenced to AS4439.3 Preparation of Leachates

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Sample Extraction for PFAS	EP231-PR	SOIL	In house
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENT ☑ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	(Yes) No N/A
PROJECT: FRNSW Deniliquin	ALS QUOTE NO.: SY-143-17 V2 GHD	Free ice / frozen ice bricks present upon receipt? melted	Yes No N/A
ORDER NUMBER: 21 25583 15	COC SEQUENCE NUMBER (Circle) COC: (1) 2 3 4 5 6 7	Random Sample Temperature on Receipt	18.7 °C
PROJECT MANAGER: Nicole Rosen CONTACT PH: 92397215	OF: 1 2 3 4 5 6 7	Other comment:	

	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
SAMPLER: Alice Walker SAMPLER MOBILE: 0415952075	Alice Walker			
COC emailed to ALS? (YES / NO) EDD FORMAT (or default): EsDAT	DATE/TIME: 18/05/17 9:30pm	DATE/TIME: 22.5.17 13:45	DATE/TIME:	DATE/TIME:
Email Reports to: alice.walker@ghd.com nicole.rosen@ghd.com				
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please hold all soil samples for six months

ALS USE | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | CONTAINER INFORMATION | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS (full suite)	ASLP with PFAS (full suite)	TOC and moisture	TCLP with PFAS (full suite)	TRH/BTEX/ PAHs	Metals (M8)		HOLD (six moths for soils)
1	MW04_0.0-0.05	16/05/17	Soil		2	X	X	X					
2	MW04_0.5-0.55												X
3	MW04_0.95-1.0			TOC / Brisbane									X
4	MW04_1.5-1.55			Subcon / Forward Lab / Split WO									X
5	MW04_2.5-2.55			Lab / Analysis:									X
6	MW04_4.0-4.05			Organised By / Date:									X
7	MW04_5.15-5.2			Relinquished By / Date:									X
8	MW04_6.5-6.55			Connote / Courier:									X
9	MW04_7.9-7.95			WO No:									X
10	MW04_9.0-9.05			Attach By FO / Internal Sheet:									X
11	MW04_10.0-10.05												X
12	MW04_11.3-11.35					X	X	X					
				TOTAL									

Environmental Division Sydney
Work Order Reference
ES1712409

Telephone : + 61-2-8784 8555

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

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CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENT** ☑ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**	
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact?	Yes / No / N/A
PROJECT: FRNSW Deniliquin	**ALS QUOTE NO.:** SY-143-17 V2 GHD	Yes Ice/Frozen ice blocks present upon receipt?	Yes / No / N/A
ORDER NUMBER: 21 25583 15		Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: Nicole Rosen	**CONTACT PH:** 92397215	Other comment:	18.7
SAMPLER: Alice Walker	**SAMPLER MOBILE:** 0415952075		
COC emailed to ALS? (YES / NO)	**EDD FORMAT (or default):** EsDAT		
Email Reports to: alice.walker@ghd.com nicole.rosen@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com			

COC SEQUENCE NUMBER (Circle)

COC:	1	(2)	3	4	5	6	7
OF:	1	2	3	4	5	6	(7) 8

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Alice Walker			
DATE/TIME: 18/05/17 9:30pm	DATE/TIME: 22-5-17 13:45	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **Please hold all soil samples for six months**

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).															
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS (full suite)	ASLP with PFAS (full suite)	TOC and moisture	TCLP with PFAS (full suite)	TRH/BTEX/ PAHs	Metals (M8)		HOLD (six moths for soils)								
13	MW04_12.95-13.0	16/05/17	Soil		2								X								
14	QA01	↓	↓		↓								X								
15	WC01					X			X	X	X										
16	RB01		Water		1	X															
17	SB07_0.0-0.05	16/05/17	Soil		2	X	X	X													
18	SB07_0.5-0.55												X								
19	SB07_1.0-1.05					X	X	X					X								
20	SB07_2.1-2.15					X	X	X					X								
21	SB07_3.8-3.85												X								
22	SB07_4.95-5.0					X	X	X													
23	QA02					X	X	X													
24	SB06_0.0-0.05	↓	↓		↓	X	X	X													
					TOTAL																

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

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☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
☐MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
☐NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com
☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENT ☑ Standard TAT (List due date):	FOR LABORATORY USE ONLY: (Circle)
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? (Yes) No N/A
PROJECT: FRNSW Deniliquin	ALS QUOTE NO.: SY-143-17 V2 GHD	Free ice / frozen ice bricks present upon receipt? (Yes) No N/A
ORDER NUMBER: 21 25583 15	COC SEQUENCE NUMBER (Circle) COC: 1 2 (3) 4 5 6 7	Random Sample Temperature on Receipt: 18.7 °C
PROJECT MANAGER: Nicole Rosen CONTACT PH: 92397215	OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: Alice Walker SAMPLER MOBILE: 0415952075	RELINQUISHED BY: Alice Walker	RECEIVED BY: MGaunt
COC emailed to ALS? (YES / NO) EDD FORMAT (or default): EsDAT	DATE/TIME: 9:30pm 18/05/17	DATE/TIME: 22.5.17 13:45
Email Reports to: alice.walker@ghd.com nicole.rosen@ghd.com	RELINQUISHED BY:	RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please hold all soil samples for six months

ALS USE | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | CONTAINER INFORMATION | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS (full suite)	ASLP with PFAS (full suite)	TOC and moisture	TCLP with PFAS (full suite)	TRH/BTEX/ PAHs	Metals (M8)		HOLD (six moths for soils)								
25	SB06_0.5-0.55	16/05/17	Soil		2								X								
26	SB06_1.0-1.05	↓	↓		↓	X	X	X													
27	SB06_2.2-2.25												X								
28	SB06_3.5-3.55												X								
29	SB06_4.95-5.0	↓	↓		↓	X	X	X													
30	MW06_0.0-0.05	17/05/17	Soil		2	X	X	X													
31	MW06_0.5-0.55	↓	↓		↓								X								
32	MW06-1.0-1.05												X								
33	MW06_2.5-2.55												X								
34	MW06_3.3-3.35												X								
35	MW06_5.0_5.05												X								
36	MW06_7.5-7.55	↓	↓		↓								X								
				TOTAL																	

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

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com
☐BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
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☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENT** ☑ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**	
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: FRNSW Deniliquin	**ALS QUOTE NO.:** SY-143-17 V2 GHD	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER: 21 25583 15	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 (4) 5 6 7	Random Sample Temperature on Receipt:	18.7 °C
PROJECT MANAGER: Nicole Rosen **CONTACT PH:** 92397215	OF: 1 2 3 4 5 6 7	Other comment:	

SAMPLER: Alice Walker **SAMPLER MOBILE:** 0415952075	**RELINQUISHED BY:** Alice Walker	**RECEIVED BY:**	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO) **EDD FORMAT (or default):** EsDAT	DATE/TIME: 18/05/17 9:30pm	DATE/TIME: 22-5-17 13:45	DATE/TIME:
Email Reports to: alice.walker@ghd.com nicole.rosen@ghd.com			
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please hold all soil samples for six months

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).															
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS (full suite)	ASLP with PFAS (full suite)	TOC and moisture	TCLP with PFAS (full suite)	TRH/BTEX/ PAHs	Metals (M8)		HOLD (six moths for soils)								
37	MW06_8.1-8.15	17/05/17	soil		2								X								
38	MW06_9.8-9.85												X								
39	MW06_11.45-11.5												X								
40	MW06_12.8-12.85					X	X	X													
41	WC02					X			X	X	X										
42	QA03					X	X	X													
43	MW06_12.95-13.0					X	X	X													
44	RBQ1	16/05/17	water		4	X															
45	RB02	17/05/17	water		1	X															
46	WC03	17/05/17	soil		2	X			X	X	X										
47	MW05_0.0-0.15	17/05/17	soil		2	X	X	X													
48	MW05_0.95_0.55	17/05/17	soil		2								X								
					TOTAL																

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

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENT** ☑ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**	
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: FRNSW Deniliquin	**ALS QUOTE NO.:** SY-143-17 V2 GHD	Freeze / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER: 21 25583 15	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 (5) 6 7	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: Nicole Rosen **CONTACT PH:** 92397215	OF: 1 2 3 4 5 6 (7)	Other comment:	18.7
SAMPLER: Alice Walker **SAMPLER MOBILE:** 0415952075	**RELINQUISHED BY:** Alice Walker	**RECEIVED BY:** M Gaved	**RELINQUISHED BY:**
COC emailed to ALS? (YES / NO) **EDD FORMAT (or default):** EsDAT	DATE/TIME: 18/05/17 9:30pm	DATE/TIME: 22-5-17 12:45	DATE/TIME:
Email Reports to: alice.walker@ghd.com nicole.rosen@ghd.com			**RECEIVED BY:**
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com			DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **Please hold all soil samples for six months**

ALS USE | **SAMPLE DETAILS** MATRIX: SOLID (S) WATER (W) | **CONTAINER INFORMATION** | **ANALYSIS REQUIRED including SUITES** (NB. Suite Codes must be listed to attract suite price). Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS (full suite)	ASLP with PFAS (full suite)	TOC and moisture	TCLP with PFAS (full suite)	TRH/BTEX/ PAHs	Metals (M8)		HOLD (six moths for soils)								
49	MW05_1.0-1.05	17/05/17	Soil		2								X								
50	MW05_2.5-2.55	↓	↓		↓								X								
51	MW05_4.0-4.05												X								
52	MW05_5.4_5.45												X								
53	MW05_7.6-7.65												X								
54	MW05_9.6-9.65												X								
55	MW05_11.0-11.1				↓	X	X	X													
56	QA04	↓	↓		↓	X	X	X													
57	SS02	18/05/17	Soil		2	X	X	X													
58	SSQA01	↓	↓		↓	X	X	X													
59	SS01					X	X	X													
60	SS14	↓	↓		↓	X	X	X													
					TOTAL																

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

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD Pty Ltd	TURNAROUND REQUIREMENT ☐ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes / No / N/A
PROJECT: FRNSW Deniliquin	ALS QUOTE NO.: SY-143-17 V2 GHD	Free ice / frozen ice bricks present upon receipt?	Yes / No / N/A
ORDER NUMBER: 21 25583 15	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:	1.8 °C
PROJECT MANAGER: Nicole Rosen CONTACT PH: 92397215	OF: 1 2 3 4 5 6 7 8	Other comment:	
SAMPLER: Alice Walker SAMPLER MOBILE: 0415952075	RELINQUISHED BY: Alice Walker	RECEIVED BY: M Goud	RELINQUISHED BY:
COC emailed to ALS? (YES / NO) EDD FORMAT (or default): EsDAT	DATE/TIME: 18/05/17 9:30pm	DATE/TIME: 22-5-17 13:45	DATE/TIME:
Email Reports to: alice.walker@ghd.com nicole.rosen@ghd.com			RECEIVED BY:
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com			DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **Please hold all soil samples for six months**

ALS USE | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | CONTAINER INFORMATION | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price). Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS (full suite)	ASLP with PFAS (full suite)	TOC and moisture	TCLP with PFAS (full suite)	TRH/BTEX/ PAHs	Metals (M8)		HOLD (six moths for soils)								
61	SS05	18/05/17	soil		2	X	X	X													
62	SS03					X	X	X													
63	SS06					X	X	X													
64	SS07					X	X	X													
65	SS08					X	X	X													
66	SS15					X	X	X													
67	SS04					X	X	X													
68	SS09					X	X	X													
69	SS10					X	X	X													
70	SS11					X	X	X													
71	SS12					X	X	X													
72	SSQA02					X	X	X													
				TOTAL																	

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

CHAIN OF CUSTODY

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CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENT** ☑ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes / No / N/A
PROJECT: FRNSW Deniliquin	**ALS QUOTE NO.:** SY-143-17 V2 GHD	Free Ice / Frozen Ice Bricks present upon receipt? Yes / No / N/A
ORDER NUMBER: 21 25583 15	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: 18.7 °C
PROJECT MANAGER: Nicole Rosen **CONTACT PH:** 92397215	OF: 1 2 3 4 5 6 7	Other comments: melted ice
SAMPLER: Alice Walker **SAMPLER MOBILE:** 0415952075	**RELINQUISHED BY:** Alice Walker	**RECEIVED BY:**
COC emailed to ALS? (YES / NO) **EDD FORMAT (or default):** EsDAT	DATE/TIME: 18/05/17 9:30pm	DATE/TIME: 22-5-17 13:45
Email Reports to: alice.walker@ghd.com nicole.rosen@ghd.com	**RELINQUISHED BY:**	**RECEIVED BY:**
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please hold all soil samples for six months

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).																	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS (full suite)	ASLP with PFAS (full suite)	TOC and moisture	TCLP with PFAS (full suite)	TRH/BTEX/ PAHs	Metals (M8)	Suspended solids (high level)	HOLD (six moths for soils)										
73	SS13	18/05/17	soil		2	X	X	X															
74	SS16	↓	↓		2	X	X	X															
75	SS17				1	X	X	moisture only							no glass jar								
76	SS18	↓	↓		1	X	X	moisture only							no glass jar								
77	SW03	18/05/17	water		2	X						X											
78	SWQA01	↓	↓		↓	X						X											
79	SW04					X						X											
80	SW02					X						X											
81	SW06					X						X											
82	SW08					X						X											
83	SW10					X						X											
84	SW11	↓	↓		↓	X						X											
					TOTAL																		

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V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

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CLIENT: GHD Pty Ltd	**TURNAROUND REQUIREMENT** ☑ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes / No / N/A (melted)
PROJECT: FRNSW Deniliquin	**ALS QUOTE NO.:** SY-143-17 V2 GHD	Free ice / frozen ice bricks present upon receipt? (Yes) / No / N/A
ORDER NUMBER: 21 25583 15	**COC SEQUENCE NUMBER (Circle)** COC: (1) 2 3 4 5 6 7	Random Sample Temperature on Receipt: 18.3 °C
PROJECT MANAGER: Nicole Rosen **CONTACT PH:** 92397215	OF: (8) 2 3 4 5 6 7	Other comments:
SAMPLER: Alice Walker **SAMPLER MOBILE:** 0415952075	**RELINQUISHED BY:** Alice Walker	**RECEIVED BY:**
COC emailed to ALS? (YES / NO) **EDD FORMAT (or default):** EsDAT	DATE/TIME: 18/05/17 9:30pm	DATE/TIME: 22.5.17 13:45
Email Reports to: alice.walker@ghd.com nicole.rosen@ghd.com	**RELINQUISHED BY:**	**RECEIVED BY:**
Email Invoice to (will default to PM if no other addresses are listed): nicole.rosen@ghd.com	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please hold all soil samples for six months

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).																			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	PFAS (full suite)	ASLP with PFAS (full suite)	TOC and moisture	TCLP with PFAS (full suite)	TRH/BTEX/ PAHs	Metals (M8)	suspended solids (high level)	HOLD (six moths for soils)												
85	SWQA02	18/05/17	water		2	X						X													
86	TRIP BLANK		soil		1	X																			
87	TRIP BLANK		soil		1	X																			
88	TRIP BLANK		water		2	X																			
				TOTAL																					

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

Appendix F – Assessment of data quality

Quality Assurance and Quality Control Report

Data Quality Indicators

Data generated during this investigation must be appropriate to allow decisions to be made with confidence. Specific limits for this investigation have been adopted in accordance with guidance from the AS4482.1 which includes appropriate indicators of data quality (data quality indicators [DQIs] used to assess QA/QC, and GHD's Standard Field Operating Procedures).

To assess the usability of the data prior to making decisions, the data is assessed against pre-determined DQIs. The DQIs including precision, accuracy, representativeness, comparability and completeness, will be reviewed at the completion of the investigation works to assess for the presence of decision errors.

The pre-determined DQIs established for the investigation are discussed below and shown in Table 1.

- Precision - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percentage Difference (RPD) of duplicate samples.
- Accuracy - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this investigation is a measure of the closeness of the analytical results obtained by a method to the 'true' (or standard) value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- Representativeness - expresses the degree to which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- Comparability - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- Completeness - is defined as the percentage of measurements made which are judged to be valid measurements.

Table 1 Summary of quality assurance / quality control criteria for groundwater

Data quality indicator	Frequency	Data quality acceptance criteria
Precision		
Inter/ intra duplicates	1 / 10 samples	<30-50% RPD
Accuracy		
Surrogate spikes Laboratory control samples Matrix spikes	All organic samples 1 per lab batch 1 per lab batch	70-130% <LOR 70-130%
Representativeness		

Data quality indicator	Frequency	Data quality acceptance criteria
Sampling appropriate for media and analytes	All samples	-
Samples extracted and analysed within holding times	All samples	Organics (7-14 days) Inorganics (6 months) Some exceptions to these holding times are listed below ([1])
LORs appropriate and consistent	All samples	All samples
Comparability		
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples
Completeness		
Sample description and COCs completed and appropriate	All Samples	All Samples
Appropriate documentation	All Samples	All Samples
Satisfactory frequency and result for QA/QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Acronyms COC: Chain of Custody LOR: Limit of Reporting QA/QC: Quality assurance / quality control		

[1] Holding times with exception to the above include:

If any of the DQIs are not met, further investigation will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data.

Field quality assurance and quality control

The quality assurance/quality control (QA/QC) procedures are based on NSW EPA *Guidelines for the Site Auditor Scheme* (2006) and AS 4482.1 – 2005 and AS 4482.2 – 1999.

QA involves all the actions, procedures, checks and decisions undertaken to ensure the representativeness and integrity of samples and accuracy and reliability of analytical results (NEPC 2013). QC involves protocols to monitor and measure the effectiveness of QA procedures.

All fieldwork was conducted with reference to the Australian Standards AS 4482.1 – 2005 and AS 4482.2 – 1999 and GHD's Standard Field Operating Procedures which ensure all samples are collected by a set of uniform and systematic methods, as required by GHD's QA system. Key requirements of these procedures are listed below:

- Decontamination procedures – including washing and rinsing of re-useable equipment, the use of new disposable gloves and sampling tubing between each sampling location and the use of sampling containers provided by the laboratory.
- Sample identification procedures - samples were immediately transferred to sample containers of appropriate composition and preservation for the required laboratory analysis. All sample containers were clearly labelled with a sample number, job number,

and sample date. The sample containers were then transferred to a chilled insulated container for sample preservation prior to and during shipment to the analytical laboratory.

- Chain of custody information requirements - a chain of custody form was completed and forwarded to the testing laboratory with the samples.
- Inter and intra duplicate and sample frequency.
- Calibration was undertaken by the rental supplier and certificates are provided in Appendix C
- Field instrument field checks were undertaken on the equipment:
  - Interface probe: A daily equipment check was undertaken to ensure that the equipment worked correctly when immersed in water.
  - Low flow pump: The low flow sampling equipment was provided by the equipment supplier in good working condition. The equipment was inspected by GHD at the start of each day to ensure that all parts of the equipment were in good working order. Purge volumes were recorded on the groundwater sampling field sheets for each site.

Sampling and analysis quality control

The QC samples collected during the investigation are described below.

- Intra laboratory duplicate: Intra duplicates are used to identify the variation in the analyte concentration between samples from the same sampling point and the repeatability of the laboratory's analysis.

Table 2 Quality control (QC) sampling frequency

Sample	Recommended sampling rate	Media	No. QC samples	No. of primary samples	Total
Intra	1/10 samples	Soil and sediment	5	30	35
Intra	1/10 samples	Groundwater and surface water	3	14	17

All quality control sampling frequency criteria were met during this investigation.

Relative percentage difference calculations

Relative percentage difference (RPD) calculations are used to assess how closely primary and inter/intra duplicate sample results match. RPDs are a quantitative measure of the accuracy of the analytical results and are calculated in accordance with the procedure described in *AS 4482.1 – 2005* (Standards Australia 2005). According to *AS 4482.1 – 2005* typical RPDs are expected to range between 30% and 50%; however, this may be higher for organics and for low concentrations of analytes. GHD adopts 30% for inorganics and 50% for organics as the general assessment criteria.

Where a result is below the laboratory limit of reporting (LOR) for one of the paired samples, the concentration assigned to that sample is the LOR. Where both results are reported below laboratory LOR the RPD is not calculated.

The QC samples analysed during the groundwater investigation are listed in Table 3, along with any RPD exceedances.

Table 3 Analysed quality control (QC) samples

Primary sample	QC sample field ID	Matrix	RPD exceedances	
			Analyte	RPD (%)
SB07_0.0-0.05	QA02	Soil	None	
MW06_0.0-0.05	QA03	Soil	None	
MW05_11.0-11.1	QA04	Soil	None	
SS02	SSQA01	Sediment	PFHxS and PFOS (Sum of Total) - Lab Calc	63
			Perfluorobutane sulfonic acid	127
			Perfluoropentanoic acid	105
			Perfluorooctanoic acid (PFOA)	56
			Perfluorodecanoic acid	72
			Perfluoroheptanoic acid	56
			Perfluorohexanoic acid (PFHxA)	70
			Perfluorooctane sulfonic acid (PFOS)	64
			PFAS (Sum of Total)	51
			PFAS (Sum of Total)(WA DER List)	55
			Leached Perfluoropentanoic acid	55
SS12	SSQA02	Sediment	None	
MW05	FD01	Ground water	None	
SW03	SWQA01	Surface water	None	
SW11	SWQA02	Surface water	None	

Laboratory quality assurance / quality control

Laboratory methods used by the primary laboratory were suitable for environmental contaminant analysis and are based on established internationally recognised procedures such as those published by the United States Environmental Protection Agency (US EPA), American Public Health Association (APHA), AS and National Environment Protection (Assessment of Site Contamination) Measure (NEPM).

The individual testing laboratory conducted an assessment of the laboratory QC program however the results were also independently reviewed and assessed internally by GHD. Recovery targets below are defined in the ALS QA/QC section of the certificates of analysis reports. All laboratory QA/QC results are documented with the laboratory certificates of analysis in the appendices of the relevant site report.

Laboratory quality control procedures

Laboratory QC samples incorporated in the analytical process include:

Laboratory blind duplicate samples

A laboratory blind duplicate provides data on the analytical precision and reproducibility of the analytical result. The laboratory blind duplicate is created by sub sampling from one of the primary samples submitted for analysis. Laboratory blind duplicates are analysed at a rate

equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch.

The permitted ranges for the RPD of laboratory blind duplicates are dependent on the magnitude of the results in comparison to the level of reporting as shown in Table 4.

Table 4 Permitted laboratory blind duplicate relative percentage difference (RPD) ranges

Magnitude of result	Permitted RPD range
< 10 x limit of reporting (LOR)	No limits
10 – 20 x LOR	0% - 50%
> 20 x LOR	0% - 30%

Matrix spike recoveries

Matrix spike sample analysis is the analysis of one or more replicate portions of samples from the batch, after fortifying the additional portion(s) with known quantities of the analyte(s) of interest. The percentage recovery of target analyte(s) from matrix spike samples is used to determine the bias of the method in the specific sample matrix. Recoveries must lie between 70% and 130%.

Laboratory control sample

The laboratory control sample (LCS) analysis of either a reference material or a control matrix fortified with analytes representative of the analyte class. The purpose of LCS is to monitor method precision and accuracy independent of the sample matrix. Typically, the percentage recovery of the LCS is compared to the dynamic recovery limit based on the statistical analysis of the processed LCS analysis. The ALS acceptance criteria, indicates recoveries must lie between 70% and 130%.

Surrogate spike recoveries

Surrogate Spikes provide a means of checking that no gross errors have occurred during any stage of the analytical method leading to significant analyte loss. Surrogate recoveries are similar to the analyte of interest in terms of chemical composition, extractability, and chromatographic conditions (retention time), but which are not normally found in environmental samples. Surrogate compounds are spiked into blanks, standards and samples submitted for organic analyses by gas-chromatographic techniques prior to sample extraction. Recoveries must lie between 50% and 150% for all analytes.

Method blank samples

Method or analysis blank sample analysis is the analysis of a sample that is as free as possible of the analytes of interest, but has been prepared the same manner as the samples under investigation. The analysis is to ascertain if laboratory reagent, glassware and other laboratory consumables contribute to the observed concentration of analytes in the process batch. If below the maximum acceptable method blank (20% of the practical quantification limit), the contribution is subtracted from the gross analytical signal for each analysis before calculating the sample analyte concentration. The method blank should return analyte concentrations as ‘not detected’.

The individual testing laboratory conducted an assessment of the laboratory QC program internally. However, the results were also independently reviewed and assessed by GHD.

Laboratory quality control results

Laboratory RPDs, matrix spike, LCSs and method blanks were within the ALS acceptable ranges with the exceptions listed in Table 5. No method blank, duplicate outliers, laboratory control outliers or surrogate recovery outliers were reported for either soils or water samples. Quality control sample frequency was achieved in both laboratory reports.

Table 5 Summary of laboratory outliers

Laboratory report	Quality Control Sample	Analytes	Sample Code	Results	Comment
ES1712409	Matrix Spike	Perfluoroalkyl Sulfonic Acids	ES1712409—001 ES1712409--059	not determined	MS recovery not determined, background level greater than or equal to 4x spike level

Sample holding times

All samples were analysed within holding time.

Evaluation of DQI

To minimise the potential for decision errors, the sampling and analysis program completed at the site by GHD has been evaluated with consideration of the Data Quality Indicators (DQIs) described in Section 3, namely representativeness, completeness, comparability, precision and accuracy.

- Data representativeness: The sampling methodology ensured all environmental samples were collected by a set of uniform and systematic methods. Laboratory and field QA/QC procedures were carried out to ensure data representativeness. All samples were provided to the laboratory with adequate preservation and in compliant containers as stated in the laboratory sample receipt documentation. Consequently, data representativeness is considered to have been satisfied.
- Completeness: It is considered that the field QA/QC procedures carried out such as blind duplicate collection frequencies and the analytes tested provide completeness in terms of the required number of field duplicate samples. Laboratory QA/QC sample analysis is considered sufficient to provide a complete overview of QA/QC procedures.
- Precision: Field blind duplicate results reported the majority of RPDs below the adopted criterion (30% for inorganics and 50% for organics). GHD therefore considers that laboratory results are acceptable for interpretation in this report.
- Accuracy: Environmental sampling procedures ensured that collection, preservation and laboratory analytical techniques are appropriate for analysis of environmental contaminants.
- Comparability: All field work was conducted with reference to the Australian Standards, which ensured all environmental samples were collected by a set of uniform and systematic methods, as required by GHD's QA system. GHD considers that the laboratory data are of a suitable quality for assessing the environmental status of the site.

The overall review of the QC results from the primary and secondary laboratories indicates that the current analytical data are of an acceptable quality upon which to draw meaningful conclusions regarding impacts at the site as part of this investigation.

Appendix G – Waste disposal

NSW Environment Protection Authority - Online Waste Tracking System

TRANSPORT CERTIFICATE - No. 2T00805648

Created by : Rizqa Frieslaar 23-Jun-2017 10:16 am **Status:** Processed

CA no: 2C00132076 **CA start date:**01-Jun-2017 **CA end date:** 31-Dec-2017

PART 1 (this part to be completed by consignor at pickup)

CONSIGNOR

FIRE AND RESCUE NSW - DENILIIQUIN
MACKNIGHT DRIVE
DENILIIQUIN, NSW 2710

Role: Producer
Contact: BILL MUIRHEAD **Email:** N/A
Phone: 0408 271915 **Fax:** N/A **Emergency:** 0408 271915
ABN: 12 593 473 110 **ANZSIC code:** 0 **Licence no.:** N/A

Pickup details: As above

WASTE

Waste code: J120 - Waste oil/hydrocarbons mixtures/emulsions in water
Description: Oil/hydrocarbon mixed with water nos
Form: Liquid **Liquid waste levy applies:** Yes
Proposed treatment: Storage **Classification:** Liquid
Contaminants: N/A
Dangerous goods class: N/A **Subsidiary risk class:** N/A **UN no.:** N/A
Packaging type: N/A **Packing group no:** N/A **No. package:** N/A

PICKUP

Pick-up date: 24-Jun-2017 **Intended delivery date:** 24-Jun-2017 **Waste amount at pick up:** 27.00 kg (required - Yes)

PART 2 - TRANSPORTER (this part to be completed by the transporter at pickup)

ENVIRONMENTAL TREATMENT SOLUTIONS (TRANSPORTER)
7 PEMBURY ROAD
MINTO, NSW 2566

Contact: JOCK GERMANY **Email:** jock@envirotreat.com.au
Phone: (02) 9603 3666 **Fax :** (02) 8078 0197 **Transit state:** NSW
Licence no.: 13157 **Vehicle reg:** TBA **Transport type:** Road

PART 3 - RECEIVING FACILITY (this part to be completed by the receiving facility)

ENVIRONMENTAL TREATMENT SOLUTIONS PTY LTD - BLAYNEY
79 MARSHALLS LANE
BLAYNEY, NSW 2799

Contact: JOCK GERMANY **Email:** jock@envirotreat.com.au
Phone: (02) 4631 2405 **Fax:** (02) 8078 0197
Licence no.: 13230

Receiving facility ref no.: N/A
Arrival date: 24-Jun-2017 **Waste amt at arrival:** 27.00 kg **Did paper TC accompany load?** Yes
Acceptance date: 24-Jun-2017
Processing date: 24-Jun-2017 **Processing treatment:** Storage

NOTE

NOTE: The Protection of the Environment Operations (Waste) Regulation 2014 ("the Regulation") requires that an approved transport certificate accompany certain wastes when transported into, out of or within NSW. This transport certificate is in the approved form and meets the requirements of the Regulation provided that:

(a) the consignor certifies, by signing this certificate, that the information in Part 1 of the certificate is correct;
(b) the transporter certifies, by signing the certificate, that the information in Part 2 of the certificate is correct; and
(c) the receiving facility (receiver) certifies, by signing this certificate, that the information in Part 3 of the certificate is correct; and
(d) the receiving facility records any discrepancies between the waste received and the information recorded on this certificate in the EPA online waste tracking system.

If any of the information in Parts 1 and 2 of the certificate is not correct and it is not practical at the time to change the information in the EPA online tracking system and print a new version of the certificate, the consignor or transporter must write and initial any corrections on the certificate. The receiving facility must ensure these corrections are entered into the EPA online system as soon as is practicable afterwards.

The receiving facility must retain this certificate for four years.

NSW Environment Protection Authority - Online Waste Tracking System

TRANSPORT CERTIFICATE - No. 2T00805651

Created by : Rizqa Frieslaar 23-Jun-2017 10:24 am **Status:** Processed

CA no: 2C00132078 **CA start date:**01-Jun-2017 **CA end date:** 31-Dec-2017

PART 1 (this part to be completed by consignor at pickup)

CONSIGNOR

FIRE AND RESCUE NSW - DENILIIQUIN
MACKNIGHT DRIVE
DENILIIQUIN, NSW 2710

Role: Producer
Contact: BILL MUIRHEAD **Email:** N/A
Phone: 0408 271915 **Fax:** N/A **Emergency:** 0408 271915
ABN: 12 593 473 110 **ANZSIC code:** 0 **Licence no.:** N/A

Pickup details: As above

WASTE

Waste code: N100 - Containers & drums cnt controlled waste residues
Description: Drums cnt waste which must be tracked
Form: Solid **Liquid waste levy applies:** No
Proposed treatment: Storage **Classification:** Hazardous
Contaminants: N/A
Dangerous goods class: N/A **Subsidiary risk class:** N/A **UN no.:** N/A
Packaging type: N/A **Packing group no:** N/A **No. package:** N/A

PICKUP

Pick-up date: 24-Jun-2017 **Intended delivery date:** 24-Jun-2017 **Waste amount at pick up:** 6.00 Drums (required - Yes)

PART 2 - TRANSPORTER (this part to be completed by the transporter at pickup)

ENVIRONMENTAL TREATMENT SOLUTIONS (TRANSPORTER)
7 PEMBURY ROAD
MINTO, NSW 2566

Contact: JOCK GERMANY **Email:** jock@envirotreat.com.au
Phone: (02) 9603 3666 **Fax :** (02) 8078 0197 **Transit state:** NSW
Licence no.: 13157 **Vehicle reg:** TBA **Transport type:** Road

PART 3 - RECEIVING FACILITY (this part to be completed by the receiving facility)

ENVIRONMENTAL TREATMENT SOLUTIONS PTY LTD - BLAYNEY
79 MARSHALLS LANE
BLAYNEY, NSW 2799

Contact: JOCK GERMANY **Email:** jock@envirotreat.com.au
Phone: (02) 4631 2405 **Fax:** (02) 8078 0197
Licence no.: 13230

Receiving facility ref no.: N/A
Arrival date: 24-Jun-2017 **Waste amt at arrival:** 6.00 Drums **Did paper TC accompany load?** Yes
Acceptance date: 24-Jun-2017
Processing date: 24-Jun-2017 **Processing treatment:** Storage

NOTE

NOTE: The Protection of the Environment Operations (Waste) Regulation 2014 ("the Regulation") requires that an approved transport certificate accompany certain wastes when transported into, out of or within NSW. This transport certificate is in the approved form and meets the requirements of the Regulation provided that:

(a) the consignor certifies, by signing this certificate, that the information in Part 1 of the certificate is correct;
(b) the transporter certifies, by signing the certificate, that the information in Part 2 of the certificate is correct; and
(c) the receiving facility (receiver) certifies, by signing this certificate, that the information in Part 3 of the certificate is correct; and
(d) the receiving facility records any discrepancies between the waste received and the information recorded on this certificate in the EPA online waste tracking system.

If any of the information in Parts 1 and 2 of the certificate is not correct and it is not practical at the time to change the information in the EPA online tracking system and print a new version of the certificate, the consignor or transporter must write and initial any corrections on the certificate. The receiving facility must ensure these corrections are entered into the EPA online system as soon as is practicable afterwards.

The receiving facility must retain this certificate for four years.

NSW Environment Protection Authority - Online Waste Tracking System

TRANSPORT CERTIFICATE - No. 2T00805652

Created by : Rizqa Frieslaar 23-Jun-2017 10:26 am **Status:** Processed

CA no: 2C00132079 **CA start date:**01-Jun-2017 **CA end date:** 31-Dec-2017

PART 1 (this part to be completed by consignor at pickup)

CONSIGNOR

FIRE AND RESCUE NSW - DENILIIQUIN
MACKNIGHT DRIVE
DENILIIQUIN, NSW 2710

Role: Producer
Contact: BILL MUIRHEAD **Email:** N/A
Phone: 0408 271915 **Fax:** N/A **Emergency:** 0408 271915
ABN: 12 593 473 110 **ANZSIC code:** 0 **Licence no.:** N/A

Pickup details: As above

WASTE

Waste code: N120 - Soils contaminated with a controlled waste
Description: Contaminated soil
Form: Solid **Liquid waste levy applies:** No
Proposed treatment: Storage **Classification:** Hazardous
Contaminants: N/A
Dangerous goods class: N/A **Subsidiary risk class:** N/A **UN no.:** N/A
Packaging type: N/A **Packing group no:** N/A **No. package:** N/A

PICKUP

Pick-up date: 24-Jun-2017 **Intended delivery date:** 24-Jun-2017 **Waste amount at pick up:** 1,811.00 kg (required - Yes)

PART 2 - TRANSPORTER (this part to be completed by the transporter at pickup)

ENVIRONMENTAL TREATMENT SOLUTIONS (TRANSPORTER)
7 PEMBURY ROAD
MINTO, NSW 2566

Contact: JOCK GERMANY **Email:** jock@envirotreat.com.au
Phone: (02) 9603 3666 **Fax :** (02) 8078 0197 **Transit state:** NSW
Licence no.: 13157 **Vehicle reg:** TBA **Transport type:** Road

PART 3 - RECEIVING FACILITY (this part to be completed by the receiving facility)

ENVIRONMENTAL TREATMENT SOLUTIONS PTY LTD - BLAYNEY
79 MARSHALLS LANE
BLAYNEY, NSW 2799

Contact: JOCK GERMANY **Email:** jock@envirotreat.com.au
Phone: (02) 4631 2405 **Fax:** (02) 8078 0197
Licence no.: 13230

Receiving facility ref no.: N/A
Arrival date: 24-Jun-2017 **Waste amt at arrival:** 1,811.00 kg **Did paper TC accompany load?** Yes
Acceptance date: 24-Jun-2017
Processing date: 24-Jun-2017 **Processing treatment:** Storage

NOTE

NOTE: The Protection of the Environment Operations (Waste) Regulation 2014 ("the Regulation") requires that an approved transport certificate accompany certain wastes when transported into, out of or within NSW. This transport certificate is in the approved form and meets the requirements of the Regulation provided that:

(a) the consignor certifies, by signing this certificate, that the information in Part 1 of the certificate is correct;
(b) the transporter certifies, by signing the certificate, that the information in Part 2 of the certificate is correct; and
(c) the receiving facility (receiver) certifies, by signing this certificate, that the information in Part 3 of the certificate is correct; and
(d) the receiving facility records any discrepancies between the waste received and the information recorded on this certificate in the EPA online waste tracking system.

If any of the information in Parts 1 and 2 of the certificate is not correct and it is not practical at the time to change the information in the EPA online tracking system and print a new version of the certificate, the consignor or transporter must write and initial any corrections on the certificate. The receiving facility must ensure these corrections are entered into the EPA online system as soon as is practicable afterwards.

The receiving facility must retain this certificate for four years.

Appendix H – Survey Results

rmk group pty ltd - T/A rmk engineering surveyors
address: 2/21 Lindon Crt Tullamarine, 3043
postal: p.o box 182 keilor victoria, 3036
tel: 03 9310 5865 or 03 9310 5875 - fax: 03 9310 5920

CLIENT: GHD
CONTACT: Alice Walker
SITE: NSW Fire and Rescue - Macknight Drv Deniliquin
DATUM: MGA/AHD
SURVEYOR: R.Kuzman

First Surveyed: 22/02/2017
Last Surveyed: 1/06/2017

Well	Easting	Northing	TOC Level	Cover/Ground Level
MW01	313820.797	6063782.963	93.688	93.770
MW02	313742.547	6063752.260	92.682	92.780
MW03	313776.952	6063695.994	92.810	92.890
MW04	313877.448	6063747.346	93.515	92.800
MW05	313887.106	6063683.160	93.757	93.060
MW06	314044.765	6063784.894	93.668	93.070
TBM Tie - In				
PM25244	314112.427	6063596.025	94.268	

Regards,

Rob Kuzman
mob: 0417 390 878

Appendix I – Photo log

FRNSW - Deniliquin Site Photographs

Photograph 1: Shallow drain on-site extending from the former AFFF use area towards a deeper drain

Photograph 2: Deep drainage channel on-site, extending onto the airport (south-east)

Photograph 3: Facing north-west, unlined drainage channel from the site bending sharply to the west and following MacKnight Drive. The site is shown in the background.

Photograph 4: Facing east, unlined drainage channel connected to the site detatching from MacKnight Drive and bending to the north (sample location SS05)

FRNSW - Deniliquin Site Photographs

Photograph 5: Facing north, overflow drainage line from the dam (sample location SS07/SW03), showing it extending to the Deniliquin Freighter property.

Photograph 6: Starting point of the eastern drainage line, believed to be the former drainage path from the site, showing an underground pipe as the starting point.

Photograph 7: Sample location SW06/ SS10, facing south, showing the eastern drainage channel and the Deniliquin Airport in the background.

Photograph 8: Facing south-west adjacent to the Cobb Highway as the drainage line bend to flow parallel with the Highway (showing sample location SW08/SS12).

FRNSW - Deniliquin Site Photographs

Photograph 9: Facing north, showing the new culvert underneath Cobb Highway (sample location SW09/SS13), with Saleyard Road in the background

Photograph 10: Facing north, showing the new newly constructed dam and the culvert. No connection was observed between the drainage line and the dam.

Appendix J – Water use survey report

Fire and Rescue NSW

PFAS Environmental Investigations Report
Water Use Survey Report - Deniliquin

October 2017

Table of contents

Appendices

1. Introduction

1.1 Background

Fire & Rescue NSW has conducted a preliminary investigation into the presence of per- and poly-fluoroalkyl substances (PFAS) on, and in the vicinity of, the FRNSW's Deniliquin training site.

This investigation is part of a review of a number of FRNSW sites across NSW where legacy firefighting foams containing PFAS have been stored, used and disposed of. PFAS are emerging contaminants, which means that their ecological and/or human health effects are unclear. FRNSW is investigating to better understand the nature and extent of PFAS across its sites and assess potential risks to human health or ecology, including the identification of pathways through which people may be exposed to these chemicals.

GHD was engaged to undertake this preliminary environmental investigation, commencing in June 2016 and reaching completion in February 2017. These works included a community engagement component, where GHD consulted with property owners to understand water use within the investigation area. This involved the distribution of fact sheets, and the hosting of meetings and information sessions. A *water use survey* was also distributed to a sample set of landowners within the Deniliquin area.

1.2 Purpose

The purpose of this report is to summarise the results from a water use survey that was distributed to a number of landowners in the Deniliquin area. This survey was conducted to obtain information from local Deniliquin landowners about water use at their properties, particularly in relation to household water use. The results detailed in this report intend to assist FRNSW in developing appropriate PFAS management strategies for the local area.

1.3 Methodology

The chosen survey method was a five page paper based questionnaire developed to acquire both qualitative and quantitative responses to 22 questions. The survey was targeted to a number of properties in the Deniliquin area. The survey boundary was developed based on advice from the Environmental Protection Authority (EPA) and was posted to properties that are located on the down gradient of the FRNSW training facility. The survey pack delivered to local residents included a cover letter, fact sheet, survey and a postage paid return envelope to assist response.

This report is based on 4 questionnaire responses received from a mail out that was sent to 13 property owners and residents over a period of three weeks. Residents were also encouraged to complete the survey during meetings with the EPA, and during a community information session held at The Fire and Rescue Training Centre on Tuesday 23rd May. The survey was also available online at: http://www.fire.nsw.gov.au/page.php?id=9176

A blank copy of the water use survey, the cover letter, and the fact sheet is attached to this report in Appendix A.

2. Summary of Key Findings

Four survey responses were received, providing the following findings into water use on properties in Deniliquin:

- All of the properties that responded to the survey identified as Industrial/Commercial Agricultural
- All of the properties identified use town water as their primary water source
- No properties indicated they have a bore on their property, or that they had ever used bore water
- No properties indicated they have a dam on their property, or that they have ever used surface or dam water
- No respondents indicated that they have used local creeks for recreational purposes.

3. Conclusion

The results of this water use survey is designed to assist FRNSW build its understanding of the way the locals use water in the area, both currently and historically. Despite the recognised value of the data collected so far, FRNSW requires a larger response rate in order to capture a more representative understanding of water use habits in the Deniliquin area in proximity of the FRNSW training facility.

All respondents who undertook this survey used town water as their dominant water source, with no respondents identifying any historical use of bore, surface or dam water on the property.

This water use survey is a valuable tool to understanding historical and present day water use for properties in the Deniliquin area. Ultimately, the effectiveness of these environmental investigations is, to some extent, reliant upon local knowledge and understanding of historical use of water, and water sources. This will in turn allow FRNSW to most effectively understand the presence and extent of PFAS in in the Deniliquin area, and contribute to the development of mitigation measures.

As such, should the environmental investigations show elevated levels of PFAS in the study catchment area this Water Use Survey will need to be intensified to ensure a representative number of residents are surveyed to inform recommendations for ongoing domestic water use for those residents who may be exposed to pathways of potentially contaminated water sources.

Appendices

Appendix A - (Water Use Survey)

NSW GOVERNMENT | Fire & Rescue NSW

Fire & Rescue NSW – PFAS Environmental Investigation Project - Water Use Survey – April 2017

Fire & Rescue NSW (FRNSW) is undertaking an environmental investigation and assessment of soil, groundwater and surface water surrounding some of FRNSW's training sites.

This water use survey is designed to help FRNSW to better understand how members of the community in the field investigation area might be using bore water. This will assist FRNSW in recommending appropriate management strategies until FRNSW understands any potential offsite impacts of PFAS in the groundwater.

We have prepared this short survey to obtain information from your household water use. We encourage you to complete the survey and submit it to us via:

Email: pfasinvestigation@fire.nsw.gov.au

By Post (in enclosed envelope):
Fire &Rescue NSW - PFAS Environmental Investigation (Sally Langley); Locked Mail Bag 12, Greenacre NSW 2190

If you have any questions at all, please contact us on **1800 316 663**
or visit our project website where there is more information about this investigation available www.fire.nsw.gov.au/pfas

Name	
Phone number	
Email	
Postal address	
Property address *(the subject of this survey)*	

This information is being collected to inform FRNSW's investigation of, and response to, the potential groundwater contamination in the area adjacent to FRNSW training sites. The collection of this information is voluntary. If you choose not to provide this information, FRNSW will find it difficult to take into account your specific circumstances.

Fire & Rescue NSW

The information you provide may be shared with FRNSW's technical advisors, relevant government agencies and organisations, and business entities directly involved in the response to the potential groundwater contamination. This information will not be made publicly available.

1. How would you classify the use of your property that is in the vicinity of the FRNSW training facility?

- ◯ Private residential
- ◯ Industrial / Commercial Agricultural
- ◯ Horticultural
- ◯ Other (please specify) _____

2. How is water supplied to your property?

- ◯ Town water
- ◯ Rain water
- ◯ Bore water

3. If you have a bore on your property is it active/do you use it? *(If you don't have an active bore or use bore water at all please go to question 14).*

- ◯ Yes, I do have an active bore on the property
- ◯ No I do not use the bore, but I have used in the past.
  (*Please provide the year it was last active if you know it*) _____
- ◯ No, I have never used the bore

4. If you answered yes to question 3, how many bores do you have on your property (in working condition).

- ◯ 1
- ◯ 2
- ◯ Please specify: _____

5. Are these bores licensed / registered?

- ◯ Yes
- ◯ No
- ◯ Unsure

6. What volume of water are you permitted to extract under your licence?

- ◯ Please specify: _____
- ◯ Unsure

7. What activities do you currently use bore water for on your property?

Fire & Rescue NSW

- ◯ Domestic (home) use
- ◯ Crop irrigation
- ◯ Cattle, stock, horse watering
- ◯ Vegetable watering
- ◯ Fruit tree watering
- ◯ Swimming pools
- ◯ Other. *Please specify*: _____

8. If you use or have used the bore water in your home please select the use/s?

- ◯ Drinking
- ◯ Other household (*please circle use*). Cooking, swimming, showering, washing, gardening, domestic animal washing/feeding.

Other use not listed _____ *(please specify.)*

- ◯ Flushing toilets only.

9. How long have you been using bore water for the purpose(s) noted above?

_____

10. If you use bore water for crop irrigation, please specify the type of crops irrigated and the approximate area irrigated

_____

11. If you use bore water for cattle / stock / horse watering, please specify the type and approximate number of stock on your property.

_____

12. If you use bore water for watering of vegetables / fruit trees, please specify the type of vegetables / fruit trees.

_____

13. Do you consume any of the following produce that is grown on your property and water using bore water?

- ◯ Chicken meat
- ◯ Eggs
- ◯ Other meat. *Please specify*: _____
- ◯ Milk
- ◯ Fruit
- ◯ Vegetables

Other produce not listed. *Please specify*: _____

14. What activities do you currently use surface or dam water for on your property?

Fire & Rescue NSW

- ◯ Domestic (home) use
- ◯ Crop irrigation
- ◯ Cattle, stock, horse watering
- ◯ Vegetable watering
- ◯ Fruit tree watering
- ◯ Swimming pools
- ◯ Other. *Please specify*: _____

15. If you use or have used the surface or dam water in your home please select the use/s?

- ◯ Drinking
- ◯ Other household (*please circle use*). Cooking, swimming, showering, washing, gardening, domestic animal washing/feeding.

Other use not listed _____ *(please specify.)*

- ◯ Flushing toilets only.

16. How long have you been using surface or dam water for the purpose(s) noted above?

_____

17. If you use surface or dam water for crop irrigation, please specify the type of crops irrigated and the approximate area irrigated

_____

18. If you use surface or dam water for cattle / stock / horse watering, please specify the type and approximate number of stock on your property.

_____

19. If you use surface or dam water for watering of vegetables / fruit trees, please specify the type of vegetables / fruit trees.

_____

20. Do you consume any of the following produce that is grown on your property and water using surface or dam water?

- ◯ Chicken meat
- ◯ Eggs
- ◯ Other meat. *Please specify*: _____
- ◯ Milk
- ◯ Fruit
- ◯ Vegetables

Other produce not listed. *Please specify*: _____

Fire & Rescue NSW

21. Do you or any of your family use local creeks for recreational purposes?

◯ Yes *(please specify the activity)* swimming, fishing, yabbying etc.

_____

◯ No

22. Please provide any additional comments about your water use.

_____

_____

_____

Thank you for completing this survey.

GHD

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Document10

Document Status

Revision	Author	Reviewer		Approved for Issue		
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